From:	Vannorman, Tim
To:	Keisha Sedlacek
Subject:	non-detriment findings for Zimbabwe and Zambia
Date:	Friday, October 27, 2017 2:40:54 PM
Attachments:	Zimbabwe Lion NDF_Enhancement Finding_Final.pdf DNPW doc - Tab2.pdf

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Keisha,

Here are the findings you requested.

Tim

--
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ENHANCEMENT AND NON DETRIMENT FINDINGS FOR AFRICAN LION SPORT HUNTING IN ZAMBIA



MAY, 2016

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1.0 Introduction

Zambia's policy on conservation is based on sustainable utilization as a way to enhance the economic and ecological importance of biodiversity. In this regard, lion has an important role not only as an apex terrestrial carnivore in the Zambian ecosystem but, also as a potential provider of economic benefits to the people of Zambia especially those living in rural communities. Zambia realizes the threats that the species is facing, and therefore the need of having strategies, programmes and plans on lion conservation. In this vein, the Zambian government through the then Zambia Wildlife Authority (now Department of National Parks and Wildlife - DNPW) formulated a lion conservation strategy (2010) and more recently has produced guidelines on hunting of lion in Zambia, which are included in this document. Importantly, the Zambian government in the recent past has promulgated a suspension of, inter alia, lion trophy hunting from 2013 to 2015, but the suspension was lifted in 2016 after data collection on Zambia's lion population showed that a limited offtake is sustainable and impacted rural communities requested that the suspension be lifted due the detrimental impact on their livelihoods and increased human-livestock-lion conflict without hunting revenues.

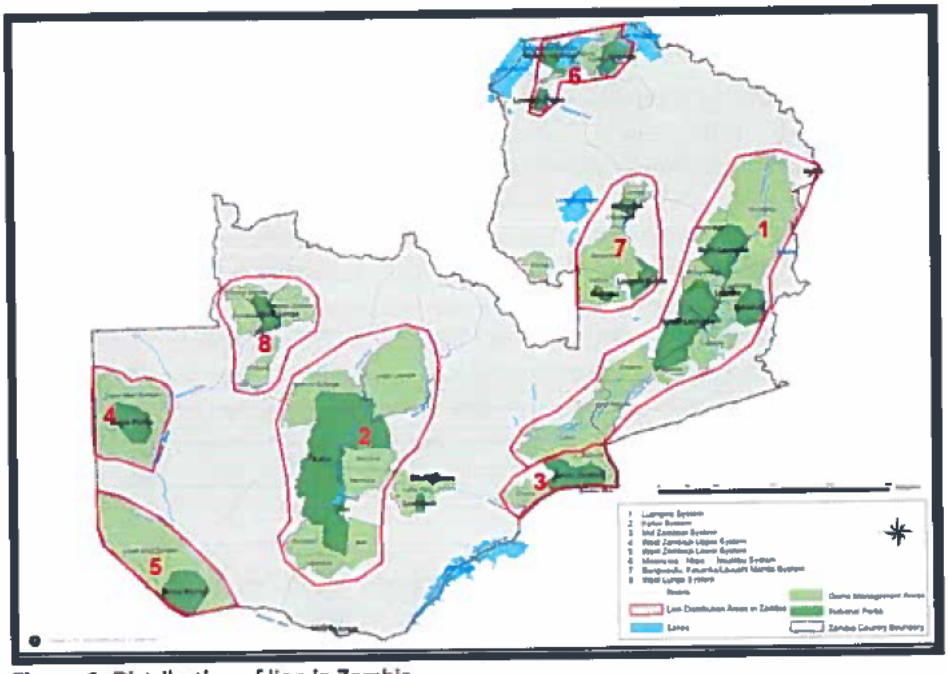
In 2015, major legal reforms occurred in the wildlife sector with the review of the Zambia Wildlife Act No. 12 of 1998. The reforms give new impetus to the structure of wildlife conservation in the country. To strengthen the lion management programme, DNPW needs additional resources to reinvest into lion research, protection and conservation. Sustainable utilization, in the form of highly selective and well-monitored sport hunting, can provide the needed revenues to achieve these goals. The proceeds from lion sport hunting are re-invested into conservation and sustainable development in local communities. In this way, sustainable sport-hunting of lions provides direct benefits to both conservation of Zambia's wild lion populations and the people living with the lions in their areas thereby promoting conservation ethics at the national and local level.

2.0 Biological status

2.1 Distribution

There are three main clusters of lion populations in Zambia; Kafue, Luangwa and Lower Zambezi ecosystems, the latter two of which share connectivity through the intervening game management areas. The historical distribution of lion prior to the 1960s is recorded as occurring throughout Zambia (Ansell, 1978), although this very general statement is likely to be reflective of historic habitat porosity, low human density and popular perceptions as opposed to being documented through systematic surveys. Current distribution of the species is restricted to National parks and the surrounding game management areas with a few lion sightings and dispersers reported each year in open areas. In addition to stronghold populations in the three main clusters, smaller numbers of lions exist in Liuwa Plains, Sioma Ngwezi, Nsumbu and the Lavushi Manda National Parks. The Kazungula and Siavonga Open Areas have vagrant populations shared with other countries. Historically, lions occurred in the West Lunga complex, although no recent sightings have been reported from that area. In contrast, lions have been documented in the Bangweulu Swamp area in recent years (Fig 1). The Lower Zambezi Population is the only significant population that is likely to be transboundary, although lions are known to move between countries in the Kavango Zambezi Transfrontier Park (KAZA).

The total lion range in Zambia is about 145,000 km^2. This represents about a 63 % of Zambia's protected area network (230,000 km^2).



1,2,3*

Figure 1. Distribution of lion in Zambia

2.2 Population status

Low density, broad and clumped distribution, largely nocturnal activity pattern, and the difficulty of observing lions in areas outside of those heavily visited by photo-tourists, makes the precise inventory of lion populations a difficult task (Schaller, 1972). These difficulties may be overcome in areas where lions are habituated to humans, but represent significant hurdles in areas where lions are heavily affected by human persecution such that they may lead to gross underestimates (Bauer & Van Der Merwe, 2004).

Previous lion estimates for the country have typically relied on expert opinion e.g., Chardonnet, 2002; Bauer and Van Der Merwe, 2004; Riggio, 2011; Riggio et al., 2013. Bauer and Van Der Merwe, 2004 gave a total national estimate of 1,500 lions, without breaking it down into component ecosystem populations. Table 1, presents the estimated lion populations according to Chardonnet, (2002) and Riggio (2011). There are subtle differences in the estimates between the two in that areas looked at differed in terms of area size. For example, whereas Chardonnet, 2002 estimated lion population for Nsumbu National Park, Riggio, 2011 included Lusenga Plains National Park in their estimate.

Table 1. Previous lion population estimates for Zambia

Protected Area	2002	2011
Nsumbu Complex	39	<50
Bangweulu		<50
Luangwa Ecosystem	1,633	
Petauke Corridor	165	425 - 835
Lower Zambezi NP and Kariba shore	183	
Kafue Ecosystem	1026	250 - 500
West Lunga	153	153
LPNP, SNNP & West Zambezi GMA	376	
LPNP		3
SNNP		<50

Source: Chardonnet, 2002 and Riggio, 2011.

Due to varying estimates, the Zambia Wildlife Authority (now DNPW) in collaboration with partners instituted intensive monitoring studies in the Luangwa and Kafue ecosystems specifically aimed at estimating the status of the lion populations in these key ecosystems. The sections below give a summary of the results in each of the core lion areas.

2.2.1 Luangwa Ecosystem

The Luangwa ecosystem can be divided into two parts; the Upper Luangwa consisting of South Luangwa, North Luangwa, Lukusuzi, Nyika, and Luambe National Parks with the surrounding Musalangu, Lupande, Munyamadzi, Mukungule and Sandwe Game Management Areas. The other area is what is considered as the Corridor Area consisting of West Petauke, Chisomo and Luano GMAs with the surrounding Open Areas. The Luangwa is considered as the most important lion cluster in the country (ZAWA, 2009). The density of lion in this ecosystem is likely affected by the topography, with the valley section having more prey density than the plateau and escarpment sections.

Yamazaki 1996, studied lions in a 355 km^2 of the Luangwa Valley the Nsefu sector in SLNP and part of the Lumimba and Lupande Game Management Areas. He studied 63 lions in 6 prides. He reported population densities ranging from 12.4 – 13.8 lions /100km^2. He found that the status of the male lion population in the study area was affected by high harvest rate.

A more recent field based study (Rosenblatt et al 2014) found for a portion of (2775km^2 study area) South Luangwa NP, a minimum density of 3.4 lion/100km^2 and a maximum density of 8.83 lion /100km^2. The IUCN Red List Assessment (Bauer et al 2015) for lion report in Table 3 of the Supporting Information a decline of 28% in the Luangwa population Such Table 3 caption is the following: *Inferred Lion population trend based on interpolated census data from 1993-2014 in 47 monitored Lion subpopulations (note that these are study subpopulations not necessarily representing total site subpopulation).* In fact, the data shown above is only for a small portion of the South Luangwa NP and not for the whole ecosystem.

In reality the Rosenblatt et al., 2014 study referenced above report an initial population estimate in 2008 of 102 (95%CL 90 - 123) lions and a final population estimate in 2012 of 94 lions (95%CL 92 - 106) a 9.21% decline i.e., about a 2% decline per year (2008-2012) and not a 28% decline as suggested and inferred by the IUCN data. A published rebuttal to the IUCN data and to a subsequent publication by Bauer et al. (2015b) that relied on the IUCN data, points out several errors in data analyses and draws a very different conclusion to claims of continent-wide species decline. (Riggio et al. 2015)

The Zambian Carnivore Programme has continued with field studies in the same study area of Rosenblatt 2014, to analyse, inter alia, lion demography in the area. In 2013, ZCP reported preliminary lion numbers were high. This was based on intensive monitoring of 13 prides and 13 coalitions collectively comprising 141 individuals, with 3 adjacent prides of 20 animals each and a number of new male coalitions (ZCP, 2014). This implies that the study population together with pride in adjacent areas was at least 200 lions. In 2014, ZCP indicated it was monitoring 15 prides and 13 coalitions, with a total of 166 individual lions identified and re-sighted. Partial data for the 2015 research season indicate that the study area now supports 15 coalitions in addition to the 15 prides, with improved cub survival and female and adult survival (Becker & Mweetwa, 2015).

The 2013 and 2014 numbers are based on observed numbers in the field and have not taken into consideration effort and detection to vigorously estimate the population size for the study area. But indicators are that the moratorium on hunting has stabilized prides in the study area and improved cub survival and number of male coalitions. No intensive research has been conducted in the corridor area, but, plans for surveys based on animal call-ins are planned for later in 2016.

Based on the current data, the lion population in this area is considered to be stable and potentially increasing.

2.2.2 Kafue Ecosystem

The Kafue National Park and surrounding Game Management Areas cover an area of approximately 66,000km^2. The earliest intensive studies on lion in the Kafue ecosystem were carried out between 2003 and 2005 by Ron and Anne Carlson (Becker et al., 2012). Since then a number of studies have been initiated to determine abundance and vital rates (Midlane et al., 2014, 2015 and ZCP, 2014).

The study by Anne and Ron Carlson covered an area of 4,720km^2 in northern Kafue National Park bordering the Lunga Luswishi and Kasonso Busanga GMAs (Becker et al., 2012). Population data was collected from 107 individually identified animals in 13 prides and 4 coalitions. The density of lion ranged between 1.5 adults/100km^2 and 1.8 lions/100km^2. The study population age structure was 21% cubs, 11% sub-adults, and 68% adults. The adult sex ratio was 3 females to 1 male. Mean pride size ranged from 2 to 7 adult females. Adult males comprised 17% of the observed population.

Midlane et al., 2015 estimated 228 lions (95 % CI 179 – 277) and 264 (95 % CI 204 – 325) for an 11,000 km^2 study area in northern Kafue. Estimated population density was 2.08 lions/100 km^2 in 2010 (95 % CI 1.63–2.53) and 2.41/100 km^2 (95 % CI 1.86–2.96) in 2011. Midlane et al's 2015 density of lion was higher than the estimated density by Becker et al, 2012. However, differences in methods and categorization of age classes preclude comparison.

In 2013, ZAWA (now DNPW) in collaboration with ZCP initiated intensive monitoring study of lions in northern Kafue covering the same intensive study area of Midlane et al's 2015 study, to monitor not only monitor abundance and trends, but to also estimate vital rates for this population. At the close of the 2014 season, there were 56 uniquely identified lions in 9 collared prides and 6 male coalitions, with several other unknown adults nomadic through the area (ZCP, 2014). Building on Carlson's and Midlane's studies the ZCP study represents a long term effort to provide demographic vital rates for this population of lions.

It is believed based on the Midlane data and other reports that the lion population in this ecosystem is stable.

2.2.3 Lower Zambezi Ecosystem

The third significant lion cluster in Zambia is represented by the Lower Zambezi system, composed of the Lower Zambezi NP, and the Chiawa and Rufunsa GMAs. This system is linked to the Luangwa ecosystem through Luano, West Petauke, and Chisomo GMAs and the Open Game ranches in the open areas east of the Luangwa River.

Chardonnet 2002, estimated the Lower Zambezi National Park and Kariba Shore area (9140 km^2) lion population at 183 lions (range 128-238). Riggio et al., 2012 estimate for the area included areas in Zimbabwe, thus cannot be included. Intensive studies undertaken for the periods 2001 – 2003 and 2006 – 2009 estimated for a 695 km^2 section of the Lower Zambezi National Park a density ranging from 1.7 lion/100km^2 to 5.2 lion 100/km^2 and 2.2 lions/100km^2 to 5.2 lions /100km^2. The study population ranged from 11 to 34 adults lions (Leigh, 2005). The population consisted of 4–37% cubs, 0–28% sub-adults, 7–46% adult males, and 31–50% adult females. Becker's study from 2012 was the last intensive lion study of the Lower Zambezi National Park. However routine monitoring through scout patrols as for all other Parks in Zambia continues in the area. This routine monitoring indicates the population in this area is recovering.

2.3 Genetic Variability

The Zambia Lion Project (ZLP) conducted an analysis of DNA sequence diversity of Zambian lion from samples collected during the period 2004 – 2012 (Curry et al., 2015). The study revealed genes that link Southern African with East African lion populations among the Zambian lion population. This suggests that Zambia may serve as a bridge connecting these lion populations. Overall gene diversity throughout the Zambian lion population was 0.7319 +/- 0.0174 with eight haplotypes found; three haplotypes previously described and the remaining five novel. These five genes, have only been reported in Zambia so far. Genetic diversity of Zambian lions is much higher than comparable areas in eastern and southern Africa were genetic diversity has been studied (Curry et al., 2015). The conclusion from this study is that Zambian lions represent a genetically diverse and healthy population. The new taxonomy proposed by IUCN citing the work of Bertola et al., (2016), used by the USFWS but not yet by CITES probably merit further discussions.

3.0 Conservation and Management

3.1 Legislation

In 2015, the Zambia Wildlife Act No. 12 of 1998 was repealed and replaced with the Zambia Act No. 14 of 2015 (Annex 1). The wildlife Act of 2015 provided for the transformation of the Zambia Wildlife Authority into a government department - the Department of National Parks and Wildlife (DNPW). The act is the principal legislation guiding the management of wildlife in Zambia, and the department is the only

government department responsible for the management of wildlife (lions inclusive) in Zambia. The Act also provides for the promotion of opportunities for the equitable and sustainable use of public wildlife estates; provides for the establishment, control and co-management of Community Partnership Parks for the conservation and restoration of ecological structures for non-consumptive forms of recreation and environmental education; provides for the sustainable use of wildlife and the effective management of the wildlife habitat in Game Management Areas; enhances the benefits of Game Management Areas to local communities and wildlife; involves local communities in the management of Game Management Areas; and provides for the development and implementation of management plans. Crucially to ensure the sustainability of the wildlife sector, the Act provides for the setting up of a Wildlife Fund, were funds from licensing and donors will be deposited.

The act provides for stiffer penalties related to poaching and enforcing all wildlife related violations in Zambia. Hunting of all wild animals without a permit is illegal. Further, it is a criminal offence to hunt, kill, capture or be in possession of a lion specimen without a license. Lion is considered a protected species under the Zambia Wildlife Act and therefore attracts stiffer penalties without option of a fine. Other legislation includes the regulations (Private Wildlife Estates) and Statutory Instruments already in force implementing the 1998 Act (These are CITES, Hunting, Elephant Hunting).

Other statutory instruments are in preparation for the implementation of the 2015 Wildlife Act including a specific statutory instrument on lion hunting.

This revision simplifies the system while continuing to generate much-needed revenue for DNPW.

3.2 Comparison in the provisions of the Zambia Wildlife Act No. 12 of 1998 and the Zambia Wildlife Act No. 14 of 2015 with particular reference to Hunting, Licenses, and the Wildlife Fund.

3.2.1 Classes of licences

Under the Zambia Wildlife Act no.12 of 1998, section 33 of the Act provided for the following classes of licences; (a) non-resident hunting licence; (b) resident hunting licence; (c) bird licence; (d) professional hunter's licence; (e) apprentice professional hunter's licence; (f) professional guide's licence; (g) apprentice professional guide's licence; (h) special licence; (i) photographic tour operator's licence; (j) hunting outfitter's licence; (k) restricted professional hunter's licence; and (l) commercial photographic licence.

The new Act on the other provides for the following types of licences *(a)* hunting licence; *(b)* bird licence; and *(c)* professional hunter's licence. The new Act has substantially reduced the number of licences that can be issued and has gone a step further and classified some of the old licences to permits. Section 39 makes provision for the issuance of the following permits *(a)* fishing permit; *(b)* capture permit; *(c)* professional guide's permit; *(d)* photographic tour operator's permit; and *(e)* commercial photographic permit. The new Act has done away with Resident and Non Resident licences. However, these activities will be undertaken under a hunting license issued to national and *bonafide* residents of hunting areas. The special licence has been replaced with a capture permit.

3.2.1.1 Procedure for obtaining a licence

Under the Zambia Wildlife Act No.12 of 1998, section 5(i) of the Act provided for the Authority to issue licenses and permits under, however, under the Zambia Wildlife Act No. 14 of 2015, section 7 establishes

the Wildlife Management Licensing Committee which shall be responsible for; considering applications for licenses, permits and certificates and grant, renewing or refusing to grant or renew licenses, permits and certificates; and terminating, suspending or revoking licenses, permits and certificates. The application for the licenses recognised under the Act is in a prescribed form requires payment of a prescribed fee under a specific Regulation. The creation of a Licensing Committee ensures transparency and accountability in the award of licenses by ensuring the discretion to award licenses exists in more than one individual.

3.2.2 The Wildlife Fund

Paragraph 22 of the first schedule under part II regulation 22 of the Zambia Wildlife Act No. 12 of 1998, provided for the funding of the Zambia Wildlife Authority which consisted of moneys (a) appropriated by Parliament, (b) paid to the Authority by way of fees, levies, grants or donations, and (c) vested or accrued to the Authority. The Authority was responsible for the funding the performance of its functions, salaries, allowance and other expenses it incurred. The Zambia Wildlife Act No 14 of 2015 in, section 109 establishes the Wildlife Development Fund for purposes of development of research, conservation and management. Whereas in the repealed Act the Authority was responsible for the disbursement of funds, under the provisions of the current Act, the Minister responsible for wildlife manages and administers the Fund through the Fund Committee. The DNPW is in the process of preparing a Statutory Instrument on the Wildlife Development Fund. The Department is liaising with the Ministry of Finance on the mechanism for sharing revenue with local communities. Currently there are regulations namely Statutory Instrument No. 89 of 2004, which provides that the Department pays into a fund established by a Community Resource Board 50% of the total revenue earned from Animals fees and 20% of concession fees from that particular GMA.

3.3 Supporting Statutory Instruments (SIs)

A number of statutory instruments have been drafted to compliment the operation of the new Act. Some of the pertinent ones include;

a) **The Zambia Wildlife (Granting of Hunting Concessions) Regulations, 2016**

   This SI provides for the Department a clear procedure for the advertisement, evaluation, negotiation and award of Hunting Concession Agreements to successful bidders, which ensures transparency in the award of these agreements.

b) **The Zambia Wildlife (Lion Sport Hunting) Regulations, 2016**

   This SI places certain conditions for hunting of Lions in Game Management Areas, including but not limited to: age-based regulations, banning the hunting of female lions, and requiring all lion hunts to be at least 16 days.

c) **The Zambia Wildlife (Keeping of Big Cats in Captivity) Regulations 2016**

   This SI will regulate the keeping of big cats in Captivity, and the export and import of live big cats.

d) **The Zambia Wildlife (Conducting of Ecological Assessments or Research on Wildlife) Regulations, 2016**

This SI regulates ecological research on wildlife, outlines the procedure for obtaining permission to conduct such research, and sets the fees to be charged for research activities

e) **The Zambia Wildlife (Elephant Sport Hunting) Regulations, 2016**

The revised SI on Elephant Sport Hunting will provide for additional procedures to hunt elephant for sport hunting, the designated areas for sport hunting, ownership and export of ivory from elephant sport hunting. These regulations ensure elephant hunting is carefully managed and sustainable.

f) **The Zambia Wildlife (Licenses and Fees) Regulations, 2016**

This particular SI is under consideration, the Department is still using the 2007 edition for purposes of pricing and issuance of licenses. The new permit under the new Act have not yet been captured under this SI.

3.4 Zambia's Conservation Strategy and Action Plan for the African lion

Zambia developed a ten-year Conservation Strategy and Action Plan for the African lion in 2010. (Annex 2) Zambia's vision as stated in the Strategy is to have a secure, viable and well managed wild population of lion that will support conservation of biodiversity that is in harmony with human development. The Strategy's mission is to galvanize stakeholder cooperation in the conservation and management of the African lion in its natural habitats in the country thereby contributing to biodiversity conservation, socio-economic development and spiritual well-being of local communities, the general public and the country as a whole, with the ultimate goal of securing, restoring and maintaining viability and genetic diversity of lion populations.

Since the approval of the strategy and in accordance with its section 6.0 several actions have been carried out by the Zambian government and its cooperating partners to implement the relevant objectives and targets of the strategy. In particular research has been initiated, management actions taken to address research and monitoring, local community benefits, human lion conflict, land use planning and zoning and trade. Specific actions taken are described in the relevant sections below.

A voluntary program to assess and age lions taken as trophies was established by ZAWA (now DNPW) in partnership with the Zambia Lion Project (ZLP). Since 2005, this program has obtained DNA samples of lions (trophies and living) across Zambia and, from 2006-2012, obtained tooth samples to estimate age of lions taken as trophies. The establishment of trophy lion sampling protocols, and the cooperation of Zambia's hunting fraternity in participating in these studies, represent a strong base from which future sampling of trophy lion (and leopard) will be conducted. In addition, results from the past sampling demonstrate the performance of the hunting sector during the past lease period (prior to age-based selection regulations), and provide a baseline for comparing future performance. Further, new studies are continually improving the accuracy of estimating the age of wild lions, which will provide additional tools to assist authorities in trophy age enforcement.

The conservation strategy noted that monitoring of hunting and illegal offtake was problematic and information was dispersed in various units of the Zambia Wildlife Authority. To address this, ZAWA (now DNPW) in 2013 set up a Conservation Unit whose main responsibility is monitoring hunting, human wildlife conflict, private wildlife estates and the effectiveness of law enforcement. Through this unit data are flowing regularly on hunting and other activities. The Conservation Unit serves as a centralized repository for these data providing for long-term monitoring of progress and trends.

The strategy requested for proper monitoring of lion diseases and health. This has been accomplished through the veterinary unit of the DNPW which is regularly sampling lion specimens for diseases and assisting law enforcement officers in the treatment of injured lions due to illegal activities, such as snaring. In addition, the DNPW authorized ZCP, South Luangwa Conservation Society (SLCS), and Game Rangers International (GRI), three NGOs working in the Luangwa and Kafue ecosystems to employ veterinarians that are field based and help in monitoring wildlife health and removal of wire snares.

Of the twelve ecologists that were employed by DNPW since 2010, three are devoting 70 per cent of their work time to lion related issues.

In implementing the strategy, several additional lions related studies have been initiated with a number of stakeholders such as the Zambia Carnivore programme (ZCP), Kafue Lion Project, Zambia Lion Project (ZLP) and WWF – Zambia (See section 4.0)

The Strategy has recently been effectively updated through the development of new guidelines governing lion hunting in Zambia. The guidelines (see section 5.3.3.2) are now in the process of being transformed into a Statutory Instrument on lion hunting which will also include provisions for monitoring lion hunting through an age-based system. As described above, the protocol for sampling and age estimation of trophy lions is already well-established, and significant improvements have been made for estimating lion age (among others see White and Belant 2016, White et al. 2016). At a participatory workshop held on 11th April, 2016 in Lusaka, these guidelines were discussed with key stakeholders in lion conservation in Zambia in order to obtain the maximum participation which is key to the success of its implementation.

Zambia's Lion Conservation Strategy and Action Plan was devised to guide lion management and conservation in Zambia for ten years and its goals address the same issues of concern (scientific management, human-lion conflict, and protection of suitable habitat) as the U.S. Fish and Wildlife Service identified in its threatened Endangered Species Act listing of the lion. DNPW is implementing the plan adapting it to management challenges and on knowledge generated through on-going monitoring and research.

3.4.1 Other Species Conservation Plans and Strategies that interact with lion Conservation strategy

Zambia recognises that the effective conservation of wildlife is through the conservation of ecosystems and not protected areas or species. Large carnivores engage in wide ranging behaviour and depend on intact ecosystems with a wide array of prey species. Well conserved large carnivore populations are an indication of intact ecosystems. And the conservation of other species that require large, intact ecosystems can simultaneously benefit large carnivores like lion by ensuring habitat and prey base are protected.

In this regard, conservation strategies for wild dog (ZAWA, 2005), elephant (ZAWA 2005), rhino (2005), and crocodile (ZAWA, 2005) were developed, and the rhino and elephant conservation strategies are currently undergoing review with the support of WWF-Zambia and the Nature Conservancy respectively. Because of the reliance of these species on intact ecosystems, the effective conservation of these species would contribute to the successful conservation of lion as well.

In addition, the DNPW is mandated by law to develop General Management Plans (GMPs) for all protected areas to guide the development and management of these areas. GMPS are discussed in section 7.1.1 below.

The hunting concession agreements (sections 5.4) that are signed by the Hunting Concession Holder, the DNPW and the Community commit all the parties to proper management of habitat, fire and wildlife. These are key sections to the agreement among these three parties.

3.5 Enforcement

DNPW is empowered by the Zambia Wildlife Act and supporting legislation to deal with issues of poaching or illegal harvesting of wildlife. Within DPNW law enforcement is under the section of Wildlife Conservation and Management (see Figure 2).

This Section is responsible for the general enforcement of wildlife laws. It is responsible for the conservation and management of wildlife and development of infrastructure in protected areas. The section's functions are outlined below:

- Detect and investigate wildlife crimes;
- Manage and mitigate human wildlife conflicts;
- Regulate operations of private wildlife estates (nature conservancies/game ranches);
- Facilitate infrastructure development in protected areas;
- Sensitise the general public on wildlife conservation;
- Manage eco systems and landscapes and conserve specific species;
- Formulate and implement park regulations;
- Promote regional and international cooperation in the area of wildlife management, conservation and law enforcement; and
- Facilitate the training of Wildlife Police Officers

The section is headed by an Assistant Director who is assisted by Principal Warden- Operations, Principal Warden- Conservation, Principal Engineer, and Principal Natural Resources Management officer. The section is organised in four units as follows:

Wildlife Law Enforcement Unit

The Unit is responsible for enforcing wildlife laws, detection and investigation of wildlife crimes. Currently the Unit has a staff compliment of 1, 250 Wildlife Police Officers covering an estimated 236, 376 km^2 of wildlife estates. This translates into an average of 189 km^2 for each Wildlife Police Officer, which is under the recommended international standards. The government of Zambia has committed itself to employ an extra 1,450 Wildlife Police officers in the next three years, starting with 600 officers planned for employment in 2016. A considerable amount of its funding comes from safari hunting permit and concession fees (see section 9).

Wildlife Conservation Unit

The Wildlife Conservation Unit is responsible for regulation of operations of private wildlife estates, management of ecosystems, landscapes and conservation of specific species as well as formulating and implementing park regulations. The Unit also manages and mitigates human wildlife conflicts and is responsible for facilitating the training of Wildlife Police Officers.

Infrastructure Development Unit

The Unit is responsible for construction and maintenance of infrastructure in protected areas, as well as maintenance of equipment plant and machinery.

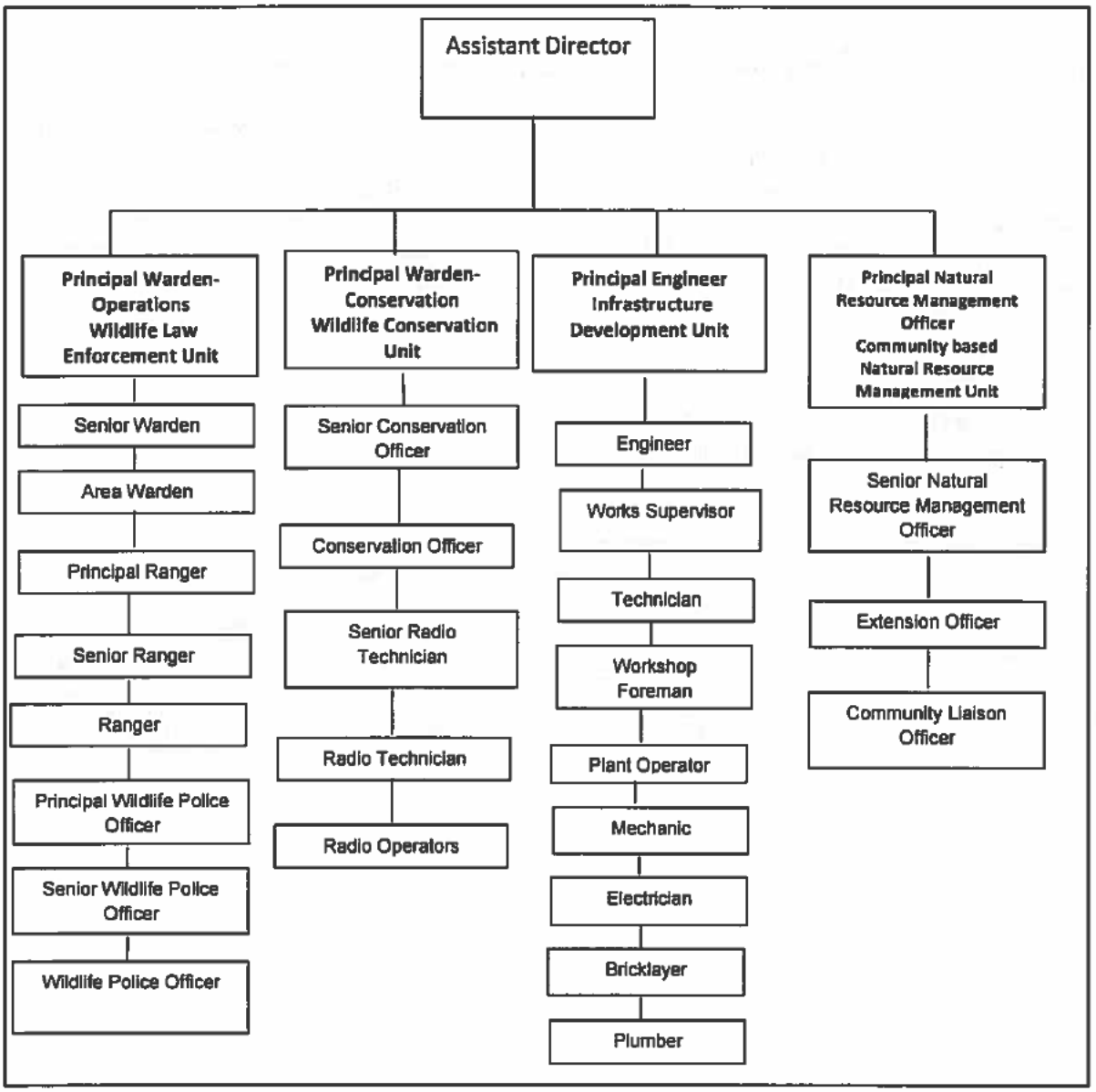


Figure 2. Organisation of the Wildlife Conservation and Management Section

Community Based Natural Resources Management Unit

The Community Based Natural Resources Management Unit is responsible for co-managing Game Management Areas with local communities and facilitating their economic and social well-being. The functions of the Unit include the following:

- Provide technical support to Community Resource Boards on the management of human and natural resources in Game Management Areas and open areas;
- Train village scouts and Community Resources Board members (see section 8);
- Facilitate the election of Village Action Groups and Community Resources Board members; and

- Monitor projects and the utilisation of funds disbursed to Community Resources Boards (CRBs).

Furthermore, an Investigations Unit is responsible for carrying out investigations and intelligence services related to wildlife crimes. The Unit is falls directly under the office of the Director National Parks.

Finally, the President of the Republic of Zambia directed the Defence and security wings in the country to join in the fight against poaching (http://zambiadailynation.com/2015/08/25/use-of-army-to-protect-wildlife-commended/; 25 August 2015; http://www.parliament.gov.zm/node/4936; parliamentary debates 10 February, 2016). In this regards, the Government has since formed a National Anti-poaching Task Force to be chaired by the Zambia Army in which all the security wings will join in the fight against illegal wildlife trade and trafficking as it is in some other African countries such as Botswana. DNPW is part of this Task Force.

3.5.1 Anti-Poaching Operations

The following tables show the effort (table 2) and results (table 3) from anti-poaching operations carried out by the Zambia Wildlife Authority in 2015.

Table 2. Zambia Law Enforcement Effort 2015

Activities	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
No. of Patrols	3,002	2,489	2,378	2,648	10,517
Patrol Days	15,334	12,913	14,350	11,752	54,349
Staff Involved	6,467	5,691	5,879	5,475	23,512
Patrol Man-days	54,468	60,485	61,486	60,589	237,028

Source: Conservation and Management DNPW

Table 3. Results from Law Enforcement Operations carried out by the Wildlife Law Enforcement Unit 2012 - 2015

s/n	Category	2012	2013	2014	2015	Total
1	Poachers Arrested	1,437	1,625	1671	1,920	6,653
2	Axes	129	196	70	218	613
3	Bicycle	269	320	144	358	1,091
4	Boats	37	9	18	11	75
5	Bush Meat Recovered (Kgs)	8,327.60	13,542.70	22831.4	29,427	74,129
6	Elephant Poached	110	135	136	168	549
7	Home Made Guns (MLG)	188	258	252	295	993
8	Home Made Shot Guns	162	75	142	283	662
9	Hunting Spears	25	80	119	118	342
10	Military Rifles	18	21	21	33	93
11	Motor Bike	5	4	12	13	34
12	Motor Vehicles	20	17	16	29	82
14	Shot Guns	156	163	134	331	784
15	Snares	5,370	8,406	9885	7,666	31,327
16	Sport Rifles	74	22	32	105	233

Source: Conservation and Management DNPW

3.6 Stakeholder Involvement in Lion Conservation

3.6.1 Hunting Outfitters

Hunting companies and professional hunters provide significant support to conservation activities throughout the hunting areas of Zambia. Section 5 provides detailed information on their involvement in anti-poaching, habitat conservation, and community development. In particular hunting operators are at the forefront in the fight against poaching in Game Management Areas through their financial and logistical support to Community Resources Boards (CRBs).

3.6.2 Communities

Community Resources Boards are responsible for wildlife management in Game Management Areas including the employment of Community Scouts who are responsible for anti-poaching operations in these areas. In section 8 we provide a detailed description of Community Based Natural Resources Management in Zambia. Communities are considered as key partners in wildlife management in Zambia

3.6.3 Non-Governmental Organizations

There are several NGOs in Zambia supporting the government in conservation activities through support to anti-poaching units. In the key lion clusters of Luangwa, Kafue and Lower Zambezi ecosystems, the Frankfurt Zoological Society (FZS) that has been active in the North Luangwa National Park for over 20 years, Conservation South Luangwa (CLS) (Formerly South Luangwa Conservation Society) in South Luangwa National Park and surrounding GMAs, Game Rangers International that has been active in the Kafue ecosystem since 2010 and Conservation Lower Zambezi (CLZ) is active in the Lower Zambezi National Park and surrounding GMAs. The aerial support that some of these NGOs provide is quite useful for locating illegal activities and monitoring animal distribution. In 2014 CLZ provided 185 hours of flying time in the Lower Zambezi National Park whilst in 2015, CSL provided over 258 hours of flying support to ZAWA in the South Luangwa National Park and surrounding GMAs (Table 2). Other NGOs providing active

support to DNPW in these areas include the Nature Conservancy (TNC) and WWF – Zambia that are active in providing support to Community Natural Resource organisations in GMAs.

Annex 3 provides the contact details for hunting associations and selected NGOs active in Zambia.

Table 4. 2015 Activities & Recoveries from Law Enforcement Operations supported by CSL in the Luangwa Ecosystem

Activities	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
Ambush Patrols	5	8	13	8	34
Day Patrols	30	21	56	58	165
Fisheries Operations	7	6	1	3	17
Forest Operations	4	4	0	3	11
Intelligence & Investigations	16	38	12	18	84
Long Patrols	35	27	25	33	120
Roadblocks	16	25	20	20	81
Short Patrols	2	3	5	4	14
Snares Recovered	43	22	72	112	249
Suspects Apprehended	13	28	24	40	105
Firearms Confiscated	3	16	15	17	51
Hours flown on Surveillance	70.1	64.4	74.5	49.6	258.6
Effective Patrol Man days	2779	1623	1686	2275	8363

Source: CSL 2015 Annual Report

4.0 Lion Surveys and Methods

Because of the difficulties in estimating lion population numbers (see section 2), long term studies are recommended. Additionally, due to questions as to the validity of point-in-time estimates of lion population size, the concept of "population trend" is becoming more widely accepted for assessing lion populations. Thus, whereas focal studies may benefit from monitoring individuals, it is recommended that long-term "trends" should be the priority for lion population monitoring moving forward. In this regard, the Department of National Parks and Wildlife in conjunction with the ZLP and ZCP has instituted long-term studies to monitor trends in key areas for lion conservation in Zambia. Methods currently available for surveying lions and have been used in Zambia include:

1. Scat (Genetics), molecular analysis[DNA] (Creel & Rosenblatt, 2013; Curry, White & Derr, 2015)
2. Spoor; spotting and recording spoor by location and differences in sizes in spoor in transects (Midlane et al., 2014 and 2015).
3. Call-ups; playing recorded lion calls or wildlife distress calls at fixed survey points (Midlane et al., 2015).
4. Mark-resight studies of individuals [Pride observations, Photo profiles, Collaring and monitoring movements] (Yamazaki, 1996; Rosenblatt et al., 2014).
5. Scout sightings, community and operator interviews [Hunting and Photographic operators] (Leigh, 2005; Becker et al., 2012)

Unlike elephants and other large herbivores where aerial surveys are used with standardized methodologies such as the MIKE standards for aerial surveys (Craig, 2012), there are no standardized methods for lions and in most cases the methods listed above are used in combination. Lions have largely

been estimated by 'guess estimates' using the above ways of observation and relating to the size of the area, and more recently by using models such as Possible Lion Occupancy (Midlane et al., 2014).

As stated in the previous sections, several research projects on lion are ongoing in Zambia. In partnership with the DNPW, the Zambia Lion Project (ZLP) initiated lion research in 2004. Research has focused on presence/absence surveys of lions throughout Zambia, and DNA has been collected from trophy and controlled lions and via biopsy darting of live animals throughout Zambia's parks and GMAs. Products of ZLP's DNA studies to date include several scientific publications describing 1) genetics of lions within Zambia's Lion Conservation Units (LCUs) (Dubach et al. 2013), 2) a perspective of Zambia's lions' genetics at the continental scale (Bertola et al., 2015), and an in-depth study that documents the genetic diversity of Zambia's lions throughout the country (Curry, White & Derr, 2015). As detailed above, ZLP in 2006 established a lion trophy monitoring program and has since worked with hunting operators and outfitters to gather data on trophy lion trophy hunting and trophy quality, specifically trophy lion age towards developing sustainable offtake. Two new scientific studies on age estimation of lions, resulting from the above described program, are now available. The first provides a method estimating age to within six month of age on average (White et al. 2016). The second describes individual variation in lion teeth and places the issue of aging lion trophies into the practical context of trophy monitoring programs (White and Belant, 2016).

The Zambia Carnivore Programme's (ZCP) current lion research efforts are focused in three areas the South Luangwa National Park, the Kafue National Park and the Liuwa Plain National Park. ZCP's seeks to document population trends and demographic vital rates of lions in these key lion areas. Products of ZCP's work include multiple publications on effects of trophy hunting in Zambia (Becker et al., 2012; Rosenblatt et al., 2014); lion abundance (Becker et al., 2012, Riggio et al., 2012, Rosenblatt et al., 2014) disease prevalence (Berestein et al., 2012 and 2013, Williams et al., 2014); effects of wire snaring (Becker et al., 2012, Watson et al., 2013) bush meat and prey depletion (Lindsey et al., 2012) habitat fragmentation, encroachment and degradation (Watson et al., 2013; Creel et al., 2013; Lindsey et al., 2014;) and policy (Creel et al., 2014).

Other lion studies have been done by independent researchers and graduate students (Carlson, 2004; Leigh, 2005; Midlane et al., 2014; 2015).

Zambia is committed to continuing and expanding further scientific surveys of Lions in order to assess the population status. Depending on the availability of funding, DNPW is planning surveys to be conducted in two areas: i) the corridor between South Luangwa National Park and Lower Zambezi National Park, comprising several GMAs and Open Game Ranches and ii) GMAs surrounding the eastern part of North Luangwa National Park. This will supplement the ongoing work of the Zambian Carnivore Programme in selected areas of South Luangwa and Kafue National Parks.

Additional genetic analyses are also being conducted by Zambia Lion Project, including assessments that will help inform DNPW in future efforts to translocate lions among different regions in Zambia in order to re-establish lion populations in historic lion range e.g., West Lunga complex.

In short, DNPW has an active research program that informs and supplements its active lion management and forms the foundation of the sport-hunting system. Overall the research capacity at DNPW needs to be further strengthened through specific research-oriented funding.

5.0 Utilization

5.1 Safari hunting in Zambia

Safari hunting in Zambia is consistent with the country's general tourism and wildlife policy. The mission of the Zambian wildlife policy is to conserve Zambia's wildlife for biodiversity and socio-economic enhancement. Sustainable utilization is the best management model to achieve the objectives of this mission outside National Parks, especially in areas where it is desirable that wilderness be maintained, and without attracting the high-human density and infrastructure typical of photographic tourism. Safari hunting is the most efficient land use in areas without species density and infrastructure because it offers high value with low impact on habitats. Large wilderness areas ensure high appreciation by clients because of the natural beauty and large variety of trophy animal species, some of them endemic to Zambia e.g., Cookson's wildebeest, black lechwe, and Kafue lechwe.

5.2 Lion hunting Areas

Lion hunting in Zambia is carried out in hunting blocks located in Game Management Areas surrounding National Parks in the Luangwa, Kafue and Lower Zambezi ecosystem and in Open Game Ranches/Conservancies (Table 3). For the period 2005 to 2012 lion hunting was carried out in 21 Game Management Areas and 5 Open Game Ranches.

5.2.1 GMAs

Game Management Areas (GMA) are a category of protected areas in Zambia designed to form buffer zones between National Parks and Open Areas. The main land use forms in GMAs has been Safari and Resident hunting. However, a few GMAs have included photographic tourism. Settlement is allowed in designated areas defined by the GMA's General Management Plan. CBNRM in Zambia is implemented in GMAs through Community Resource Boards (CRBs) provided for by the Wildlife Act of 2015 (see section 8). There are 36 Game Management Areas covering 177,404 km^2.

5.2.2 Open Game Ranches

Open Game Ranches are unfenced private wildlife estates outside public protected areas that are reserved by a person or local community for wildlife conservation and management. Game ranching in Zambia has evolved in the last ten years as one of the best conservation success stories. Started in areas that were severely depleted in terms of wildlife species and with widespread illegal activities such as poaching, illegal logging and mining, thanks to partnerships between private investors and local communities most of these areas have been rehabilitated and recolonised by wildlife including lion.

The concept of Open Game Ranches is unique in that the private sector and the community agree to protect wildlife on privately owned or communal lands. Unlike closed Game Ranches, Open Game Ranches are not fenced and the animals are free to move back and forth beyond the ranch boundary into the surrounding Game Management Areas. This avoids fragmenting habitats and blocking wildlife movement corridors. The wildlife is still considered as belonging to the state. In exchange for protecting the wildlife the Department of National Parks and Wildlife issues the Open Game Ranches annual non-resident hunting quotas. The anti-poaching efforts in these lands contribute directly to assisting the Department in protecting national parks and GMAs. In many instances the owners of the ranches have invested in these areas by restocking the areas with more game species thus improving the diversity.

Most of these Open Game Ranches, even though private sector driven have co-management agreements with local communities.

One example of an innovative partnership developing in the Open Game Ranches is Kaindu Community Game Ranch, close to Kafue National Park.

In 2002, DANIDA (Danish Aid Agency) created the Kaindu Natural Resources Trust (KNRT) and an existing farm, FARM 10415, was developed as an unfenced Game Ranch that was to be managed by the Trust for the benefit of the Kaindu community. The main objective was to create income from safari hunting since Kaindu was one of the few Kafue communities not attached to a Game Management Area (GMA) and did not benefit from any form of tourism. In 2005 this project floundered due to insufficient capacity and lack of financial resources.

In 2008 Royal Kafue Ltd., a development company, forged a direct partnership with KNRT which has 20% of the shares of the development company. As landlords, the Kaindu community is considered the investor. Farm 10415 was leased from KNRT with the objective of establishing a number of commercial models making best economic use of the property while keeping the environment sacrosanct. This agreement has the approval of the traditional leadership of Chief Kaindu, The Royal Establishment Committee, Mumbwa District Council, the District Commissioner, the Office of the President, and the then ZAWA. The enterprise has been sustained through the innovative nexus of direct ownership of land and management of wildlife and other natural resources by the local community. In 2010 Farm 10415 was registered with ZAWA as Kaindu Community Game Ranch.

The KNRT, a legal environment body representing the Kaindu people, has title to approximately 15,500 hectares of pristine wilderness and this was a tremendous advantage to the promoters as DANIDA had initiated surveys and social studies had been implemented. The location was ideally suited due to its close proximity to both Lusaka and the Kafue National Park, which is hugely advantageous. The land and soils were deemed unfit for agriculture but adjoined game rich feeder areas from the adjacent Lunga Luswishi GMA to the north and both the Mushingashi Conservancy and Kafue National Park to the west.

Unlike the first effort, this partnership has succeeded by active participation of skilled and well-resourced partners in a business enterprise, and by the community holding an equity stake as well as retaining title to the land. The Royal Kafue project was one of the first of its kind to be successfully implemented in Zambia and demonstrates an awareness of natural resources as assets. It has the potential to diminish the market for illegal wildlife products and can reverse the depletion of natural resources. So far, wildlife is recovering in the area, and the ranch has hosted several tourist safari hunters, thus generating revenue for the enterprise.

All Open Game Ranches increase the land available for wildlife conservation (lion included) and buffering the loss of wildlife habitats in the country. Example of these includes the Open Game Ranches located on the eastern banks of the Luangwa River southward of the South Luangwa NP such as Nyakolwe, Nyamvu and Munyamadzi Game Ranches. Zambia currently has 17 registered open Game ranches extending, according to official DNPW data, for over 2,500 km^2 (Table 5).

Table 5. List of Open Game Ranches in Zambia

S/n	Name	Location	Area (Ha)	Area (Sq.km)
1	Illinda Game Ranch	Kasempa	55,000	550
2	Mushingashi Game Ranch	Mumbwa	36,557	366
3	Nyakolwe Game Ranch	Sinda	24,800	248
4	Sitatunga Game Ranch	Kasempa	22,000	220
5	Mpyamanzi Conservancy	Nyimba	20,000	200
6	Munyamadzi Open Game Ranch	Nyimba	17,500	175
7	Kaindu Natural Resources Trust	Mumbwa	15,500	155
8	Musonweji Game Ranch	Mufumbwe	15,000	150
9	Chinamanama	Mpika	15,000	150
10	Nyamvu Game Ranch	Nyimba	12,000	120
11	Chipepo Royal Game Ranch	Gwembe	10,650	107
12	Nkalamu Game Ranch	Nyimba	6,000	60
13	Kanzutu Game ranch	Sandwe	3,100	31
14	Kazumba Game Ranch	Nyimba	750	8
15	Bangweulu Island	Samfya	500	5
16	Mulilanama Open Game ranch	Nyimba	350	4
17	Kalwelwa	Mwinilunga	350	4
			255,557	2,556

5.3 Hunting Quotas

5.3.1 Quota allocation process

Zambia has a participatory quota setting process. The main scientific information used in the quota setting process for most species is derived from aerial surveys which are regularly done in the country and includes many ungulate species. Other information is taken from ground counts, patrol sightings, local and expert opinion and hunting monitoring. Quota setting is done for each hunting block in GMAs for all types of hunting after close of hunting season and prior to the next hunting season.

The quota for lion is set using information from scientific studies, field observations from professional hunters, operators and field officers and from hunting records. This allows CRBs and DNPW to review the previous hunting season's offtake (see also section 5.3.3.1).

DNPW follows a bottom-up approach where CRBs submit a proposal of a quota to DNPW head office for adoption and approval. The following table illustrates the quota setting process.

Table 6. Institutions involved in Zambia's quota allocation process

Institution	Information provided by institution for quota setting	Benefits for participating in quota setting
Community Resource Boards	Provides info on: - Observed trends of illegal offtake of wildlife - Human settlement patterns - Status, availability and distribution of wildlife in the area - Resource use in the area	- In depth understanding of how quotas are set - Improved knowledge of the relationships between safari hunting and other wildlife management activities in the same area - Improved sense of ownership of the quota
Department of National Parks and Wildlife	- Provides info on: - Wildlife populations - Trends of illegal offtake - Previous year's quota utilization - Law enforcement info in relation to illegal offtake - Monitors hunting activity - Facilitates quota setting workshops	- Enabling democratic and participatory environment for reaching consensus on quotas and allocations; - All key stakeholders to participate in setting quotas, thereby improving the sense of ownership; - Provides a platform for information exchange that can be used to arrive at quotas - Final approval of quotas for GMAs
Lease holders (Operators)/Professional Hunters	- Provides information on: - Wildlife population trends; - Safari sector performance - Competitiveness of the area - Resource use - Wildlife and other conflicts in the area - First-hand input in quota setting	- Opportunity to come up with a sustainable and economical quota for safari - Opportunity to participate in the process - Opportunity to have a long-term view of the sustainability of hunting in the area
Other organizations including some NGOs	- Provide financial support to CRBs and DNPW, - Provide technical support for wildlife population estimates	- Represents the interests of the communities including quota setting - Training on quota setting, facilitate workshops and provide technical assistance on wildlife management.

The quotas are compiled by the Research Unit in DNPW after feedback from the field staff, safari hunting outfitters and CRBs. Management approves the quotas before they are distributed to operators by the Licensing Unit. Quotas are verified by the Wildlife Conservation and Management Unit. To enhance transparency and accountability, the DNPW is now required to share the approved quotas with other government agencies, which include among others the Auditors General's office and Anti-Corruption Commission. This ensures that the quotas produced cannot be altered by any person and provides the sustainability and benefits of the system.

= 68/yr

5.3.2 Lion Quotas and utilisation 2005 – 2012

Zambia issued a total of 683 lions on quota for the period 2005 to 2015 in 21 Game Management Areas and 5 Open Game Ranches (Table 4). For this period the highest number of lions issued on quota was 117 issued in 2005 and the lowest was 55 issued in 2011 (Table 4). The quotas were generally based on the levels of utilisation of the previous year's lion quotas and in some instances the quota was fixed in the concession agreements. This level of utilisation may have been locally unsustainable considering that lions like most large carnivores have low adult mortality rates (Murray et al., 2010). However, the trend during the period 2005 – 2012 was towards a low offtake quota. This was attributable to two factors: 1) a decrease in allocated quota by ZAWA (now DNPW), and 2) greater selectivity by hunters engaged in the voluntary age-based trophy selection program.

To address this concern, by 2012 the country's lion quota had been reduced by 58 per cent. Although offtake overall was decreasing through greater selectivity, the program was voluntary and a high offtake of males was still of concern in two of the Game Management Areas (Lupande and Lumimba) (Yamazaki, 1996; Rosenblatt et al., 2014).

Moreover, during this same period Zambia took measures in protecting lion populations in the Lower Zambezi and Nsumbu Complex. Following the results of studies undertaken in the Lower Zambezi (Leigh, 2005 referred to in Becker et al., 2012), the DNPW (then ZAWA) discontinued lion hunting in Chiawa Game Management Area. In the same vein due to uncertainty about the lion populations in Tondwa and Luano GMAs lion hunting was discontinued in these areas in 2006 and 2009 respectively. Thus for the Lower Zambezi ecosystem, lion hunting has only continued in Rufunsa GMA. However, for this particular GMA lion hunting was only allowed because of the high levels of human lion conflict with 10 lions killed in an effort to mitigate conflict during the period 2005 to 2016 (Refer to Section 7.2 below)

Research by Packer et al., 2011 in the Serengeti recommends lion harvest rates of 1 lion/1000 km^2 in high lion density areas and 1 lion/2000 km^2 in low density areas. This was to be in lieu of adopting a five/six-year aging approach. However, recent research seems to suggest that this may not be the case across all ecosystem, due to differences in population demographic rates (Creel et al., 2016 in review). In any case, a review of Zambia's offtake rates for the period 2005 to 2012 indicates that harvest rate of 1 lion/1000 km^2 was only exceeded in 4 of the 21 Game Management Areas in which lion hunting was conducted for the period 2005 to 2012 (Table 5). Three of these were in the Luangwa ecosystem and one in the Kafue ecosystem. For the other 17 Game Management Areas the harvest rates were far below the rate of 1 lion /1000 km^2 despite some areas being in high lion density areas. For some areas lion hunting was stopped altogether.

Harvest rates in Open Game Ranches were greater than 1 lion/1000km^2. However, Open Game Ranches are typically managed with high levels of protection and large prey bases per km^2.

Table 7. Zambia lion Allocated Quotas for the period 2005 to 2012

s/n	Hunting Area	Area (sq.km)	2005	2006	2007	2008	2009	2010	2011	2012
1	Lupande GMA	4,840	12	10	12	8	10	8	6	7
2	Lumimba GMA	4,500	14	11	14	14	10	12	7	9
3	Munyamadzi GMA	3,300	10	10	9	6	5	5	5	6
4	Mukungule GMA	2,402	3	3	3	2	1	1	1	1
5	Chisomo GMA	3,390	2	2	2	1	0	1	0	0
6	Musalangu GMA	17,350	13	12	13	13	12	12	6	9
7	Sandwe GMA	1,530	3	3	3	3	1	0	0	1
8	West Petauke GMA	4,140	6	4	4	5	5	5	4	4
9	Luano GMA	8,930	3	1	2	1	1	0	0	0
10	Chiawa GMA	2,334	2	0	0	0	0	0	0	0
11	Rufunsa GMA	3,179	2	2	2	2	1	2	1	1
12	Mumbwa GMA	3,370	7	5	6	6	4	5	4	5
13	Nkala/Bilili GMA	3,274	4	3	4	3	2	2	2	2
14	Mulobezi GMA	3,430	8	5	5	3	5	4	4	5
15	Namwala GMA	3,600	2	2	2	3	2	2	1	2
16	Kasonso Busanga GMA	7,780	4	4	3	4	3	3	3	3
17	Lunga Luswishi GMA	13,340	7	7	7	6	6	6	4	5
18	Sichifulo GMA	5,175	3	3	2	2	2	0	1	1
19	West Zambezi GMA	38,070	3	4	4	4	1	0	0	0
20	Mufunta GMA	5,104	0	0	0	0	0	0	1	1
21	Tondwa GMA	540	2	1	0	0	0	0	0	0
22	Mushingashi Game Ranch	365	2	2	3	3	2	2	2	2
23	Nyakolwe Game Ranch	248	3	0	1	3	2	2	1	2
24	Munyamadzi Game Ranch	180	2	2	2	1	1	1	1	1
25	Nyamvu Game Ranch	120	0	0	0	0	0	1	1	1
26	Kaindu Natural Resource Trust	106	0	0	0	0	0	0	0	1
	Total	**137,517**	**117**	**96**	**103**	**93**	**76**	**74**	**55**	**69**

Table 8. Lion harvest rates in Zambia 2005 – 2012 (Lions /1000 km²)

Hunting Area	Area (sq.km)	2005	2006	2007	2008	2009	2010	2011	2012
Lumimba GMA	4,500	2.22	1.33	2.89	2.89	2.00	2.00	1.11	2.00
Munyamadzi GMA	3,300	2.73	-	1.82	1.82	1.21	1.52	1.21	1.21
Lupande GMA	4,840	1.86	0.62	2.27	1.24	1.65	1.03	1.24	1.03
Musalangu GMA	17,350	0.46	0.17	0.69	0.46	0.52	0.40	0.29	0.35
Mukungule GMA	2,402	-	-	0.42	0.42	0.42	0.42	-	-
Chisomo GMA	3,390	0.59	-	-	0.29	-	-	-	-
Sandwe GMA	1,530	1.96	-	-	1.31	-	-	-	0.65
West Petauke GMA	4,140	0.48	-	-	0.48	-	0.48	0.72	0.48
Nkala/Bililí GMA	3,274	0.61	-	0.61	0.31	0.31	-	0.31	0.31
Mumbwa GMA	3,370	1.19	0.30	1.19	1.48	1.19	1.19	1.19	1.48
Mulobezi GMA	3,430	0.87	-	0.87	0.87	0.29	0.87	0.58	0.58
Lunga Luswishi GMA	13,340	0.30	0.30	0.30	0.37	0.45	0.37	0.30	0.37
Sichifulo GMA	5,175	0.19	-	-	0.19	-	-	0.19	0.19
Kasonso Busanga GMA	7,780	0.26	-	0.39	0.39	0.26	0.26	0.26	0.13
Namwala GMA	3,600	-	-	0.28	0.56	0.56	0.28	-	-
Mufunta GMA	5,104	-	-	-	-	-	-	0.20	-
Rufunsa GMA	3,179	0.31	0.31	0.31	0.31	0.31	-	0.31	0.31
Luano GMA	8,930	-	-	-	-	-	-	-	-
Chiawa GMA	2,334	0.43	-	-	-	-	-	-	-
West Zambezi GMA	38,070	-	-	0.03	0.05	-	-	-	-
Tondwa GMA	540	-	-	-	-	-	-	-	-
Kaindu GR	106	-	-	-	-	-	-	-	9.43
Nyakolwe GR	248	13.04	-	4.35	8.70	8.70	4.35	4.35	8.70
Mushingashi GR	365	2.74	2.74	5.48	8.22	2.74	-	5.48	2.74
Munyamadzi GR	180	-	5.56	11.11	5.56	5.56	5.56	5.56	-
Nyamvu GR	120	-	-	-	-	-	8.33	-	-

5.3.3 Lion Hunting Quotas and guidelines for hunting lions

5.3.3.1 Lion Hunting Quotas - 2016

In line with the procedures outlined in section 5.3.1, and with additional measures described in this section 5.3.3 and subsections, the DNPW has established a quota for 2016 of 24 lions (Table 9). This is the lowest hunting quota that the country has had in the last 10 years. The quota is much more conservative than the thresholds of 1 lion/2000km² for low density areas and 1.0 lion/1000km² for high density areas.

Zambia's lion population could sustainably handle higher offtakes, but DNPW chose to reopen hunting slowly to allow for careful monitoring and implementation of an age-based guideline for legal lion trophies.

Table 9. Lion Hunting Quota for 2016

s/n	Hunting Area	Area (sq.km)	Quota	lions / 1000 sq.km
1	Musalangu GMA	17,350	4	0.23
2	Lupande GMA	4,840	2	0.41
3	Lumimba GMA	4,500	3	0.67
4	Munyamadzi GMA	3,300	2	0.61
5	Kasonso Busanga	7,780	1	0.13
6	Mulobezi GMA	3,430	2	0.58
7	Nkala/Bilili GMA	3274	1	0.31
8	Mumbwa GMA	3,370	1	0.3
9	West Petauke GMA	3,227	1	0.31
10	Sichifulo GMA	5,175	1	0.19
11	Lunga Luswishi GMA	13,340	2	0.15
12	Rufunsa GMA	3,179	1	0.31
13	Mufunta GMA	5,104	1	0.2
14	Open Game Ranches	2,556	2	0.78
	TOTAL	**80,425**	**24**	0.3

Source: Research, DNPW

5.3.3.2 Guidelines for Hunting Lion

In reopening lion hunting in 2016 following a three-year moratorium, DNPW consulted independent lion experts to get advice and held a workshop with stakeholders in April 2016. This resulted in the formulation of guidelines on lion hunting in Zambia. The guidelines are considered as part of an adaptive process to manage lion hunting in the country and are being finalized with relevant stakeholders in a participatory manner. They will be further reviewed at the end of the 2016 hunting season taking into account the experiences from the first year of implementation.

It is possible to achieve sustainable lion hunting by using 'best practice' approaches in hunting. The guidelines include:

1. Utilisation must be based on scientific principles: use area size and lion density, population status trends and prey availability;
2. Hunted lions must be from a minimum age of 5 years.
3. Use adaptive approaches in managing lion. This may include varying quotas according to lion population status in a particular hunting area.

It is important therefore, to establish a monitoring mechanism that provides information on:

A) Indicators that show the lion trends in a particular area

1. Hunting effort - time spent to find the desirable trophy;
2. Hunting Success – was the hunted lion of desired and acceptable trophy size
3. Trophy size - Size of skull, body length, shoulder height etc.
4. Age – the average age of lawful trophies

B) The status of habitat and prey in a particular area

1. Satellite images of the area
2. Encroachment levels
3. Quantitative and Qualitative indication of prey

C) Regular collection of data on the hunted lions with prompt checking on the accuracy of information provided

1. Skull, teeth, and hide to be examined, sampled and permanently tagged
2. Provide certificates for proof of sampling and rating of trophy.

5.3.3.3 Specific lion hunting provisions

The guidelines also recommend:

1. No hunting of female lions
1. No hunting of any lion born or held in captivity;
2. No use of pre-recorded sounds in lion hunting;
3. No lion hunting on fenced game ranches;
4. Lion will only be hunted in Prime and Secondary areas and Open Game Ranches known to be rich in lion and prey.

5. Establish a central place for trophy measurements of hunted lions for exports. During the workshop held in April, 2016 Professional hunters and DNPW staff underwent training in aging lions.

5.3.3.4 Age-based Harvesting

The guidelines have categorized lions into 4 categories to facilitate age based harvesting. These categories are:

Category 1

Male lions between 5 and 6 years old and above

Category 2

Male lions above 4 years old, but below the age of 5 years old. exports allowed!

Category 3

Male lions 4 years old and below - confiscated

Category 4

Male lions of 7 years old or above

3) A person holding a Professional Hunter's licence, shall not hunt any male lion in Categories 2 and 3 and if such a person hunts a male lion in this Categories, on top of the fines prescribed in schedule I, the Department shall order the following:

   a) Where the lion hunted is of Category 2, allow the export of the trophy

   b) Where the lion hunted is of Category 3, confiscate the hunted trophy

4) Where a professional hunter's client harvests a lion in Category 4 the Director may, based on a system developed by the Department, award the concession where the harvest took place of one more lion in the quota in any of the next hunting seasons.

5) A professional Hunter shall submit a lion sighting form and a lion trophy size record form.

6) The Concessionaire or Professional Hunter or their appointed representative shall physically submit the trophy to the department for measurement, and all relevant requested data e.g., photographs, at least two months after the hunt.

7) A lion hunt shall be a minimum 16 days

Moreover, the following will be applied:

8) A lion daily conservation fee of $150.00 per hunter and $100 per observer shall be established and the revenues from this fee shall be used for monitoring purposes.

9) The Director shall establish a lion aging evaluation participatory committee composed of experts with specific competence in aging procedures for lions. This committee will also include representatives from the Professional Hunters Association, the Safari Operator Association and

the Wildlife Producers Association together with officers from the Department nominated by the Director. The committee shall meet once a year to establish the age of the hunted lions in order to allow the issuance of CITES export permits.

10) A concessionaire who feels that their area does not have enough adult lions in category 1 is free to ask the department to suspend lion hunting in their concession for a stated period of time.

11) For the 2016 hunting season no hunting concession shall have more than 1 lion on quota.

The above guidelines will be incorporated in a proper Statutory Instrument that the DNPW is at present in the process of finalizing to allow lion hunting to restart in May-June 2016.

On the whole, monitoring these guidelines and indicators allow for adaptive adjustment of lion quotas.

The new management approach to Lion hunting in Zambia is based on three pillars, i) a conservative, precautionary quota, well below one of the recommended thresholds for sustainability, ii) an age–based harvest limit and strong monitoring of lion offtakes, and iii) significant and direct community benefits. This will ensure that lion hunting in Zambia is sustainable and does not negatively affect the population. In addition, in the hunting concession agreements signed in 2015 no hunting outfitter has been guaranteed a lion on quota, it is made clear that the quota for any species shall be based on scientific methods including the latest available survey and aging techniques.

5.4 Allocation of hunting concessions

According to section 7 of the Zambia Wildlife Act No. 14 of 2015 the DNPW in consultation with the local community is mandated to grant hunting concessions to a business enterprise for the purpose of hunting in a specified hunting block. For a business enterprise to be granted a hunting concession it needs to –

- be registered in Zambia;
- have a tourism enterprise license;
- have a valid Tax Clearance Certificate;
- provide proof that the company is not bankrupt; and
- any other conditions set out by the Evaluation Committee.

The allocation of hunting concession is done in accordance with the Zambia Public Procurement Act No 12 of 2008. The procedure for granting hunting concessions is by open tender in the following manner–

- (a) **Call for bids;**

  The Department invites bids from Local and Citizen Companies by advertisement in the media for companies to submit bids for granting of safari hunting concessions.

(b) **Submission of bids by the applicants;**

Bids must be submitted in accordance with the Instructions to Bidders contained in this solicitation documents. Bids must be submitted using the **"TWO ENVELOPE SYSTEM"**. The Technical Proposal and the Financial Proposal must be placed in separate envelopes clearly marked **"Technical Proposal"** and **"Financial Proposal"** and each bearing the name of the bidder and the name of the hunting block.

(c) **Opening and evaluation of bids;**

Bids shall be opened in the presence of the bidders or their representatives who choose to attend, on the date, time and place specified in the solicitation documents. The evaluation shall be carried out by an Evaluation Committee, which shall base their evaluation on numerically weighted criteria set forth in the Wildlife Act. During the evaluation, the Committee shall examine the bidder's submissions for responsiveness to the technical and substantive requirements of this Tender offer. The Financial bid shall not be opened until the qualitative technical evaluation of each bid has been completed and scored. Only the financial bids of those bidders that are technically responsive and scoring above 80 shall be opened and the award shall be made to the bidder whose financial bid is found to be the highest amongst the technically responsive bids for each hunting block subject to it only being equal or above the Reserve Price.

(d) **Negotiation and Award of contract;**

The Department in conjunction with the Local Community after negotiations with the successful bidders negotiate on the critical areas such as community obligations law and enforcement contributions, awards the Hunting concession agreement to the Bidder whose bid has been determined to be substantially and technically responsive and scoring the highest evaluated price and has been determined to be the highest evaluated bid. Thereafter due diligence is conducted before signing the Hunting Concession Agreement.

(e) **Length of Leases**

The lease periods for the hunting blocks is variable and is dependent on the classification of the hunting block. Lease periods range from 7 to 15 years. Hunting of lions is done in Prime and Secondary hunting blocks. Classification of blocks depends on the species richness and relative abundance of species. Prime hunting areas generally have short lease periods compared to understocked hunting areas. Generally understocked areas have no lion on quota because of the low wildlife numbers in these areas, but are given a longer lease period. This is to allow the concessionaire invest more resources for the rehabilitation of the area and allow wildlife numbers to recover before they could embark on hunting.

5.4.1 Obligations of the concessionaire in the hunting concession agreement

The awarded contracts to the concessionaires of a hunting area include 4 obligations, namely

Law Enforcement: - the concessionaire is obliged to support resource protection through the employment of Community Scouts, provision of logistical support such as vehicles, fuel, patrol rations, and equipment. This obligation is performed thoroughly by the concessionaires and their professional hunters with removal of snares, assistance in the arrest of poachers, illegal loggers, encroachers, and illegal miners.

Social and Community Development: - the concessionaire is obliged to support Community development through support to community social needs such as health and education. In this regard some concessionaires have agreed to support the employment of teachers and nurses, purchase of ambulances and building classrooms, clinics and houses for teachers and health personnel so that they are resident within the communities.

In addition to Community development obligations, concessionaires are obliged to provide 50 % of the meat from hunted animals to the local community. White and Belant (2015), estimated that sport hunting provides approximately 129.8 tonnes of meat annually to rural communities,

which coincides with times of food scarcity in most of these rural communities. (See Section 6.1.3).

Infrastructure Development: - the concessionaire is obliged to support the Community in infrastructure development as agreed during the negotiations. Common infrastructure projects include boreholes, class rooms, community clinics and roads, and road maintenance and wildlife scout outposts.

Resource Monitoring and Fire Management: - the concessionaire is obliged to support resource monitoring. This is basically monitoring the status of the wildlife in their concession. This includes support to fire management, vegetation and habitat monitoring, game counts, quota setting and general support to the Community Resources Boards.

The above obligations are one of the components of the partnership in conservation of natural resources between the Communities, Safari Operators/professional hunters and the DNPW. Therefore, no hunting concession agreement is valid without the signature of the Chief/s or CRB.

The following table illustrates the annual financial obligations of operators in the allocated blocks for the duration of their respective concession agreements.

Table 10. Current Annual financial obligations of hunting concessionaires to Communities in selected Game Management Areas (In Zambian Kwacha)

GMA	Status	Community Obligation	Law Enforcement	Infrastructure Development	Resource Monitoring
Chiawa	Secondary	130,000.00	50,000.00	100,000.00	50,000.00
Kasonso Busanga	Prime	300,000.00	50,000.00	50,000.00	10,000.00
Lumimba	Prime	310,000.00	187,750.00	140,625.00	36,500.00
Lunga Luswishi	Secondary	300,000.00	165,000.00	100,000.00	55,000.00
Lupande	Prime	580,000.00	127,000.00	100,000.00	30,000.00
Mulobezi	Secondary	120,000.00	110,000.00	125,000.00	25,000.00
Mumbwa	Prime	345,000.00	90,000.00	50,000.00	50,000.00
Mukungule	Secondary	100,000.00	50,000.00	20,000.00	20,000.00
Munyamadzi	Prime	425,000.00	165,000.00	117,000.00	110,000.00
Musalangu	Prime	335,035.00	150,000.00	100,000.00	34,500.00
Nkala	Prime	200,000.00	75,000.00	25,000.00	25,000.00
Sichifulo	Secondary	120,000.00	118,000.00	60,000.00	30,000.00
West Petauke	Prime	150,000.00	90,000.00	100,000.00	27,000.00
Total		**3,415,035.00**	**1,427,750.00**	**1,087,625.00**	**503,000.00**

Source: DNPW

On top of these financial obligations the concessionaire and professional hunters provide important voluntary contributions to increase the level of protection and social development in the hunting areas. These include additional contributions to law enforcement, community development, infrastructure and resource monitoring. Examples of three companies' voluntary contributions in their blocks to communities located in the Luangwa Ecosystem are listed in Table 11.

Table 11. Contributions of Safari Companies to Wildlife Conservation, an example from the Luangwa System (2008 - 2015)

Year	Other Contributions	Permanent Employees	Casual Employees	Snares Removed	Comments
2008	64,595,000.00	42	135	2,779	• Support to Traditional Ceremony, • Support to Community Youth Group, • Donation to Secondary School, • Donated 2 Hammer mills, • Donated Land rover, • Funded awareness meeting against snaring
2009	41,500,000.00	42	137	1,894	• Support to traditional Ceremony, • 1 Hammer mill • Cement and iron sheets for community shelter, • Transport and lodging for CRB members to attend meetings
2010	60,500,000.00	42	139	1,664	• Support to Traditional Ceremonies • Sponsoring Community Members to international meeting • Settling Statutory Fees Arrears for CRB • Outboard Engine • Contribution towards Village scout training
2011	33,000,000.00	42	144	1,686	• Motor bike spares • Transport • Second land hand cruiser • Fertilizer and seed
2012	35,706,000.00	42	148	1,521	
2013	20,004,000.00	24	75	715	• Hunting Operations could not sustain contributions, • Service parts for vehicle
2014	20,000,000.00	24	75	544	• Spares for truck • Hunting operations could not sustain contributions
2015	5,000.00	12	30	401	• Supported law enforcement operations, • No hunting but met concession agreement obligations

*Data from three companies in three hunting blocks

5.4.2 Compliance to obligations of the concession agreement

The Hunting Concession Agreement has provisions specifying the mechanism of monitoring the implementation of the agreement. Mechanisms include annual evaluations at the end of the hunting season, and before the beginning of the next hunting season that involve the Department, CRBs and representatives of the concessionaire. A concession holder who does not comply with the obligations can have their concession terminated before the end of the agreement's term.

5.5 Mechanism for monitoring trophy hunting in Zambia

5.5.1 Quota monitoring

As explained in section 5.3.1 quotas are allocated to the hunting companies in a participatory process. The final quotas are issued by the licensing unit. The produced quotas are distributed to the CRBs, Hunting companies and DNPW field stations. During the hunting season wildlife officers accompany hunters on all hunts. The officer records activities related to the hunt on specified forms i.e., Safari Hunting monitoring forms, trophy measurement forms, and a client questionnaire. The officer endorses used licenses ensuring that they cannot be used again. The law requires that all harvested trophies are to be registered.

5.5.2 Lion Hunting Monitoring

Apart from the procedures described in section 5.5.1 above, the DNPW is introducing a monitoring system specific for lions. This monitoring system as explained in section 3.1 will be based on a statutory instrument which is in preparation, which will introduce a mandatory sampling system that requires trophy lions meet or exceed a minimum age as one measure for harvesting trophy lions. The monitoring system will be based on specific forms (Figures 3 and 4) that will help ensure proper compliance with the provisions of the law, including confirmation of legal licenses and collection of data associated with the hunt including but not limited to location, date, participants, and photos, as requested by DNPW. The monitoring system will be complemented by regular surveys for lions throughout the GMAs.

LION SIGHTING FORM

Game Management/Open Area: ..... Hunting Block: .....Name of recorder: .....

Sighting #	Date (dd/mm/yy)	Time	Pride Size and Structure						Pride Identity	GPS Location (in decimal degrees)		Activity	Photos (Y/N)
			# Cubs	# AM	# AF	# SAM	# SAF	Total #		Latitude	Longitude		

Clear pictures of lions indicating whisker spot patterns are required for every sighting.

AM = Male; AF = Female; SAM = Sub Adult Male; SAF = Sub Adult Female

Notes

Age estimate in the field: Mane characteristics, nose pigmentation, skin coloration, leg markings, whiskers, colour and wear of teeth (in the lab).

Activities: These may include; resting, feeding, walking, chasing/hunting etc.

Pride identity: Identity code can be any name given to a particular pride or coalition of males.

Figure 3. Example of lion sighting form to be used by Professional Hunters

TROPHY SIZE RECORD FORM

Name of Professional Hunter:	Hunting Outfitter:

DETAILS OF CLIENT

Name of client:	Nationality:

Country of Residence	
Postal Address	

GMA permit No:	Non Resident Hunting Licence No:

DETAILS OF HUNT

Name of GMA		Hunting period from to	
Name of Hunting Block			

Date Killed or wounded	Species	Sex	Killed or Wounded	Give Your Estimate of Lion Age	GPS Location		Trophy for export	
					South	East	Yes	No

DETAILS OF TROPHY MEASUREMENTS

Species	Body length (tip of nose to end of tail)	Shoulder height (Shoulder to base of paw)	Skull length	Skull width	Left canine length	Right canine length

Figure 4. Lion Trophy record form

5.6 International Trade

The African lion is included in Appendix II of the Convention on International Trade in Endangered Species of wild fauna and flora (CITES). Legal utilization of lion in Zambia occurs under sport (safari) hunting. Table 11 below gives the number of lion trophies from Zambia as recorded by CITES for the period 2008 - 2012.

Other exports recorded in Zambia include parts and derivatives such as specimens for scientific purposes, skulls, skins and live animals but in low numbers (CITES trade database). Note that due to the lag time associated with trophy preparation and export, CITES trade data may not accurately reflect offtake on a year to year basis.

Table 12. Lion trophy exports (term Trophies) from Zambia 2008 - 2012

Year	2008	2009	2010	2011	2012
Number	50	40	89	37	73

Source: CITES Trade Database

Lions are imported in Zambia as live captive bred lions for lion walks. This demand is driven by the private sector to support the growing photo tourism market in Livingstone area in Southern Zambia. Although this international trade is not related in any way to hunting it creates a conservation challenge. The lions are imported from neighbouring South Africa and Zimbabwe. Since 2008, a total of 54 lions have been imported into Zambia on condition that they will not be introduced into the wild as these are captive bred lions.

A Statutory Instrument is under preparation, which seeks to regulate the importation and captive uses of lion, leopard and cheetah in Zambia. This includes banning the holding of, breeding, commercial use (walking and petting) in captivity of all large cats other than for temporary veterinary purposes. In addition, animals currently being held in captivity in Zambia will be required to be castrated or spayed to eliminate further breeding, and all commercial uses of captive-held cats will be phased out as there is little or no value to conservation attached to these activities (Hunter et al., 2013). Particular care will be taken to avoid the "dumping" of captive-held cats into wild areas for any reason, especially for hunting or 'release' as means for the owners to avoid the penalties or costs associated with authorized disposition of their animals. By taking these steps, Zambia will ensure that it does not become a hosting for activities associated with captive-bred lions that negatively impact wild lion populations and their conservation (Williams et al., 2015).

Worldwide, there is growing concern over use of lion parts, especially in illegal trade. Unknown volumes of wild lion and lion parts are illegally utilized in Zambia. Lion parts are allegedly sought, traded and used for charms, magic and medicinal purposes. The level of illegal use of lion parts in Zambia is currently unknown, but is not considered to be significant, however impacts of trade in lion bones and other body parts is recognized as being potentially detrimental to wild lion populations.

The DNPW will be is establishing an investigation into current levels of illegal trade and use of lion parts. Identifying levels and source routes will be a first step in controlling this potential, but not actual yet, threat to Zambia's wild lion populations.

6.0 Involvement of the hunting sector in Lion Conservation

6.1 Benefits of lion hunting in Zambia

Sustainable utilization has demonstrated ecological, economic and social benefits and is a critical component of DNPW's overall lion management strategy.

It is for these reasons that DNPW is committed to improving lion management strategies throughout Zambia thereby achieving maximum benefits for lions and people

6.1.1 Ecological Benefits

Lion hunting is an essential component of the tourism industry that maintains wildlife areas as suitable habitats for wildlife. In Zambia, GMAs and Open Game Ranches (there are also Open Areas and Fenced Game Ranches) where safari hunting is conducted represent nearly 180,000 km^2 as compared to about 64,000 km^2 in national parks that are strictly protected. Without the incentives provided by hunting, this habitat could be lost and converted to other, less optimal land uses that do not include wildlife.

Trophy hunting, by definition, targets post-breeding males. By ensuring that offtake is sustainable (including the targeting of non-breeding males of certain minimum age, without dependent young), hunting provides maximum benefits while ensuring minimal negative effects on the remainder of the lion population.

Conservation of a species requires conserving the genetic variability and viability of a population rather than focusing on individual animals. While individual deaths serve to inform on sources of mortality, disease and more, loss of specific individuals do not affect population trends. However, humans (photo-tourists) may become emotionally attached to individuals, often because they are unaware of the cycles of life and death in nature. By better educating tourists and locals on the realities of population versus individual losses and gains, a more comprehensive understanding of the ecological, economic and social benefits associated with sustainable hunting of lions can be obtained. This is one of the objectives of DNPW and it should be the objective of all stakeholders who seek to conserve Zambia's wild lion populations.

6.1.2. Economic Benefits

- Lion hunting is the mainstay of safari hunting in Zambia; it attracts tourist hunters and brings income to the communities and the nation; particularly to wildlife conservation.
- DNPW devolves 50 percent of the Game Fees and 20% of the Concession Fees to rural communities to improve their livelihoods.
- Safari Operators provide:
  - Creation of employment
  - Financial support to anti-poaching
  - Provision of Health care
  - Provision of Education
  - Infrastructure development
  - Provision of meat (see below)

The remaining part of revenues are used by DNPW for wildlife conservation including lion itself through, inter alia, support to Law enforcement including anti-poaching and prosecutions and resource monitoring.

For further details, refer to this section and sections 8 and 9.

6.1.3. Social Benefits

- Lion–human conflicts occur on the interface between communities and lion range. Often, this results in "problem animals" being removed through lethal means. Increased conflict may indicate either increase in lion numbers or in human population, and require a reduction in lion numbers and/or redress in human settlement patterns.
- Lion hunting increases revenue to communities and places a value directly on the presence of living with lions thereby providing local people with tangible benefits for conserving wildlife.

For further details, refer to this section and sections 7, 8 and 9.

In particular, the economic and social benefits of sport hunting to rural communities through the provisioning of game meat have been illustrated in a recently published study (White and Belant, 2015). Provisioning of game meat to rural communities by the sport hunting sector in Zambia for three game management areas (GMAs) was on average > 6,000 kgs per GMA of fresh game meat annually from hunting operators. In most of the GMAs, provisioning of meat exceeded what was required in the lease agreements. Provisioning of game meat peaked during the end of the dry season (September–October) coincident with when rural Zambians are most likely to encounter food shortages. Extrapolating the results across all GMAs estimated 129,771 kgs of fresh game meat provisioned annually by the sport hunting sector to rural communities in Zambia at an approximate value for the meat alone of >US$600,000 exclusive of distribution costs. During the hunting moratorium (2013–2014), this supply of meat was halted, adversely affecting rural communities previously reliant on this food source. The paper recommended that proposed alternatives to sport hunting should consider protein provisioning in addition to other benefits (e.g., employment, community pledges, and anti-poaching funds) that rural Zambian communities receive from the sport hunting sector.

The hunting sector's support is crucial to the government's actions in conserving wildlife and habitats. It cannot be stressed enough the crucial role that safari hunting plays in wildlife conservation in Zambia. During the 2013 to 2016 moratorium on lion hunting (leopard hunting was stopped only in 2013 and 2014) the government was forced to subsidize the operations of ZAWA, Community Resource Boards and wildlife management (see section 9.0 below).

6.2 Transparency

The Wildlife Act of 2015 established a Wildlife Management Licensing Committee whose task is to supervise and grant, renew and revoke licenses, permits and certificates related to hunting. The committee is composed of several members appointed by the Minister of Tourism and Arts selected from different institutions including representatives from Ministries responsible for environment, lands, fisheries, forests, finance, tourism, chiefs, and mines. Other officials will come from the Attorney General's office, Ant-Corruption Commission, and Tourism Council of Zambia. This committee will enhance transparency on the administrative processes related to licensing.

7.0 Threats and Mitigation

Threats to the persistence of lion populations in Zambia include habitat encroachment and fragmentation, bush meat poaching/snaring, human lion conflict and prey depletion.

7.1 Habitat Encroachment and Fragmentation

With 20 National Parks and 36 Game Management Areas Zambia has close to 35% of it land mass set aside for wildlife conservation. Including National and local forests and National heritage sites this land mass is

well over 40 % of the country's total land area (Lindsey et al., 2014). However, habitat encroachment and fragmentation are increasingly threatening to reduce the ecological functionality and connectivity of these protected areas. Watson et al., 2013 reported rates of encroachment from roads in some areas of 2km per year and 18 ha per day light hour in a 160,000 km^2 study area covering the Luangwa and Kafue ecosystems. Large carnivores, lions inclusive are sensitive to encroachment and fragmentation even in areas outside protected areas through edge effects (Woodroffe and Ginsberg, 1998). The eradication of tsetse flies in most protected areas render these areas suitable for domestic livestock. The recent aerial survey in the country estimated cattle at well over 45,000 in the Kafue ecosystem (ZAWA, 2016; Annex 4). Watson et al., 2013 and 2014 recommend carefully planned human settlements, and agricultural development zones in GMAs to counter the effects of encroachment and fragmentation. To deal with the challenges posed by habitat encroachment and fragmentation, the Zambian government through DNPW has employed a number of strategies outlined in the three subsections below.

7.1.1 General Management Plans

The majority of the GMAs in which lion hunting occurs have a General Management Plan (GMP) in place. Only Munyamadzi, Sandwe and West Petauke in the Luangwa ecosystem, and Rufunsa GMA in Lower Zambezi do not have General Management Plans at present. A General Management Plan (GMP) outlines the basic management and development guidelines for a GMA or Open Area after the systematic assessment of land and water potential, alternatives for land use, economic and social conditions in order to provide the best land use options for addressing land use conflicts / problems and achieving identified land use management objectives over a 10-year period. It is prepared through a highly consultative, interactive and participatory Strategic Planning Process (SPP) involving all key stakeholders. The GMP emphasises the commitment of all concerned, affected and interested stakeholders to balance between the preservation and utilization of the protected area's biodiversity in order to ensure the long-term survival of the natural resources including wildlife resources in a way that benefits the local communities. As such the final document is ratified by a Community Resources Boards, their patrons (who are usually the chiefs in these areas) and the DNPW. Table 13 below gives the status of GMPs for critical areas in the lion range ecosystems.

Table 13. Status of General Management Plans in Zambia's lion hunting Areas

s/n	GMA	Ecosystem	Status	Date Ratified
1	Musalangu GMA	Luangwa	Ratified	2014
2	Lupande GMA	Luangwa	Ratified	2014
3	Lumimba GMA	Luangwa	Draft	-
4	Munyamadzi GMA	Luangwa	In preparation	-
5	West Petauke GMA	Luangwa	In preparation	-
6	Sandwe GMA	Luangwa	In preparation	-
7	Kasonso Busanga	Kafue	Ratified	2014
8	Mulobezi GMA	Kafue	Ratified	2014
9	Nkala GMA	Kafue	Ratified	2014
10	Mumbwa GMA	Kafue	Ratified	2014
11	Sichifulo GMA	Kafue	Ratified	2014
12	Lunga Luswishi GMA	Kafue	Ratified	2014
13	Mufunta GMA	Kafue	Ratified	2014
14	Rufunsa GMA	Lower Zambezi	In preparation	-

Source: Planning Unit DNPW

7.1.2 Eviction of illegal squatters

Furthermore, in an effort to maintain habitat in National Parks and GMAs successful operations were made to remove squatters. Interestingly, the local Chiefs and their communities requested the DNPW that people illegally settled in the wilderness zones of the GMAs be resettled so that they could fully realize the benefits from protecting the wildlife areas. The government has fully come out in support of removing squatters illegally settled in areas designated as conservation zones in GMAs (http://www.parliament.gov.zm/node/5019 ; parliamentary debates 18th February, 2016; https://www.daily-mail.co.zm/?p=42954&paged=424; Zambia Daily Mail 8th September, 2015). Lukusuzi National Park, Namwala and Mumbwa GMAs are examples of protected areas in which squatters were recently evicted.

For example, over 2000 households from Mumbwa GMA were evicted from the conservation zone as designated in the General Management Plan. The local community argued that the encroachers were actually settlers from other areas of the country and their action of illegally settling in the zone prevented the local communities from realising the benefits associated with wildlife as the pressure on wildlife increased. The Zambia Lands Tribunal ruled on 4th September, 2013 that the encroachers were settled in the area illegally. The government therefore gave them two years to prepare for eviction and the action was successfully conducted in August, 2015. The whole exercise cost the Department around ZMK44, 520.00, and was carried out in conjunction with the office of Disaster Management and Mitigation Unit (DMMU), under the Office of the Vice President.

7.1.3 Open Game Ranches and Trans-frontiers Conservation Areas

As detailed in section 5.2.2 Open Game Ranches are privately owned lands bordering GMAs or National Parks that stock wildlife. These areas, regulated in the Wildlife Act 2015, further buffer the National Parks and GMAs from encroachment and ensure movement corridors are protected. These are new models of

wildlife conservation in the country that the Zambian government is supporting to ensure sustainable use of wildlife resources and protection of habitats.

In the most recent conservation developments, establishment of the Kavango-Zambezi Transboundary Park (KAZA) by Peace Parks seeks to protect a contiguous habitat of over 280,000km^2 that includes the whole of Kafue NP ecosystem and the Sioma Ngwezi National Park region as part of an international effort to maintain connectivity of viable habitats for all species, including lions. Other proposed Trans – frontier Parks include the Liuwa - Mussuma between Zambia and Angola and the Mana Pools - Lower Zambezi between Zambia and Zimbabwe.

In general, due to the increase in donor funding and increased number of economic opportunities availed through tourists' lodges, protected areas in general attract a lot of immigrants on their boundary areas (Wittemyer et al., 2008). Zambia has not been spared from the phenomenon, Mfuwe the gateway town to the South Luangwa National Park has seen increased population growth and increased infrastructure development unlike other areas in the ecosystem devoid of photographic tourist's lodge (Twakundine Simpamba Senior Ecologist SLNP pers. comm.). This has caused habitat loss. Because hunting concessions usually have one operator over a large area and are located in areas that are not easily accessible, Safari hunting helps in buffering protected areas from the effects of immigration, while at the same time providing economic support to rural communities and maintaining habitat. In general, the Safari hunting sector is extremely supportive of initiatives aimed at maintaining wild areas. Their presence acts as a deterrent to would be squatters. They also act as monitors and able to immediately inform the CRBs or the Department of illegal settlements in GMAs.

7.2 Human Lion Conflict

Human-Lion conflicts (HLC) are not uncommon in Zambia. Fortunately, retaliatory killings by livestock owners are not as common as in East Africa. Therefore, direct lion poaching is not believed to be significant. ZAWA (now DNPW) developed an adaptive system that includes a procedure whereby reported cases of lion damages are investigated by field officers and complete reports are reviewed by the most senior officer for immediate feedback. Interventions include; scaring lions through blasting, or killing the animals suspected to be responsible for the attack on livestock and humans. This approach is considered incompatible with sustainable conservation of wildlife, and may contribute to the decline in the lion populations. DNPW is committed to implement the best practises on HLC including for example the HLC toolkit developed by the Niassa Carnivore Project. This will be done through the development of a specific policy on Human Wildlife Conflict that the department, pending the availability of funding, would like to devise as soon as possible.

Moreover, table 14 below shows the livestock killed by lions due to conflict in Zambia for the period 2008 to 2016. In the same period at least 8 people have been reported as having died as a result of being attacked by lions and a further 13 having been injured as a result of a lion attack.

Table 14. Livestock killed or maimed by lions in Zambia for the period 2008 to 2015 – by Ecosystem

Protected Area	Lower Zambezi Ecosystem	Kafue Ecosystem	Luangwa Ecosystem	West Zambezi GMA	West Lunga	Total
Cattle killed	0	65	42	54	23	184
Shoats killed	0	4	36	0	0	40
Pigs killed	0	14	30	1	0	45
Donkeys killed	0	2	0	17	0	19
Dogs killed	0	0	8	0	0	8
Other livestock killed	13	0	14	0	0	27
Livestock maimed	0	4	0	0	0	4

Sixty-eight lions have been killed as a result of human lion conflict since 2002. Development of a specific policy to address Human Wildlife Conflict, as described above, is anticipated to greatly reduce the number of lions killed as problems through increased use of non-lethal strategies to deal with conflicts. As table 15 shows the number of lions killed on control spiked in the period 2013 to 2015.

Table 15. Control of Problem Lions in Zambia

Year	lions controlled
2002	2
2003	4
2004	1
2005	0
2007	5
2008	8
2009	2
2010	5
2011	3
2012	8
2013	5
2014	10
2015	14
2016	1

The average number controlled in the period 2010 to 2012 was 5.3 lions per year, this almost doubled to 9.7 lion per year in the period 2013 to 2015. This could be a result of the moratorium where lions cannot be hunted by tourist hunters thus leading to increased conflicts. Movement of lions out of the National Parks and GMAs into regions where they become "problems" is likely to be exacerbated by high lion densities that occur in the absence of sport hunting. Rather than just controlling them for the sake of reducing conflict, it would be beneficial if these lions were hunted through safari hunting because of the

increase in tolerance by rural communities toward lions generated by the revenues from sport hunting which are also used to protect lion habitat and to implement other mitigation measures.

The Lower Zambezi and Luangwa ecosystems accounted for 70 % of the lions killed on control. The levels of lethal control in the Lower Zambezi is particularly high with Rufunsa GMA accounting for 42 % of the animals killed in this ecosystem. The high levels of conflict in the Rufunsa GMA could be as a result of high human settlements along the river, thus there is competition for resources between wildlife and people. Considering the lower density of lions recorded from studies in the Lower Zambezi, lion hunting in this GMA is strategically meant to increase tolerance of lions and then contributing to solve problem animal conflict and bring communities on side by providing revenue that contributes to their livelihood strategies.

7.3 Bush meat poaching and prey depletion

Poverty and the necessity for rural people to obtain some income are the main drivers of bush meat poaching in Zambia. Although bush meat poaching occurs widely in Zambia it has not yet resulted in an overall decrease of the potential lion prey. As illustrated in section 7.3.1 below, results of the recent aerial surveys have shown an overall stable to increasing population of key prey species in the Kafue and Luangwa ecosystems.

7.3.1 Prey Availability and abundance

Abundance of prey species is highly correlated with lion density (Hayward, 2007; Périquet et al, 2014). Protected areas with healthy prey population support healthy populations of large lions. Therefore, prey abundance is a good indicator of the status of lion populations. The recent aerial survey of large mammals in Zambia (Annex 4) indicate that for key wildlife species in the Kafue ecosystem, their numbers have been increasing over the period 2006 to 2015. The trends for the Luangwa system have been stable to increasing. The only exception being the Lower Zambezi ecosystem where there has been a significant decrease in one of the main lion prey, the buffalo. The causes of this decline are being investigated. Figures 5, 6 & 7 below show the population trends of the key wildlife species in the South Luangwa, Kafue, and Lower Zambezi National Parks, the core areas for wildlife in the three main lion clusters in Zambia. The Kafue ecosystem can potentially hold more prey species than it currently has, and the observed increasing trend is encouraging as it is likely to result in the increase of lion in this huge ecosystem.

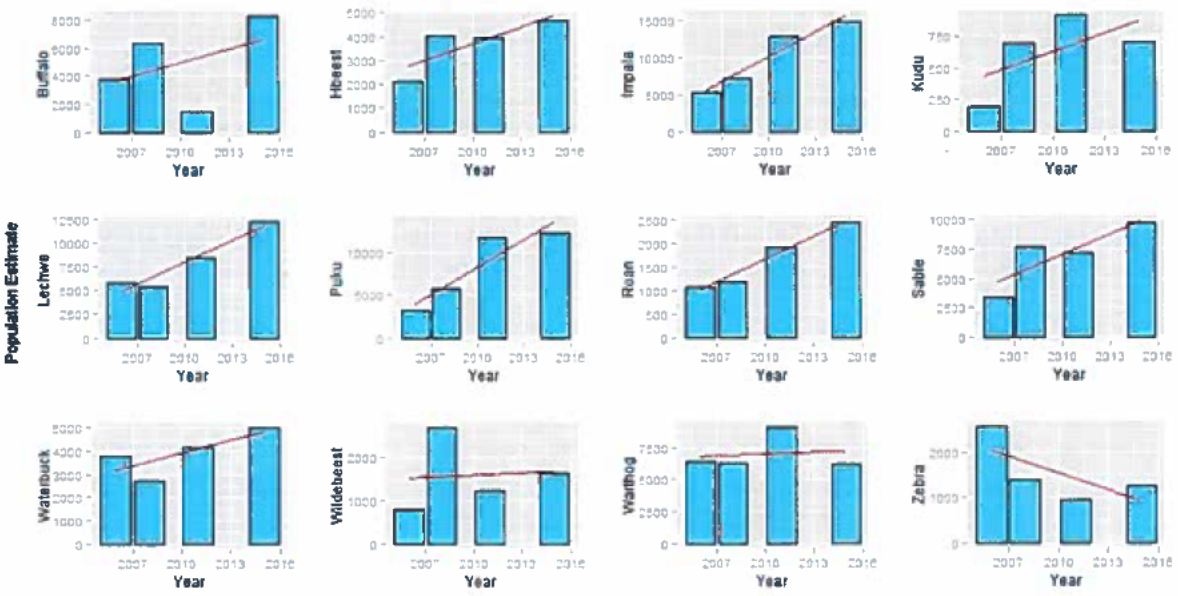


Figure 5. Population trends for selected species in the Kafue National Park 2006 – 2015

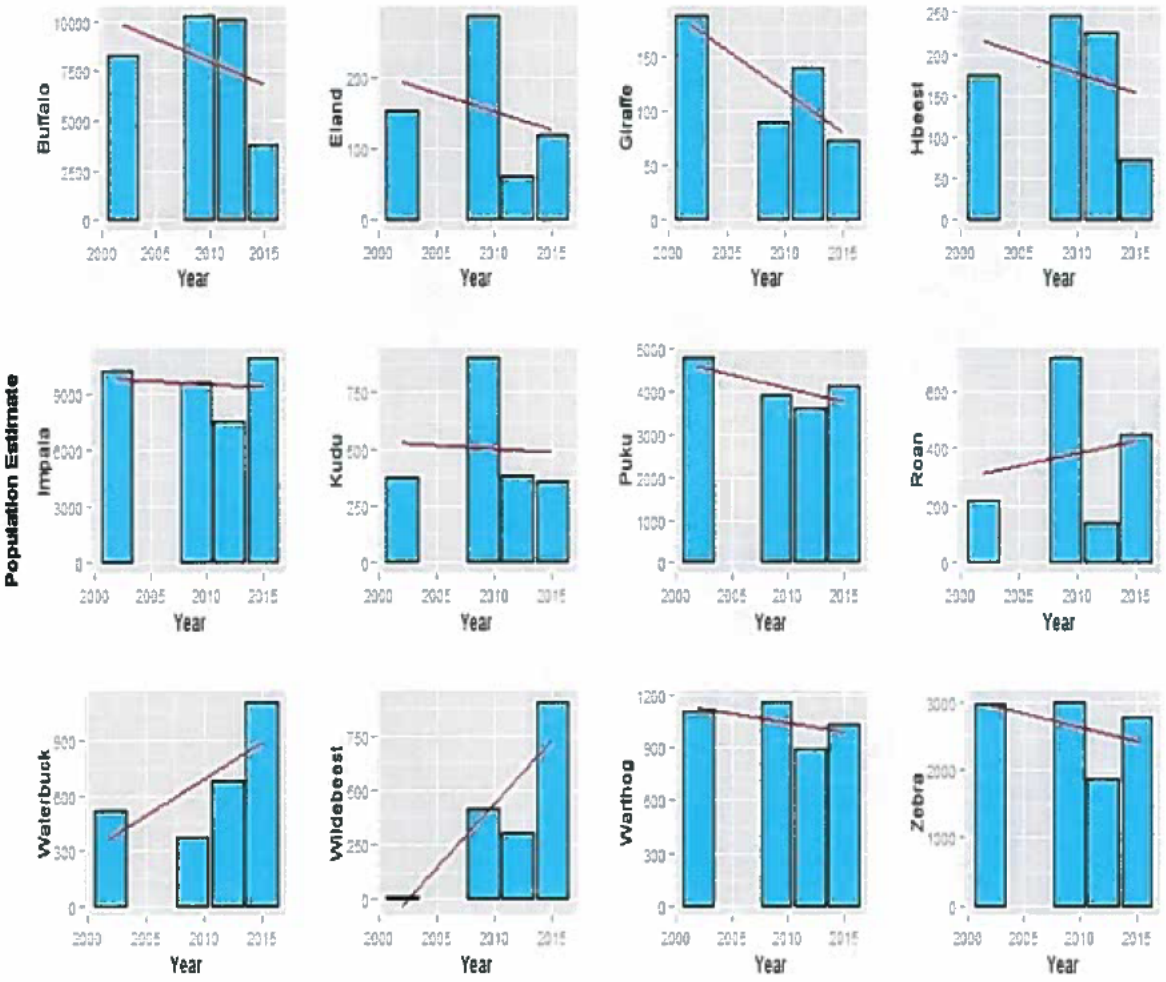


Figure 6. Ungulate population trends in South Luangwa National Park

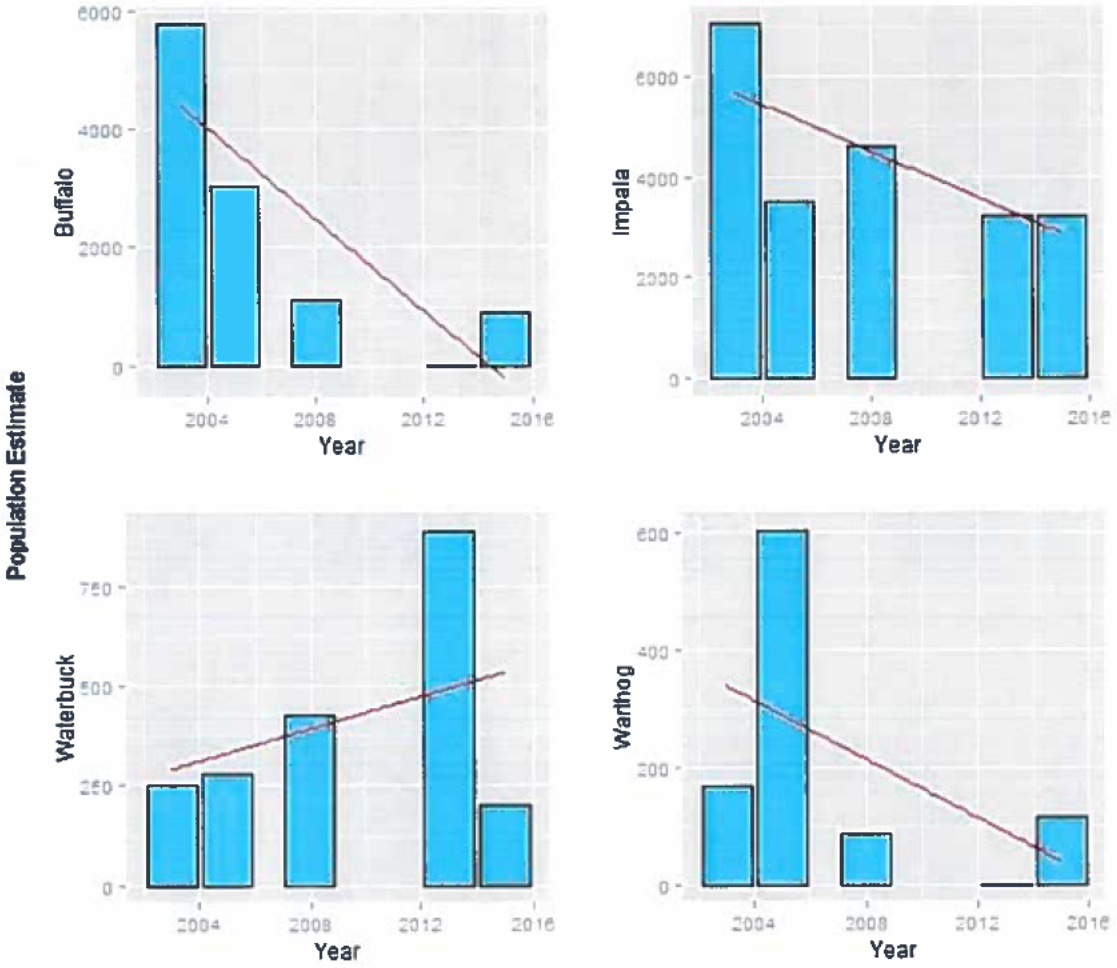


Figure 7. Population trends for buffalo, impala, waterbuck and warthog in the Lower Zambezi National Park

Figure 8 below is a comparison of ungulate abundance in the Luangwa ecosystem between GMAs and the 4 National Parks (South Luangwa, North Luangwa, Lukusuzi and Luambe National Parks). Buffalo and wildebeest were more abundant in the GMAs than in the National Parks. These findings underscore the importance of GMAs as habitat for populations of some species, in particular, buffalo and wildebeest and the need to maintain the habitats intact.

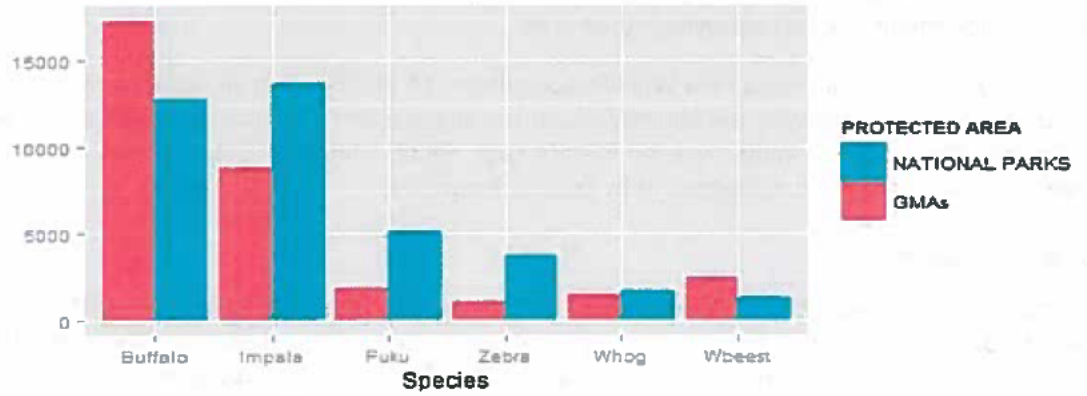


Figure 8. Species abundance in the Luangwa ecosystem National Parks vs GMAs

8.0 Community Based Natural Resources Management (CBNRM)

8.1 CBNRM in Zambia

The origin of CBNRM in Zambia owes much to a program that came to be known as the Administrative Management Design Program for Game Management Areas (ADMADE), which commenced in 1987. Funded by the United States Aid for International Development (USAID), ADMADE established the principle that communities had the right to participate in wildlife management and that it was the most effective way to achieve conservation. The program could be considered as one of the first CBNRM programs in Southern Africa. The theory behind the program, was to encourage rural participation in wildlife conservation. Rather than all taxes on safari hunting going to the state treasury, government to returned a portion of some revenue streams to a local GMA committee for its use in development and for investments in wildlife management.

In 1999, the Department of National Parks and Wildlife Service (NPWS) was transformed into the Zambia Wildlife Authority (ZAWA) - a statutory body established by the Zambia Wildlife Act number 12 of 1998. The Act gave birth to Community Resources Boards (CRBs), based on the ADMADE model and they were legally mandated to co- manage wildlife resources in Zambia.

Following the 1998 Zambia Wildlife Policy, local communities residing in chiefdoms and geographic areas which are contiguous to any wildlife estate or any open area are encouraged and assisted to apply and register as Community Resources Boards (CRBs) with the DNPW. Management of all CRBs established for the purpose of enhancing management and sustainable use of wildlife resources outside National Parks is done through a democratically elected representation of the local community themselves, but day to day operations of any CRB should be through a secretariat. The elections are done according to Village Action Groups and it is from those elected in these Action Groups that form members of the CRB. The chief of the area is regarded as the patron of such CRBs. DNPW cooperates with all registered CRB's and provides the technical input that assists them to develop management strategies. It is the responsibility of DNPW to work with CRBs and other stakeholders in the preparation of general management plans using a participatory planning process and format developed by the Department and adopted to meet local condition requirements.

All meetings of the CRBs are conducted in a democratic way, decision reached through consensus, and minutes of all their transactions and deliberations recorded. DNPW, District Council and non- governmental organisations (if present in the area) are called to the meeting to provide

the appropriate technical input that will assist CRBs make informed decisions about the rational and sustainable utilization of natural resources in their area.

Since the entry into force of the Zambia Wildlife Act number 14 of 2015 (See section 3.1), the Wildlife Policy is at present under review by the Ministry of Tourism and Arts and it will strengthen several aspects of the Zambia CBRNM programme such as wildlife user rights, Human Wildlife Conflicts and it will improve stewardship in wildlife management by local communities.

8.2 Community Benefits

The Zambia wildlife Act No. 12 of 1998 introduced rights to benefit from natural resources. The Zambia Wildlife Act No. 14 of 2015 allows greater participation of local communities, thus establishing their rights to use and manage natural resources in GMAs and Open Areas. This includes provisions for participation in developing management plans. In particular, as provided for by the 2015 Wildlife Act, a local community in a chiefdom in a Game Management Area, or in an open area or a particular chiefdom with common interests in the wildlife and natural resources in that area, may apply to DNPW for registration as a Community Resources Board (CRB). According to the Zambia Wildlife Act No. 14 of 2015 the CRB have the following functions:

i. negotiate, in conjunction with the Department, co-management agreements with hunting outfitters and photographic tour operators;
ii. manage the wildlife under its jurisdiction within quotas specified by the Department;
iii. appoint community scouts to exercise and perform the duties of a wildlife police officer under the supervision of a wildlife police officer in the area falling under the board's jurisdiction;
iv. in consultation with the Director, develop and implement management plans which reconcile the various uses of land in areas falling under the board's jurisdiction; and
v. Perform such other functions as the Minister or Director may direct or delegate to it.

From the revenues generated, members of local communities have been employed by CRBs as Community Scouts, funded also through obligations under the Concession Agreement (see section 5.4.1.), to assist DNPW with law enforcement and monitoring of wildlife resources. These scouts also help in assess crop damage and problem animal controls in their communities, where they also conduct environmental awareness among the local populace.

There are currently seventy-five (75) registered CRBs which employ approximately 750 Community Scouts operating in various GMAs in Zambia with a total monthly wage bill of ZMW 359,779.50 (USD 38,853.13). An additional 79 support staff (these include Book Keepers and Administrative officers) are employed by CRBs across Zambia. In some GMAs revenues from hunting are used to pay teachers and medical staff as in the case for Nabwalya CRB while others offer student scholarships which range from secondary school to tertiary education.

The revenues the local communities obtain allows them access to social amenities and various rural development projects. The projects span construction of bole- holes, schools, clinics, and feeder roads, as well as crop damage counter-measures including solar and chili pepper fences. More residents benefit indirectly from participating in wildlife management and accessing the resource, depending on the ability of the wildlife sector to generate funds. It has to be noted that local communities have limited benefits from non-consumptive tourism.

Animal fees are shared:

i. 5% of the funds go to the CRB patron (traditional leader or Chief);
ii. 45% of the funds go to the CRB in the form of community funds; and
iii. 50% of the funds go to ZAWA in the form of conservation funds.

Concession fees are shared:

i. 5% of the funds go to the CRB patron (traditional leader or Chief);
ii. 15% of the funds go to the CRB in the form of community funds; and
iii. 80% of the funds go to ZAWA in the form of conservation funds.

According to the "Guideline on the use of Community funds accrued from wildlife management" the communities are expected to be utilised as follows:

i. 45% of the funds go to wildlife management, including resource protection and patrols:
ii. 35% of the funds go to community projects such as construction of clinics, roads, schools, and wells; and
iii. 20% of the funds go to administration of the CRBs.

9.0 Revenues and Expenditures from Trophy Hunting

The fee revenues discussed in this section relate to revenues of DNPW, part of which are shared with communities. But a foreign client contributes far more to Zambia's economy than permit and concession fees. A foreign client pays to the operator a daily fee, and hunting a lion are often sold as a package together with other species such as buffalo, hippo, and impala. Therefore, the foreign client pays for more than just lion and for a significant period of time.

In addition to the daily fees, clients will often pay observers fees and taxes not imposed by DNPW, such as firearms taxes to the Treasury.

Safari hunting also generates "multiplier" impact due to the client's travel, tipping, eating in restaurants, purchase of souvenirs, and taxidermy requirements. The multiplier spending also generates tax revenue for the country's general Treasury. In short, the revenues generated by tourist safari hunting are many times greater than the fees directed to DNPW which are summarized here.

9.1 Animal and hunting fees

Hunting license fees in Zambia are statutory, the current hunting animal fee for a lion is US $4,200.00 to the outfitter. In addition to animal fees the hunting outfitter pays concession fees and outfitters fees annually. The department charges GMA Area fees per hunt and annual Professional Hunter fees. Other minor fees include certificate of valuation of trophies, certificate of ownership of trophies, permit to export, handling fees, and the CITES security stamp.

A foreign client pays a fee above this depending on what the outfitter charges. The department does not deal with the foreign client directly. It should be noted that hunting a lion is sold as a package together with other species such as buffalo, hippo, and impala among others. Therefore, the foreign client pays for more than just lion. Annex 5 provides the current animal fees as set by statutory instrument No. 60 of 2007.

9.2 Revenues from safari hunting

Table 16 Total ZAWA Revenues (ZMW) 2010 - 2015[1]

Description	2010	2011	2012	2013	2014	2015
Consumptive Revenue	23,676,244.65	24,352,872.71	27,120,628.30	5,166,710.21	4,568,488.41	16,956,733.29
Non Consumptive Revenue	26,183,244.27	28,311,567.47	34,596,145.48	36,501,500.48	52,029,138.51	50,297,933.05
Grants	14,254,780.64	33,717,778.22	27,247,240.21	70,688,875.94	59,506,322.16	122,866,591.92
Other Income	254,572.20	65,625.31	252,594.34	64,314.03	110,403.04	442,312.78
Total Income	64,368,841.75	86,447,843.71	89,216,608.33	112,421,400.66	116,214,352.12	190,563,571.04

Table 16 provides a breakdown of ZAWA fee revenues for the period 2010 to 2015.

In 2013 and 2014, there was no hunting in 19 out of the 33 hunting blocks in the Country due to a moratorium imposed in 2013, which included lion and leopard although for the latter hunting was resumed in 2015. This led to reduced revenues from game permit fees and concession fees, thus the significant drop in revenue during the period 2013 - 2014 as illustrated in figure 9 below.

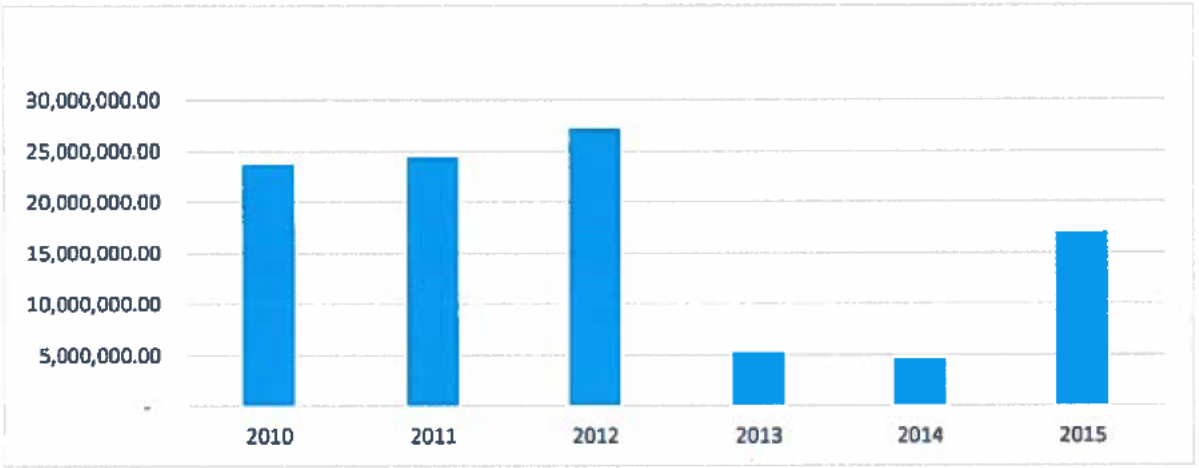


Figure 9. Hunting Revenues 2010 - 2015 (ZMW)

[1] For conversion rates from ZMW to USD please refer to:
https://www.fiscal.treasury.gov/fsreports/rpt/treasRptRateExch/historicalRates.htm

On average hunting revenues accounted for 32% of all the revenues that ZAWA received in the three years (2010 - 2012) before the moratorium on cats hunting.

During the moratorium (2013 & 2014) this reduced to an average of 4%. The deficit in terms of revenue was offset by an increased allocation from grants, which saw the grants almost triple from 22% in 2010 to 64% of ZAWA's income by the end of 2015.

The contribution of non-consumptive tourism averaged 36% during the six-year period from 2010 – 2015. On average Safari hunting revenues accounted for 88% of all the income from consumptive hunting during the pre-ban years reducing to 67 per cent during 2013 and 2014. It increased to 74% in 2015 with the resumption of hunting in some hunting blocks.

Table 17. Safari hunting revenues (ZMW) 2010 - 2015

Source	2010	2011	2012	2013	2014	2015
Animal Fees – Safari	13,390,444.50	14,653,302.15	17,007,494.58	1,168,063.84	3,063,611.44	7,459,738.45
Concession fees	5,609,062.99	5,201,607.05	5,886,650.62	1,097,808.40	292,644.80	4,009,874.25
Hunting rights	-	358,394.75	170,484.84	17,846.40	-	84,859.10
Bird License – Safari	216,168.28	192,480.95	179,500.04	24,178.42	16,022.65	60,236.60
Professional Hunters License	319,251.70	352,524.56	330,213.52	54,814.12	60,823.78	150,365.60
Outfitters Safari License	464,074.23	560,022.50	606,776.17	232,320.00	271,137.50	733,722.50
GMA Permit Fees	-	-	561,722.27	59,441.27	81,088.17	212,267.78
Total Income	19,999,001.70	21,318,331.96	24,742,842.04	2,654,472.45	3,785,328.34	12,711,064.28

Source: DNPW Accounts Unit

9.2.1 Revenues from lion hunting

Lion together with leopard and elephant (note however that elephants' trophies import restrictions apply in some countries) are the main drivers of revenues generated from trophy hunting. For the pre-ban period (2010 – 2012) lion revenues averaged 6.5 per cent of all revenues from animal fees and 1.24 per cent of ZAWA's total income during the pre-ban. It should be noted however, that licenses are usually sold as a package with other animals on the license, and as such the contribution of lion is actually higher than indicated in the graph. In 2013-2015, zero revenue was raised from lion hunts. The lack of revenue, and specifically lion hunting fees, reduced then-ZAWA's capacity for management and protection of lion (and other species).

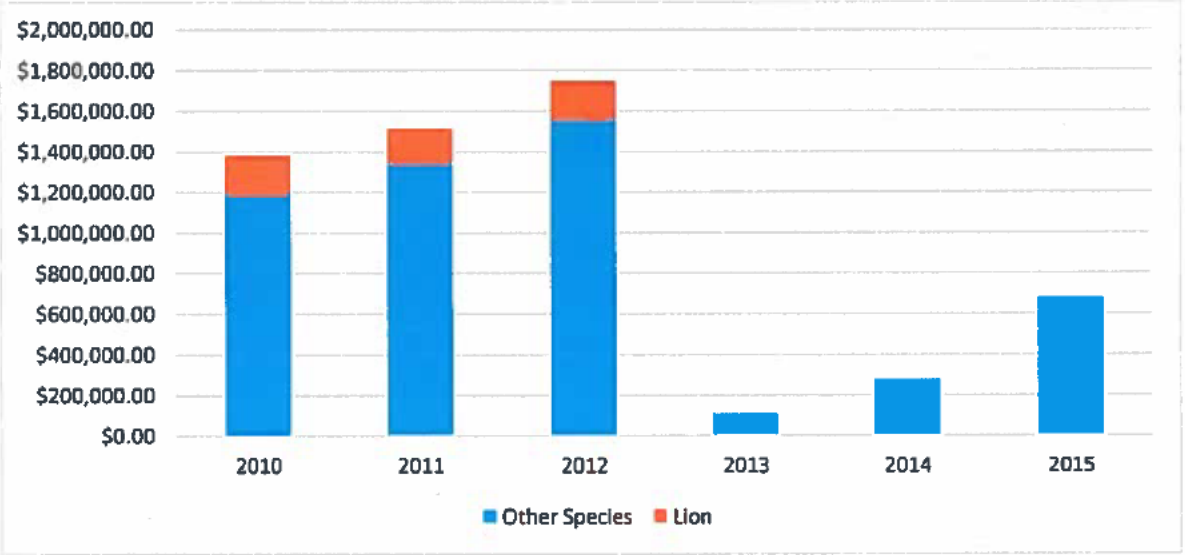


Figure 10. Lion animal fees as a proportion of total animal fees (in USD)

As discussed in section 5.3, the DNPW is re-establishing lion hunting that will restart in May 2016. Among the issues under discussion there is the feasibility of introducing a lion conservation fee on top of the animal fee, while requiring that lion hunting cover a minimum of 16 days. This is to maximize revenues and to use the additional conservation fee for specific monitoring programs on lion hunting. In addition, a Statutory Instrument, the Zambia Wildlife (Licenses and Fees) Regulations, 2016, revising Hunting Fees is under consideration and the lion fee will be slightly increased, under the proposed regulations. The upward adjustment in addition to the conservation fee will imply the price of lion goes up, adjusting to price in other countries, due to the reduction in quota.

9.3 Expenditures of revenues

Hunting revenues are utilized for general wildlife management activities and conservation activities. In this regard, hunting revenues pay for Scout/Wildlife Officers salaries, resource protection, prosecutions, animal surveys and staff training among other things. On average over the period 2010 to 2015 salaries accounted for 72% of all expenses. Of this amount close to 90% was salary related expenses for uniformed staff directly related to Conservation and management. Table 18 below is a summary of ZAWA's expenses for the period 2010 to 2015.

Table 18. ZAWA Expenditures 2010 - 2015 (ZMW)

S/N	Description	2010	2011	2012	2013	2014	2015
1	Operational Expenses	7,729,077.76	10,012,021.52	9,789,236.09	8,336,135.84	11,284,084.16	10,664,712.10
2	Salary Related Expenses	52,887,642.67	56,396,245.59	79,251,728.88	59,809,879.01	66,526,576.47	119,473,738.31
3	Administrative Expenses	6,324,166.93	6,603,338.51	10,511,912.98	9,130,591.80	7,935,295.74	16,660,015.70
4	Staff Training, Workshops and Transfers	1,206,917.95	1,660,735.79	2,229,534.12	755,587.28	1,343,203.38	3,667,097.07
5	Animal Surveys and Control	93,358.96	472,550.91	12,166.50	1,135,281.90	9,505.42	49,494.70
6	Repair and Maintenances	2,518,924.22	2,728,577.50	2,740,956.28	2,277,535.73	3,389,423.12	4,189,049.25
7	Consultancy and Legal Fess	2,430,375.14	3,594,930.37	1,099,026.64	830,955.46	1,825,947.53	900,438.27
8	Other Expenses	571,983.42	1,393,469.12	592,732.10	728,672.31	894,165.44	941,403.78
	Total Expenditure	72,962,447.04	82,861,869.31	106,227,293.58	83,004,639.33	93,208,201.26	156,545,949.18

The hunting revenues shown in table 17 cover an average of 25 per cent of ZAWA's expenditure during the pre-ban period, which was enough revenue to cover ZAWA operational expenses. The revenues from lion animal fees during the pre-ban period were enough to cover expense for Animal surveys and control during this period.

The added value of lion hunting cannot in any case be measured only in financial terms. The value to habitat protection, law enforcement and social benefits are some of the immaterial components of the lion hunting's contribution to conservation.

In the past, DNPW has not used fees generated from the hunting of a specific species for the conservation and management of that specific species, but rather pooled funds for enforcement and management costs. Again, one of the issues under discussion is the requirement of a lion conservation fee that will be specifically used for lion monitoring.

9.4 Funds disbursed to Communities

As explained in section 8, the Wildlife Act of Zambia provides for a revenue sharing system between the government and the communities. The following (table 19) are the revenues disbursed to communities in the period 2010 to 2015.

Table 19. Funds disbursed to Communities (2010 - 205) in ZMW

Year	Amounts Paid
2010	5,192,443.52
2011	10,660,206.34*
2012	4,658,671.35
2013	5,246,776.84
2014	5,203,553.87
2015	3,368,390.76
Total	**34,330,042.68**

As explained in section 8.2 above, guidelines governing the use of funds disbursed to the communities stipulate that the funds should be utilized in the following manner:

- 45% of the funds go to wildlife management, including resource protection and patrols;
- 35% of the funds go to community projects such as construction of clinics, roads, schools, and wells; and
- 20% of the funds go to administration of the CRBs.

Note that the increased disbursement in 2011 shown in Table 19 was a result of additional support from government. Further, although revenues went up significantly in 2015, community disbursement went down because there were less revenues from hunting due to the moratorium. Moreover, many employees of the safari hunting outfitters were also out of work during that time.

10.0 Conclusions and Non-detriment findings

Sustainable development and the need to fight poverty is the first and foremost priority of the Zambian government to also achieve wildlife conservation. The depletion of wildlife is slowly reducing in Zambia due to important investments made by the government, private sector, and donors.

In general, protection is important if done in parallel with poverty reduction strategies which shall include consumptive and non-consumptive wildlife utilization. In this regard, trophy hunting is one of the components that the Zambian government is using in its wildlife conservation strategies because of the high level off benefits, tangible and intangible, that it can produce. Safari Operators are in need of a good and healthy wildlife population in order for the sector to be viable. To achieve that they are supporting the government in actions not only to increase protection of habitats and wildlife, but also in community development.

The new management approach to lion hunting in Zambia is based on three pillars, i) a conservative, precautionary quota, well below one of the recommended thresholds for sustainability, ii) an age–based harvest limit and strong monitoring of lion offtakes, and iii) significant and direct community benefits. This will ensure that lion hunting in Zambia is sustainable and does not negatively affect the population.

Zambia has spent considerable resources to improve lion hunting and is experiencing a successful partnership with all stakeholders to ensure sustainability of the offtakes and financial and socials returns to conservation.

The CITES Scientific Authority of Zambia has considered the population of lion in Zambia; the quota-setting system and current precautionary quota of only 24 lions; the newly implemented age-based harvest policy; the limited offtake; the adaptive management of lion; and the substantial revenues generated for DNPW operations, anti-poaching, and community development. The Scientific Authority has considered the current threats to lion, including loss of habitat and human-lion conflicts, and potential of safari hunting to mitigate those threats.

Upon considering these factors and in accordance with Article IV of CITES and CITES Resolution Conf.16.7, the Scientific Authority concludes that the low level of off-take generated by safari hunting is not detrimental to the survival of the lion in Zambia and the amount of revenues generated by this low level of off-take are of crucial importance for the conservation of the species also because of the benefits it provides to rural communities. Safari hunting provides a net benefit to the species, it does not pose a threat to the species, and it is not a detriment to the survival of the species. In fact, the Scientific Authority of Zambia finds the regulated safari hunting of lion in Zambia enhances the survival of the species. The newly-developed lion management systems, Statutory Instruments and hunting reforms employ an adaptive management approach thereby ensuring long-term sustainability, health and enjoyment of Zambia's wild lion populations.

The CITES Scientific Authority of Zambia underlines that it expects CITES Parties to implement CITES Resolution Conf. 2.11 with particular reference to paragraph b) that states: *"in order to achieve the envisaged complementary control of trade in Appendix-I species by the importing and exporting countries in the most effective and comprehensive manner, the Scientific Authority of the importing country accept the finding of the Scientific Authority of the exporting country that the exportation of the hunting trophy is not detrimental to the survival of the species, unless there are scientific or management data to indicate otherwise"*.

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APPENDIX 1 - Assessment of the Zambia DNPW Enhancement and Non-Detriment Findings against the IUCN SSC "Guiding principles on trophy hunting as a tool for creating conservation incentives. Ver. 1.0. IUCN SSC (2012)"

DNPW produced an assessment of its Enhancement and Non-Detriment Finding on Lion in Zambia (2016) against the IUCN SSC GUIDING PRINCIPLES ON TROPHY HUNTING AS A TOOL FOR CREATING CONSERVATION INCENTIVES. VER. 1.0. IUCN SSC (2012), recognizing the importance of the implementation of these principles as best practices to manage trophy hunting as a legal, regulated activity which is a critical tool to secure a sound social, economic and ecological conservation scenario.

Biological Sustainability

Trophy hunting[†] can serve as a conservation tool when it:

#	Principle	Remarks
1	**Does not contribute to long-term population declines of the hunted species or of other species sharing its habitat, noting that a sustainably harvested population may be smaller than an unharvested one;**	***Safari hunting is not a threat to the Zambian lion population because it has not contributed to long-term population declines. Even though some studies in a limited area of the Luangwa valley showed a decline in lions, the moratorium that Zambia imposed in January 2013 has allowed a better understanding of lion population dynamics in certain areas and has driven a new very cautionary quota complemented by a mandatory aging system and monitoring of hunting.***
2	**Does not substantially alter processes of natural selection and ecosystem function; that is, it maintains "wild populations of indigenous species with adaptive gene pools." This generally requires that hunting offtake produces only minor alterations to naturally occurring demographic structure. It also requires avoidance of breeding or culling to deliberately enhance population-genetic characteristics of species subject to hunting that are inconsistent with natural selection;**	***It has been demonstrated by Curry, White & Derr (2015) that the genetic pool of the Zambian lion population is one of the most diverse in Africa. Thus, giving potential evidence that hunting offtake has had no evident effect on the population of Zambian lions.*** ***Zambia has never embarked in breeding programmes for hunting lion and has never done any culling on its lion population. In this regard, Zambia is enacting legislation to prohibit breeding of lions in captivity and hunting of captive bred lions.***

[†] The term "trophy hunting" is used by IUCN to refer to hunting that is: Managed as part of a program administered by a government, community-based organization, NGO, or other legitimate body; Characterized by hunters paying a high fee to hunt an animal with specific "trophy" characteristics (recognizing that hunters each have individual motivations); Characterized by low off-take volume; Usually (but not necessarily) undertaken by hunters from outside the local area (often from countries other than where the hunt occurs).

3	**Does not inadvertently facilitate poaching or illegal trade of wildlife;**	***Hunting in Zambia is an activity legally regulated and contributes to enhancement of habitat conservation and community livelihoods. Zambia has not recorded any confiscations related to lions poached for trophy or export. Community partnership arrangements in GMAs and Open Game Ranches are reducing poaching by increasing community conservation incentives.***
4	**Does not artificially and/or substantially manipulate ecosystems or their component elements in ways that are incompatible with the objective of supporting the full range of native biodiversity.**	***Trophy hunting in Zambia does not manipulate ecosystems in ways that are incompatible with supporting biodiversity. To the contrary, hunting is done in areas, the GMAs, which expand the natural habitat in the buffer zones around National Parks. Further, Open game ranches in Zambia further enlarges the habitat available for wildlife and support the conservation of biodiversity. In this way safari hunting creates financial incentives for wildlife conservation in an area extending nearly 180,000 sq.km (GMAs and Open Game Ranches) and thus providing habitat for a variety of species that conserve biodiversity and ecosystem services.***

Net Conservation Benefit

Trophy hunting can serve as a conservation tool when it:

#	Principle	Remarks
1	**Is linked to identifiable and specific parcels of land where habitat for wildlife is a priority (albeit not necessarily the sole priority or only legitimate use); and on which the "costs of management and conservation of biological diversity [are] internalized within the area of management and reflected in the distribution of the benefits from the use";**	***Hunting in Zambia is linked to clearly identifiable land areas where habitat for wildlife is a priority. These include 36 Game Management Areas covering an area of 177,404 sq.km and 17 Open Game Ranches covering an area of 2,556 sq.km. The cost of management and conservation area as much as possible internalized and a borne by the Safari Operators. These costs include but are not limited to Concession fees, concession financial obligations and camp expenses related to logistics, salaries, administration, anti-poaching, community assistance etc. Therefore, the private sector and the community as landholders bear the majority of the cost to maintain the area. Nevertheless the government through revenues from hunting pays for anti-poaching, community development through the***

		50% generated from animal fees and other conservation activities.
2	**Produces income, employment, and/or other benefits that generate incentives for reduction in pressures on populations of target species, and/or help justify retention, enhancement, or rehabilitation of habitats in which native biodiversity is prioritized. Benefits may create incentives for local residents to co-exist with such problematic species as large carnivores, herbivores competing for grazing, or animals considered to be dangerous or a threat to the welfare of humans and their personal property;**	*Hunting in Zambia has facilitated the creating of over 750 jobs for Community scouts, and benefits from hunting outfitters obligations such as distribution of over 50% of the meat from all carcasses hunted, and the contractual requirement of provision of social and community development initiatives. Moreover, over 1,000 people are employed in the hunting sector. Safari hunting in Zambia has generated from the period 2006 to 2012 more than USD 13 million in revenues for the Government and the communities.* *In 2013 a moratorium on hunting of cats was decided and also several concessions were suspended. The impact on revenues for the Government and communities has been substantial. Revenues from trophy hunting are contributing to the daily wildlife conservation work in Zambia. Revenues from safari hunting contribute to income for local communities and, inter alia, increase tolerance of communities towards problematic wildlife species including lions.*
3	**Is part of a legally recognized governance system that supports conservation adequately and of a system of implementation and enforcement capable of achieving these governance objectives**	*The Wildlife Act of 2015 is the principal legislation guiding the management of wildlife in Zambia, and provides a legally recognized governance system for the promotion of opportunities for the equitable and sustainable use of wildlife. This system is implemented and enforced by the DNPW with assistance from stakeholders such as the communities, the hunting sector and NGOs.* *Lion in Zambia are managed under a Conservation Strategy and Action Plan and guided by several Statutory Instruments that, inter alia, establish an age-based harvest guideline and other "best practices" for lion hunting and conservation.*

Socio-Economic-Cultural Benefit

Trophy hunting can serve as a conservation tool when it:

#	Principle	*Remarks*
1	**Respects local cultural values and practices (where "local" is defined as sharing living space with the focal wildlife species), and is accepted by (and preferably, co-managed and actively supported by) most members of the local community on whose land it occurs;**	***Local communities residing in chiefdoms and geographic areas which are contiguous to any wildlife estate or any open area are registered as Community Resources Boards (CRBs) with the DNPW. Management of all CRBs is done through a democratically elected representation of the local community themselves. The elections are done according to Village Action Groups (VAGs) and it is from those elected in the VAGs that form members of the CRB. The chief of the area is regarded as the patron of such CRBs. All meetings of the CRBs are conducted in a democratic way and decisions are reached through consensus. Minutes of all CRBs transactions and deliberations are recorded.*** ***Co-Management models between private investors and local communities are established in some Open Game Ranches such as the Kaindu Community Game Ranch in the Kafue ecosystem, extending for 15,500 hectares, which is providing an interesting and successful conservation model where the community through the Kaindu Community Resource Trust is managing the area together with private investors.***
2	**Involves and benefits local residents in an equitable manner, and in ways that meet their priorities;**	***The obligations under the hunting concession agreement provide involvement of and benefits to local communities. The concession's obligations are a components of the partnership in conservation of natural resources between the Communities, Safari Operators/professional hunters and the DNPW. No hunting concession agreement is valid without the signature of the Chief/s or CRB.***
3	**Adopts business practices that promote long-term economic sustainability.**	***The lease periods for the hunting blocks is variable and is dependent on the classification of the hunting block. Lease periods range from 7 to 15 years. Hunting Concession Agreements for GMAs are negotiated with DNPW and communities, which gives the communities their own voice and encourages the adoption of business practices that promote long-term sustainability. Long-term economic sustainability of community based programmes involving trophy hunting depends also on the international framework on trade as***

		international trade restrictions can jeopardise conservation programs.

Adaptive Management: Planning, Monitoring, and Reporting

Trophy hunting can serve as a conservation tool when it:

#	Principle	*Remarks*
1	**Is premised on appropriate resource assessments and/or monitoring of hunting indices, upon which specific quotas and hunting plans can be established through a collaborative process. Optimally, such a process should (where relevant) include local communities and draw on local/indigenous knowledge. Such resource assessments (examples might include counts or indices of population performance such as sighting frequencies, spoor counts) or hunting indices (examples might include trophy size, animal age, hunting success rates and catch per hunting effort) are objective, well documented, and use the best science and technology feasible and appropriate given the circumstances and available resources;**	***Zambia has a participatory quota setting process. The main scientific information used in the quota setting process is derived from aerial surveys which are regularly done in the country and includes many ungulate species. Other information is taken from ground counts, patrol sightings, local and expert opinion. Quota setting is done for each hunting block in GMAs for all types of hunting after close of hunting season and prior to the next hunting season. The quota for lion is set using information from scientific studies, field observations from Professional hunters and field officers and from hunting records. This allows CRBs and DNPW to review the previous hunting season's offtake. DNPW follows a bottom-up approach where CRBs submit a proposal of a quota to DNPW head office for adoption and approval. The final quotas are issued by the licensing unit. The produced quotas are distributed to the CRBs, Hunting companies and DNPW field stations. During the hunting season Wildlife officers accompany hunters on all hunts. The officer records activities related to the hunt on specified forms i.e., Safari Hunting monitoring forms, trophy measurement forms, and a client questionnaire. The officer endorses used licenses ensuring that they cannot be used again. The law requires that all harvested trophies are registered.***
2	**Involves adaptive management of hunting quotas and plans in line with results of resource assessments and/or monitoring of indices, ensuring quotas are adjusted in line with changes in the resource base (caused by ecological changes, weather patterns, or anthropogenic impacts, including hunting offtake);**	***Zambia has stopped lion hunting in areas were the lion population was low e.g., Chiawa and Tondwa GMAs. Furthermore the 2016 lion quotas have been set below the scientific recommended threshold with management and monitoring scheme including an aging system***
3	**Is based on laws, regulations, and quotas (preferably established with local input) that are**	***Trophy hunting in Zambia is regulated through the Zambia Wildlife Act and a number of Statutory Instruments with one, in preparation, specifically***

	transparent and clear, and are periodically reviewed and updated;	***targeting lions. Quotas are established in a transparent and participatory way.***
4	**Monitors hunting activities to verify that quotas and sex/age restrictions of harvested animals are being met;**	***DNPW has a long standing monitoring system for all trophy hunting. In 2015 it developed guidelines on lion hunting in Zambia.*** ***DNPW is also introducing a monitoring system specific for lions. This monitoring system will be based on a statutory instrument which is in preparation, which will introduce a mandatory sampling system that requires trophy lions meet or exceed a minimum age as one measure for harvesting trophy lions. The monitoring system will be based on specific forms that will help ensure proper compliance with the provisions of the law, including confirmation of legal licenses and collection of data associated with the hunt including but not limited to location, date, participants, and photos, as requested by DNPW. The monitoring system will be complemented by regular surveys.*** ***Zambia is committed to initiate further scientific surveys of Lions in order to assess the population status. Depending on the availability of funding, DNPW is planning surveys to be conducted in two areas: i) the corridor between South Luangwa National Park and Lower Zambezi National Park, comprising several GMAs and Open Game Ranches and ii) GMAs surrounding the eastern part of North Luangwa National Park. This will supplement the ongoing work of the Zambian Carnivore Programme in selected areas of South Luangwa and Kafue National Parks.***
5	**Produces reliable and periodic documentation of its biological sustainability and conservation benefits (if this is not already produced by existing reporting mechanisms).**	***Several reports are regularly published:*** - ***Reports of aerial surveys*** - ***Reports of other wildlife counts*** - ***DNPW partners in research produces annual report*** - ***Scientific publications*** - ***Community outreach programmes*** - ***DNPW Annual report***

Accountable and Effective Governance

A trophy hunting programme can serve as a conservation tool when it:

#	Principle	*Remarks*
1	**Is subject to a governance structure that clearly allocates management responsibilities;**	***The Zambian government structure for wildlife is described in the Wildlife Act No. 14 of 2015. The Act clearly defines the management responsibilities of the Government Department of National Parks and Wildlife. The Conservation Unit in DNPW monitors and oversees hunting in the country. The CBNRM Unit coordinates CBNRM activities in GMAs and builds capacity of CRBs in Resource monitoring including Safari hunting***
2	**Accounts for revenues in a transparent manner and distributes net revenues to conservation and community beneficiaries according to properly agreed decisions;**	***Revenues generated from trophy hunting are shared with local communities. From the revenues generated, members of local communities have been employed by CRBs as Community Scouts to assist DNPW with protection and monitoring of wildlife resources. These scouts also help assessing crop damage and problem animal controls in their communities, where they also conduct environmental awareness among the local populace.*** ***The revenues the local communities obtain allows them access to social amenities and various rural development projects. The projects span construction of bole- holes, schools, clinics, and feeder roads, as well as crop damage counter-measures including solar and chili pepper fences. More residents benefit indirectly from participating in wildlife management and accessing the resource, depending on the ability of the wildlife sector to generate funds. It has to be noted that local communities have limited benefits from non-consumptive tourism.*** ***Budgets of DNPW and CRBs are audited by the Office of the Auditor General.***

3	**Takes all necessary steps to eliminate corruption;**	***The Anti-Corruption Commission (ACC) is the Agency that is mandated to spearhead the fight against Corruption in Zambia. It was established in 1980 under an Act of Parliament, the Corrupt Practices Act No. 14. Currently the Commission is operating under the Anti-Corruption Act No. 3 of 2012 which has domesticated a number of legal provisions from the international protocols and conventions on corruption.*** ***The worldwide Transparency International ratings (http://www.transparency.org/country/#idx99) of corruption perceptions for Zambia have over the years improved tremendously. This is largely due to various anti-corruption intervention that the Government through the Anti-Corruption Commission and other stakeholders has put in place and continue to execute. (source: http://www.acc.gov.zm/portfolio/transparency-international-corruption-perception-ratings/)*** ***A representative of the Anti-Corruption Commission sits on the Wildlife Licensing Committee***
4	**Ensures compliance with all relevant national and international requirements and regulations by relevant bodies such as administrators, regulators and hunters.**	***The CITES Management Authority of Zambia, working in the DNPW, ensures compliance of the trophy hunting programme to CITES provisions.*** ***The Attorney General sits on Wildlife licensing committee to ensure compliance to national and international regulations.***

APPENDIX 2 - Reference Table to the USFWS Letter and Questionnaire on Lion in Zambia

The attached table cross-references the sections of the foregoing Enhancement and Non-Detriment Findings with the questionnaire directed to ZAWA (now DNPW) from the USFWS, dated 2 February 2016.

Question	Responded to in Section(s)
I. Overview *The lion is listed in Appendix II of CITES. As such, the Scientific Authority of the exporting country must make a determination that the export of a sport-hunted trophy will not be detrimental to the survival of the species (Article III, 2(a)). While the finding that the U.S. Fish and Wildlife Service must go beyond the "Non-detriment" standard, it would be very beneficial to our review if you could provide a copy of a recent "Non-detriment" finding made by your Scientific Authority.*	All sections, especially 10.0
II. MANAGEMENT PLAN (a comprehensive plan addressing specific management goals or actions) *1. Does Zambia currently have a national management plan for lions and, if so, could you please provide a copy? If there is no national plan, have regional plans been developed and adopted, and if so, could you please provide copies?*	3.4 and subsection
2. Is your agency the only government agency that is responsible for managing lions within your country? If not, which other agency or organisation within your national, regional, or local government is responsible?	3.1, 3.5 and subsection, 3.6 and subsections
3. Have you developed a mechanism (i.e., adaptive management approach) for implementing the plan(s) and determining its effectiveness? Could you describe how implementation of the plan is progressing and if there are management or logistical problems that still need to be addressed?	3.4, 3.1 (legislation), 3.3 (statutory instruments), 5.3.2 and 5.3.3 and subsections (adaptive management of quotas)

4. Are there any other management plans or conservation plans that contribute to or interact with the lion management plan(s) (i.e., regional plans, hunting concession plans)?	3.4.1, 7.1.1
III. Population Status *1. What is the status of lion populations within your country (e.g., population numbers; population trends; sex and age classification)?*	2.0 and subsections
2. Do you have a standardized process to conduct population censuses? If so, how often? What areas are censused? Do they include all hunting areas? What is the censusing methodology?	2.0 and subsections, 4.0
3. What is the current distribution of lions within your country (i.e., widespread, environmentally confined to specific areas, confined to national or regional protected areas)?	2 and subsections
4. Even with protection activities and legal intervention, poaching could still occur. Do you have any estimates on the number of specimens lost to illegal killing annually?	5.6, 7.0 and subsections
5. What impact are human-lion conflicts having on local or national populations? Is there a standardized national policy to address such conflicts and problem lion control? If so, does this policy include culling of surplus animals and removal of nuisance animals? Is there domestic harvesting of lions for local consumption or use?	7.2
IV. Conservation and Management *1. Please describe potential threats to the species, such as poaching and human-animal conflicts, and how these threats are being addressed.*	7.0 and subsections, see also 3.5 and subsections

2. Is your agency currently conducting any research efforts addressing conservation issues involving lions? What about other agencies or departments within your national or regional governments and what are their roles? Are you aware of any NGO projects currently underway that involve lion conservation or management? If so, could you describe such projects or provide contact information to the organization carrying out the work?	2.0 and subsections, 4.0 Annex 3
V. Hunting Policies/Regulations *1. Please describe how lion hunting program functions within your country. Specifically, do you have an established national/regional hunting quota? How is this quota determined? Many countries have established age restrictions on harvesting lions. Has your country established such age restrictions and, if so, what are they and how are they implemented?*	3.1,5.0 through 5.3 including subsections
2. What format do you use to manage sport hunting (i.e., establishment of national districts under government control, awarding hunting concessions to privately owned operations)?	5.2 and subsections, 5.4 and subsections
3. If hunting areas/concessions allocated to safari outfitters, how are they allocated? What requirements have been established for the concession holders (i.e., mandatory census activities, assistance to local villages, etc.)? Are concessions awarded on an annual basis or for longer periods? If concession areas are centrally controlled by your government (e.g., several outfitters hunt in the same areas and no one outfitter is responsible for overall management), what mechanism is used to monitor and control outfitter activities?	5.2 and subsections, 5.4 and subsections, 6.0/6.1 and subsections
4. How much do hunting licenses cost foreign hunters? How does your government utilize this revenue? Does a percentage go directly to lion conservation efforts or into more general wildlife management efforts? If so, what percentage is allocated to each? Is any of this revenue provided to local communities? If so, what percentage?	8.0 and subsections, 9.0 and subsections
5. How does the sport-hunting program provide any other tangible benefits, besides revenue, to local communities (i.e., increase employment, jobs in anti-poaching units)?	8.0 and subsections, 9.0 and subsections, see also 7.1.2, 7.1.3

Annex 1 Zambia Wildlife Act No. 14 of 2015

This annex is transmitted by email as PDF

Annex 2 Zambia's Conservation Strategy and Action Plan for the African Lion

This annex is transmitted by email as PDF

Annex 3 Contact details for selected Hunting Associations and NGO's in Zambia

a) Hunting Associations

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Annex 4 Report on the 2015 aerial census of elephants and other large mammals in Zambia Volume ii: population estimates and statistics for other large mammals and birds

This report is under final review and will be transmitted once completed by email as PDF

Annex 5 **Current fees as set by Statutory Instrument No. 60 of 2007**

This annex is transmitted by email as PDF

Republic of Zimbabwe

Enhancement and Non-Detrimental Findings for

Panthera leo in Zimbabwe

Zimbabwe Parks and Wildlife Management Authority



October 2016

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1 INTRODUCTION

The United States Fish and Wildlife Service (USFWLS) made a ruling in terms of its Endangered Species Act of 1973 (ESA) that the status of the southern and eastern African lion subspecies (*Panthera leo melanochaita*) is threatened (see http://www.regulations.gov). This ruling, which came into effect on January 22, 2016, now requires that the importation of all trophy lion from Zimbabwe will require an import permit. The decision whether to issue an import permit will in future be based on a Non-Detrimental Finding (NDF) that takes into consideration four main factors outlined under 50 CFR 17.22 and 17.32. These are:

- What direct and indirect impacts would occur on the wild population?
- Would issuing a permit conflict with any known programs intended to conserve the species?
- Would the purposes of the permit reduce the threat of extinction facing the species?
- What are the opinions of experts?

In addition to these factors USFWLS will also take into consideration the IUCN Species Survival Commission (SSC) *Guiding Principles on Trophy Hunting as a Tool for Creating Conservation Incentives, Ver. 1.0* (IUCN/SSC 2012). This document identifies five guiding principles of a hunting program that creates "*incentives for the conservation of species and their habitats and for the equitable sharing of the benefits of use of natural resources*" and recognizes that trophy hunting can contribute to biodiversity conservation and the conservation of the hunted species.

These are:

- **Biological sustainability** i.e. the hunting program:
    - Cannot contribute to the long-term decline of the hunted species
    - It should not alter natural selection and ecological function of the hunted species or any other species that share the habitat
    - It should not inadvertently facilitate poaching or illegal trade in wildlife by acting as a cover for such illegal activities
    - It should also not manipulate the ecosystem or its component elements in a way that alters the native biodiversity.

- **Net Conservation Benefit** i.e. the biologically sustainable hunting program should be:
    - Based on laws, regulations, and scientifically based quotas, established with local input, that are transparent and periodically reviewed
    - It should produce income, employment, and other benefits to create incentives for reducing the pressure on the target species
    - It should create benefits for local residents to co-exist with the target species and other species

- **Socio-Economic-Cultural Benefit** i.e. a well-managed hunting program can serve as a conservation tool when:
    - It respects the local cultural values and practices
    - It involves and benefits residents in an equitable manner
    - It adopts business practices that promote long-term economic sustainability

- **Adaptive Management: Planning, Monitoring, and Reporting** i.e. can the hunting programme enhance the species when it is based on appropriate resource assessments and monitoring (e.g., population counts, trend data), upon which specific science-based quotas can be established. Resource assessments should be objective, well documented, and use

the best science available. Adaptive management of quotas, based on the results of resource assessments and monitoring, is essential

- **Accountable and Effective Governance** i.e. a biologically sustainable trophy-hunting program should be subject to a governance structure that clearly allocates management responsibilities. The program should account for revenues in a transparent manner and distribute net revenues to conservation and community beneficiaries, and take steps when needed to eliminate corruption and ensure compliance with national and international requirements and regulations.

To address the points raised above, a systematic review of the status of lion in Zimbabwe has been undertaken with the full cooperation of stakeholders from the Government, Private Hunting Sector, Community NGOs and research organisations to demonstrate that the lion populations in Zimbabwe are being managed sustainably for benefit of both the conservation of the species and that the management programme is also providing economic incentives for local communities to protect and expand lion habitats. In doing so this assessment addresses the following issues:

- That the Zimbabwe hunting industry is based on sound scientific information and identifies mechanisms that would arrest the loss of habitat or increase available habitat (where feasible) and ensuring adequate protection from human encroachment.
- Demonstrate that there are government incentives in place to encourage habitat protection by private landowners and communities and incentives to local communities to reduce human-wildlife conflicts.
- Demonstrate that hunting concessions are managed to ensure the long-term survival of the listed species and its habitat.
- That trophy hunting provides financial assistance to the Zimbabwe Parks and Wildlife Management Authority, including the communal CAMPFIRE programme and private sector, to carry out various wildlife management programmes. It will also highlight how local communities directly and indirectly benefit from the presence of lion in their areas.
- Finally, this document will demonstrate how the participation of U.S. hunters in the Zimbabwe hunting industry contribute to the overall management of lion within the country.

2 Status and Distribution of Lion in Zimbabwe

Bauer et al (2015) summarise time series data for 47 lion populations across West, Central, East and Southern Africa where regular survey data are available. Using a Bayesian state space model to estimate growth rate-λ for each population, this study concludes that lion populations are declining everywhere across Africa, except in four southern countries (Botswana, Namibia, South Africa, and Zimbabwe). The population models indicate a 67% chance that lions in West and Central Africa will decline by one half, while estimating a 37% chance that lions in East Africa will also decline by one-half over two decades. It is concluded that almost all lion populations that historically exceeded ~500 individuals are declining, *but lion conservation is successful in southern Africa, in part because of the proliferation of reintroduced lions in small, fenced, intensively managed, and funded reserves.* This statement reflects the situation in Zimbabwe where lion populations in the conservancies have flourished under sound management regimes. They have also recovered rapidly in instances where appropriate actions have been taken to arrest unsustainable practices (i.e. Hwange) and where protected areas are receiving adequate funding (i.e. Gonarezhou).

2.1 The extent of lion distribution in Zimbabwe

The Zimbabwe Parks and Wildlife Management Authority (ZPWMA) is responsible for managing one of the largest estates in the country which constitutes approximately 5 million hectares of land or 13%

of the Zimbabwe's total land area (see Table 1 below). The bulk of Zimbabwe's wildlife occurs within the Parks Estate which includes 11 national parks, 16 safari areas, 16 recreational parks, 6 sanctuaries, 12 botanical reserves and 3 botanical gardens, all spread across the country, among other wildlife tourism related activities (Parks and Wildlife Act 2001 Chapter 20:14).

Wildlife populations also occur on the state Forest Areas, Communal CAMPFIRE areas and private conservancies dedicated to wildlife-based land use (Figure 1). Table 1 below provides a summary of these different categories, and whether they support lion populations (see Annex 1 for the details of each area).

Table 1. Summary of the National Parks Estate, CAMPFIRE, Forestry and Conservancies where lion populations are resident

Land Category		**Presence of Lion**				**Total (ha)**	**Total (km^2)**
		Yes (ha)	**%**	**No (Ha)**	**Migratory (Ha)**		
Parks Estate	National Parks	2,608,710	96	61,850	47,150	2,717,710	27,177
	Safari Area	1,745,300	92	146,600	-	1,891,900	18,919
	Botanical gardens	-	-	2,069	-	2,069	21
	Sanctuary	-	-	18,980	-	18,980	190
	Recreational	-	-	357,161	-	357,161	3,572
Forestry		436,165	47	491,701	-	927,866	9,279
CAMPFIRE		8,953,700	36	5,435,100	10,319,000	24,707,800	247,078
Private Conservancies		758,200	66	243,500	150,897	1,152,597	11,526
Matetsi Farms		-	-	-	155,627	155,627	1,556
Total Ha		**14,502,075**		**6,756,961**	**10,672,674**	**31,931,710**	**319,317**
Total km^2		**145,021**		**67,570**	**106,727**	**319,317**	
Percentage		**45%**		**21%**	**33%**		

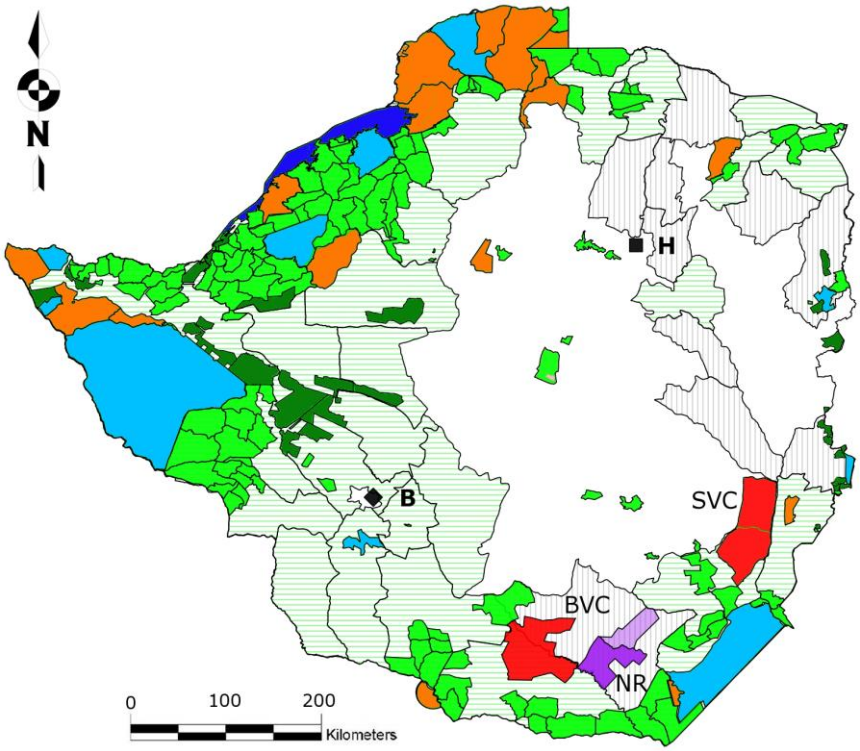


Figure 1: Map of Zimbabwe's main wildlife areas: [i] National Parks are represented in light blue; [ii] Safari areas are represented in orange; [iii] Forestry areas are represented in dark green; [iv] Community and Private wildlife areas are represented in light green; [v] Communal Land (CAMPFIRE Areas) in which sport-hunting may occur is represented by light green horizontal stripes; [vi] Communal Land in which sport-hunting does not occur is represented by grey vertical stripes. [vii] The Bubye Valley [BVC] and Savé Valley [SVC] Conservancies are represented in red. [viii] The Nuanetsi Ranch [NR] on which sport-hunting takes place is represented in dark purple (light purple represents the Nuanetsi Ranch cattle area); [ix] Lake Kariba is represented in dark blue. Harare (the capital city) is represented by a black square and letter '**H**'. Bulawayo is represented by a black diamond and letter '**B**'. Sport-hunting may occur in areas: ii, iii, iv, v, vii & viii (from du Preez, B. Groom, R., Mufute, O., Mandisodza-Chikerema, R. and Booth, V. (2016).

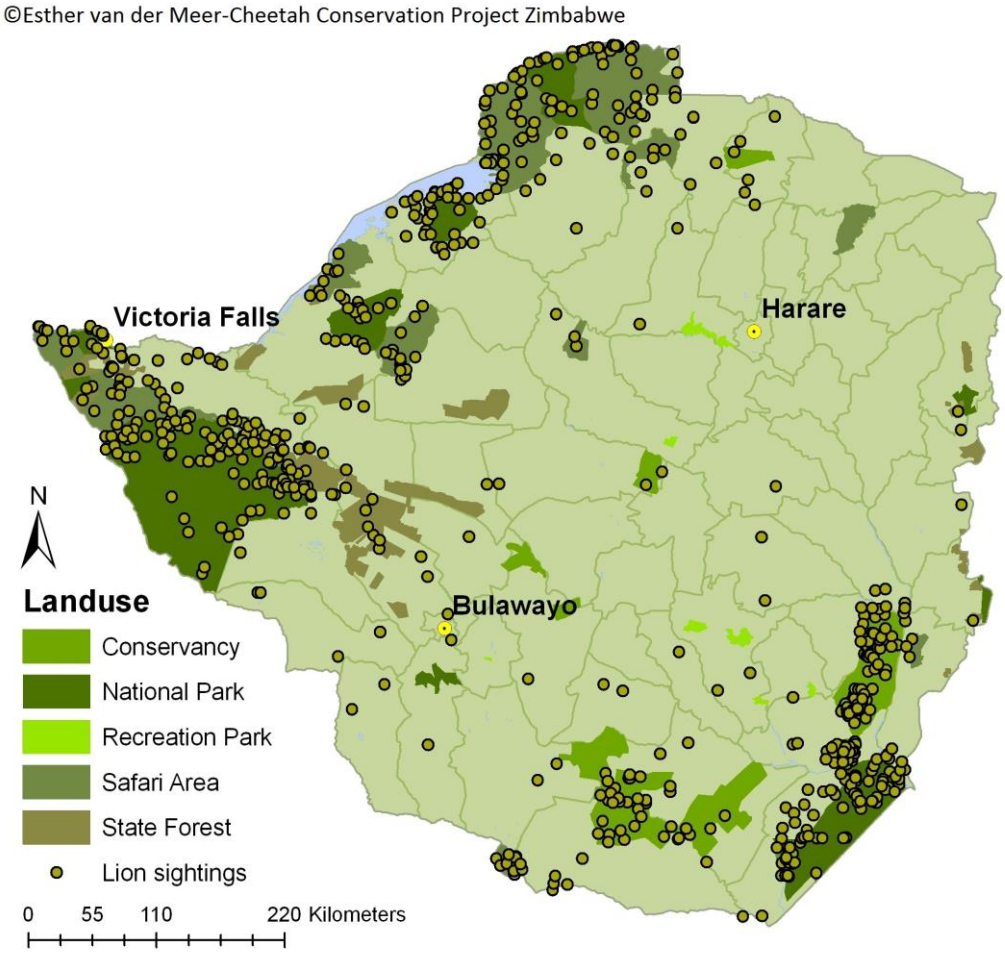


Figure 2: Range of African Lion Distribution in Zimbabwe

There are approximately 319,317 km^2 of land where some form of wildlife based land use is practiced in Zimbabwe. Lion occur permanently in 45% of this available range (c. 145,00km^2), with the majority occurring in State protected national parks (96%) and safari areas (92%). Lion also occur permanently in 47% of the State forest areas and 66% of privately owned Conservancies. The CAMPFIRE areas comprise approximately 247,000km^2 and lion occur in 36% of these areas. Lion are transient in CAMPFIRE, Conservancy and resettled areas adjacent to the major protected areas, and move across the border into Zambia, Mozambique, South Africa and Botswana (Figure 2).

There are two established Transfrontier Conservation Areas (TFCAs), the Great Limpopo Transfrontier Park (GLTP) which includes Gonarezhou National Park, and the Limpopo/Shashe TFCA. Other TFCAs that are at various stages of development are the Kavango-Zambezi (KAZA), Lower Zambezi-Mana Pools, Zimbabwe-Mozambique-Zambia (ZiMoZa) and Chimanimani.

2.2 Minimum population of lion in Zimbabwe

The minimum number lion that occur in approximately 51,642km^2 of land where reliable survey data are available is estimated to be c.1,917 (range 1,800 – 2,000) and is summarised in Table 2. The Western sector of the country dominated by Hwange National Park and the surrounding safari areas, forest areas, communal areas and private conservancies supports c.737 lion (or 38% of the overall population). The Southern sector dominated by the two major conservancies (Save and Bubye) and

Gonarezhou National Park supports c. 896 lions (48%) while the Central and Northern sectors of the country support c.284 lions (15%).

Table 2: Estimated minimum population of Wild Lion populations in Zimbabwe – September 2016 (Data compiled from a variety of reports)

REGION	AREA	AREA (km^2)	Estimated Number of Lions	Percentage
Western	Hwange NP	14,900	559	38%
	Matetsi Units 1-5	1,934	59	
	Matetsi Units 6-7 and Zambezi NP	1,585	67	
	Kazuma Pan NP	313	20	
	Kazuma Forest	240		
	Panda Masuie Forest	355		
	Matetsi ECA	1,556	15	
	Ngamo and Sikumi Forest	1,386	6	
	Gwaai Conservancy	927	22	
	Hwange Communal Land	392	2	
	Tsholotsho buffer adjacent HNP	1,275	7	
Subtotal		**24,863**	**737**	
Central	Chizarira NP	1,948	31	4%
	Chirisa SA	1,713		
	Omay	1,865	10	
	Matusadona NP	1,427	31	
Subtotal		**6,953**	**72**	
Northern	Chewore North and South	1,648	45	11%
	Dande	1,155	21	
	Hurungwe (Nyakasanga and Rifa)	1,709	32	
	Charara/Mukuti	1,692	20	
	Mana Pools	1,287	94	
Subtotal		**7,491**	**212**	
Southern	Gonarezhou National Park	5,053	125	48%
	Malilangwe	400	37	
	Bubye Valley Conservancy	3,440	450	
	Save	3,442	284	
Subtotal		**12,335**	**896**	
Overall Total		**51,642**	**1,917**	

2.2.1 Captive Breeding Facilities

Currently there are only two properties registered as captive lion breeders (Lion and Cheetah Park, and Antelope Park) and < 10 non-registered captive lion breeding operations (Table 3). Most of these centres keep lions for non-consumptive tourism and environmental education purposes with only a few keeping lions as pets. Altogether there are 345 lions held in captivity.

Table 3: Record of lions held in captivity – September 2016

Property	TOTAL
Doddieburn	13
Lion & Cheetah Park	40
Sentinel	2
Vhuka	5
Antelope Park	114
Safari Par, Masuwi Lodge (Lion Encounter)	4
Mhondoro Game Park	2
Chedgelow Farm	9
Chengeta	5
Turk Mine	6
Bally Vaughan	8
Mwanga Lodge	8
Masvingo	17
Karoi	2
Oscro	10
Simply Wild	19
Sondelani	9
Ruwazi	7
Imire	2
Makado Ranch	2
Chipangali	32
Crocodile Farm, Victoria Falls	1
Kuimba Shiri	2
Pamuzinda	6
Shearwater	10
Inyathi Ecogame Park	10
Total	**345**

3 Conservation and Management

3.1 Policy And Legislation

The Ministry of Environment, Water and Climate has a comprehensive suite of policies and legislation that provides the Zimbabwe Parks and Wildlife Management Authority (ZPWMA) with a mandate to conserve and protect all fauna and flora in the country.

The legal framework is enshrined in the National Legislation and associated Regulations that are informed by the Wildlife Policy (1992) that seeks to maintain a protected area network for the conservation of the nation's wild resources and biological diversity. Amongst others it seeks to create

economic activity to enhance rural development and encourages the conservation of wild animals and their habitats outside the protected areas.

The ZPWMA is established by the Parks and Wildlife Act of 1996 (Chapter 20:14) as amended by Act Number 19 of 2001 which came into operation on the 1st of June 2002 through a Statutory Instrument 144C of 2002. The Act provides for the:

- Establishment of a Parks and Wildlife Board;
- Confers functions and imposes duties on the Board;
- Establishment of national parks, botanical reserves, botanical gardens, sanctuaries, safari areas and recreational parks;
- The preservation, conservation, propagation or control of wildlife, fish, and plants of Zimbabwe and the protection of her natural landscape and scenery;
- Conferment of privileges on owners and occupiers of alienated land as custodians of wildlife, fish and plants;
- Giving of certain powers to environment committees (formerly intensive conservation area committees); and matters incidental to or connected with the foregoing.

The Act that was originally passed by Parliament in 1975 was unique in that it provided a legal basis for the devolution of Authority to private landowners over all wildlife on their land which resulted in in the rapid development of the country's wild life industry. It also paved the way for the partial extension of this principle to the Communal Lands through the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) in the 1980s that granted Appropriate Authority Status to the communal areas to manage the wildlife resources for their own benefit.

The Act was subsequently revised in 1996 and 2001 with the latest revision paving the way for the establishment of the current Parks and Wild Life Management Authority to replace the former Department of National Parks and Wild Life Management.

The legal and regulation framework applicable to the conservation and protection of lion and all other species includes:

- Parks and Wildlife Act; Chapter 20:14 (1996) as amended in 2001.
- Environmental Management Act; Chapter 20:27.
- Forest Act; Chapter 19:05.
- Statutory Instrument 362 of 1990: Parks and Wildlife (General) Regulations, 1990.
- Statutory Instrument 76 of 1998: Import and Export of Wildlife Products.
- Statutory Instrument 40 of 1994: Parks and Wildlife Act (General) Amendments.
- Statutory Instrument 26 of 1998: Parks & Wildlife Act (General) Amendment.
- Statutory Instrument 92 of 2009: Compensation Values for Wildlife.
- Statutory Instrument 93 of 2009: Compensation Values for Trapping of Animals.
- Trapping of Animals Control Act 20.16.

A summary overview of these instruments is provided in Annex II.

3.2 The Zimbabwe Parks and Wildlife Management Authority

The Parks and Wildlife Management Authority is mandated by the Parks and Wildlife Act [Chapter 20:14] with the responsibility of conserving Zimbabwe's wildlife heritage through effective, efficient and sustainable protection and utilisation of natural resources for the benefit of present and future generations. The Authority was established to allow it to retain the revenue that it generates for

funding its operations and thereby reducing its dependence on Treasury. This entailed introducing a commercial dispensation and putting in place effective revenue generation and financial management systems.

The ZPWMA has the mandate to manage the entire wildlife population of Zimbabwe, whether on state, private and communal land. Vision, mission and core values of ZPWMA are as follows:

Vision: *To be the world leader in sustainable conservation*.

Mission: *To conserve Zimbabwe's wildlife heritage through effective, efficient and sustainable utilisation of natural resources for the benefit of present and future generations and stakeholders*

Core Values: Teamwork, Commitment, Transparency, Professionalism, Integrity, Accountability, Fairness, in harmony with nature.

While private landowners may utilise the wildlife on their land, they are still accountable to the ZPWMA for the welfare of the wildlife in terms of Statutory Instrument 26 of 1998, which, among other things, states that "*No person shall permit any person who is not ordinarily resident in Zimbabwe to hunt on any land for which he is the appropriate authority any animals other than those entered on the authority to hunt…*'

3.3 Conservation Strategy and Action Plan for Lion

A *Conservation Strategy and Action Plan for the Lion (Panthera leo) in Zimbabwe* was prepared in 2006 by the ZPWMA, local and international NGOs. This was in response to the proposal submitted by Kenya at the 13th Conference of the Parties to the Convention on International Trade in Endangered Species of Flora and Fauna (CITES) calling for the transfer of the lion population from Appendix II to Appendix I. The Parties recommended a detailed examination of the issues surrounding the conservation of the African lion, through a series of regional workshops.

IUCN responded to this and together with other key stakeholders, organised the first workshop in 2005 which involved the 14 West and Central African lion range states. The second workshop brought together 15 lion range states from Eastern and Southern African in January 2006 (Bauer, Chardonnet and Nowell, 2005). Each workshop included the Directors of Wildlife Conservation Departments and their technical advisors, safari operators, community leaders, non-governmental organisations involved in conservation, as well as researchers on the African lion.

The workshops came up with several recommendations which included:

- The need for African lion range States to follow up the workshops by developing and implementing national lion management plans.
- The need for a Pan African Conservation strategy to form the basis of a region wide collaboration in the conservation of the lion and which would also form the basis for the management of other wildlife species on regional scale.

Responding to the first recommendation, the ZPWMA, together with IUCN, convened a workshop in November 2006 to develop a national lion conservation strategy and action plan for Zimbabwe attended by conservation NGOs, the private sector, and Rural District Councils (RDCs), as well as ZPWMA and IUCN (Conservation Strategy and Action plan for the Lion (*Panthera leo*) In Zimbabwe, 2006).

The deliberations of this workshop identified the following issues related to lion conservation in Zimbabwe:

- Management and research including technical advice, policy formulation and management interventions
- Capacity needs as reflected by adequate human, financial and material resources
- Mitigation of human-wildlife conflict
- Socio-economic costs and benefits of long-term lion conservation
- Communication and information dissemination for key decision makers at different levels
- Framework for captive breeding of lions
- Trade and regulations to ensure non-detriment findings related to trade in all lion related products
- Regional collaboration to strengthen bilateral and regional lion conservation strategies

The analysis of these issues led to the formulation of the conservation strategy whose vision is that *Lions (*are*) conserved and managed sustainably for their aesthetic, cultural and ecological values, and the socio-economic development of Zimbabwe*. The immediate objective of this strategy is *to secure and where possible, restore as many viable lion populations as possible in Zimbabwe whilst mitigating their negative impacts and enhancing their value for the benefit of people through sustainable use*.

Three broad targets were identified to achieve this objective:

1. Ensure the persistence of key lion populations and other important populations including those of doubtful viability;
2. Human and livestock loss reduced, and
3. Optimize wildlife conservation-related net benefits to local communities

Table 4 summaries the progress with achieving the results identified in the strategy:

Table 4: Summary of implementation progress of the 2006 lion conservation strategy.

Output 1. Lion Management - Lion populations, their habitats and wild prey effectively conserved and managed in collaboration with local stakeholders	
Target 1.1 Establish a baseline survey and monitoring programme for identified lion populations and their range inside and outside the Parks & Wildlife Estate	Baseline surveys have been completed for the Parks Estate using monitoring protocols for key variables (populations, habitats, prey). Selected surveys undertaken of areas outside National Parks in conservancies and some communal land and forest areas.
Target 1.2 Maintain and strengthen capacity for lion conservation, management, monitoring and research within PWMA and amongst other key stakeholders	Carnivore research programmes undertaken by NGOs (Mana, Matusadona, Gonarezhou, Zambezi and Hwange NPs, Matetsi, Chirisa SA) and research institutions (Bubye and Save Conservancies) in various parts of the country. Personnel trained in data collection and capture, management, lion aging and analysis.
Target 1.3 Identify and implement best management standards and practice for all trophy hunted lion populations, ensuring their viability and sustainable, equitable and adaptively managed trophy quotas	Quota setting methodology reviewed and annual quotas and offtakes analysed considering population changes, trophy quality and levels of PAC over time. Trophy hunting database in place and in process of being refined to provide cost-effective system for collation, entry, analysis, reporting and feedback to key stakeholders in the wildlife industry (ZPWMA, RDCs, SOAZ, ZPHGA, conservation NGOs, Researchers etc.). System of fixed and optional quotas reviewed and age-based criteria for male trophy animals in place and functioning.
Target 1.4 Develop and implement a national lion captive breeding management policy	Policy in place (see discussion below).
Target 1.5 Develop and implement co-management frameworks for wildlife management	Collaborative national lion action plans to co-management lion populations in place for NW Matabeleland and SE Lowveld, including three conservancies (Bubye Valley, Save and Malilangwe).
Target 1.6 The geographic distribution range of the lion population expanded	Conservancies and neighbouring communities are working together to maintain existing geographic distribution of lion populations. Zimbabwe proactive in the KAZA and GLTFCA programmes.
Output 2. Lion Research - Information for effective and adaptive lion conservation management generated	
Target 2.1 Initiate targeted research on lion ecology, management and mitigation of conflict	Extensive research programmes focussing on lion ecology and biology undertaken in Hwange, Bubye, Save, Malilangwe, Matusadona, Chizarira and Chirisa. ZPWMA have cooperated with NGOs, such as Panthera, to develop cost-effective age determination methods for lions. Key threats to lion populations, with focus on human-lion conflict, snaring and poisoning, undertaken and continually monitored.
Output 3. Mitigation - Human-lion related conflicts minimized and, where possible, eliminated	

Target 3.1 Develop and establish databases on lion/human conflict	Data on Problem Animal Control (PAC) reports on lion related problems collated.
Target 3.2 Identify and implement methods to reduce and mitigate livestock losses and lion attacks on humans	Approaches to mitigate livestock losses and lion attacks on humans being tested and implemented in Hwange. Methods to mitigate lion attacks on livestock being implemented as appropriate at selected sites (e.g. Tsholotsho).
Target 3.3 Trained and properly staffed PAC Units established to conduct rapid response, restrained and precisely targeted problem animal control	PAC Units at ZPWMA field station and/or RDC levels partially established.
Target 3.4 Incidents of human-lion conflict reduced by at least 30% in 5 years while also reducing retaliatory killing	Specific awareness and education package on lion conservation and management developed and implemented in Matusadona, Hwange and Gonarezhou regions.
Output 4. Socio- Economic - The costs and benefits of long-term lion management equitably distributed	
Target 4.1 Complete an inventory of stakeholders directly affected by lion conservation	Stakeholder groups (e.g. local communities, CAMPFIRE RDC representatives, commercial safari hunting operators (SOAZ, ZPHGA), tourism operators (ZATSO) identified. Financial impacts of lion conservation and extent and magnitude of socio-economic impacts on each stakeholder group completed.
Target 4.2 Deliver appropriate training and capacity building to prioritised stakeholders	Representative stakeholder groups in some regions identified (Hwange, Matusadona, Gonarezhou). Limited training undertaken. Implement adaptive programme across four wildlife regions
Target 4.3 Agree and implement collaboratively developed area-specific lion management plans with identified stakeholder groups in each wildlife region within 5 years	In progress. Hwange NP Management Plan approved.
Target 4.4 Implement transparent mechanisms to equitably distribute lion-related/generated income to identified stakeholders (groups and/or communities)	Scale of income generated from lion conservation reviewed and use of funds to encourage protection of lion populations reach local stakeholders undertaken (see CAMPFIRE generated revenues)
Output 5. Regulations - Effective regulation of consumptive lion utilisation ensured	
Target 5.1 Implement approved policy and practice at national and local levels regarding problem animal control (PAC) of lions within 2 years	Current policy and practice regarding problem animal control of lion reviewed, at national and local levels. PAC offtakes reconciled with trophy hunting quota offtake to ensure that the overall offtake (i.e. total quota) is sustainable.
Output 6. Communication, Awareness and Information Dissemination	

Target 6.1 To carry out awareness programmes in 50% of the districts in Zimbabwe within the next three 3 years	Awareness programmes initiated at a national level, with professional hunters, communities and NGO community. Awareness campaigns being carried out by the Extension and Interpretation Unit in all the regions.
Target 6.2 Create lion conservation and management information units within one year	Databases established at some key research centres using dedicated external research programmes (e.g. WILDCRU).
Output 7. Regional and Trans-Boundary Collaboration	
Target 7.1 Undertake an inventory of national strategies for lion management	Done.
Target 7.2 Encourage the development of national lion conservation strategies where these are missing &/ or incomplete	National lion conservation strategies discussed at AWCF (meeting held under auspices of KAZA).
Target 7.3 Develop an integrated and harmonised lion management strategy for Transfrontier Conservation Areas (TFCAs)	Lion conservation strategies for SADC discussed at AWCF meeting held under auspices of KAZA.
Target 7.4 Implement lion conservation strategy and management plan	Strategy under review.

3.3.1 National Lion Captive Breeding Policy

A target of the Conservation Strategy and Action Plan for the Lion in Zimbabwe was to develop and implement a National Lion Captive Breeding Management Policy. This was achieved in 2011 when the ZPWMA met with lion breeders, keepers and animal welfare organizations to define the purpose of breeding and keeping lions; identify and discuss issues related to breeding and keeping of lions in captivity and to chart the way forward on the breeding and keeping of lions in captivity.

The objectives of the policy are to provide a national approach and minimum standards to all aspects relating to the management of captive bred lions including the role of captive bred lions upon reaching maturity and regulate the import and export of captive bred lions. The policy also defines the measures to protect the genetic integrity of indigenous lion populations. The use and welfare of captive bred lions is monitored by a captive lion inspection team.

In terms of this policy, lions that are kept in captivity for species conservation and commercial purposes are subject to the following conditions:

1. No permit for the keeping of lions in captivity will be issued before the facility has been inspected and approved by ZPWMA as a Captive Lion Holding Facility.
2. Lions may not be allowed to breed in captivity unless the holding facility is registered as a Captive Lion Breeding Centre. If a breeding permit is not issued, it is the responsibility of the owner to ensure that the animals do not breed. If breeding occurs without a permit the owner will be fined and the animals are subject to confiscation and possible destruction by ZPWMA.
3. Lions may not be captured from the wild population and kept in captivity unless the animal is orphaned or injured and is captured with the purpose of rehabilitating the animal and returning it to the wild within as short a time as possible.
4. Captive bred lions may not be released into the wild or transferred from the facility without prior permission from ZPWMA, and are subject to an approved release plan.

No lion can be transported without the necessary internal and national permits and without being micro-chipped, and all transportation of live animals must comply with CITES Resolution Conf. 10.21(Rev. CoP 14). To safeguard the integrity of the indigenous gene pool, no import permits will be issued for non-indigenous lions. Any lion that are to be transported must be issued a certificate of health by a competent veterinarian confirming that the premises of origin has been free from anthrax, panleukopenia and canine distemper for six months, and that each predator is free from diseases such as FIV, BTB or any other disease which may threaten local populations. The animal should also have been vaccinated for rabies and treated with a broad spectrum de-wormer and acaricide.

It is an offence to export lions from Zimbabwe without a ZPWMA export permit, and all export permit will only be considered if the exporting facility holds a current permit to keep captive lions. Moreover, an export permit will only be issued if the importing facility, in the country of import, conforms to regulations laid out in this policy document.

4 Population Trend Data For Key Lion Populations In Zimbabwe

Zimbabwe has in recent years taken proactive actions to enhance the conservation of lion populations both inside and outside the protected areas. These have included implementing moratoriums on hunting, reducing quotas, implementing an age-based hunting regulation and undertaking independent monitoring programmes conducted by international research institutions. Emerging from this is evidence that by implementing appropriate regulatory, management and monitoring actions, coupled with raising awareness, the lion populations respond rapidly and recover to near

former levels. The section below summarises the data from key range areas both inside and outside the National Parks Estate to substantiate this.

4.1 LION SURVEY TECHNIQUES

The population estimates of lions in Zimbabwe are determined through carnivore spoor surveys, systematic lion collaring and call-up surveys. With the strategy to maintain the wilderness values of most protected areas, there is low road penetration in the parks estates, however all suitable roads are used as transects, and in areas of suitable substrate, spoor surveys have shown to be an effective and efficient means to assess wildlife densities (Stander 1998, Fuston et al. 2001, Davidson and Romanach 2007). Patrol reports, field observations by ZPWMA rangers and other sightings by tour operators and tourists also contribute to the knowledge of the status of lions in Zimbabwe's protected areas. Similarly, the occurrence of lion in Safari Areas is recorded by resident safari operators, including those operating in CAMPFIRE areas.

4.2 RESULTS OF REGIONAL LION SURVEYS

Lion population surveys provide indices of abundance that can be used to determine spatial distribution, as well as temporal trends in population numbers. The results of the different survey methods are used to generate information for setting sustainable lion trophy hunting quotas and for population management.

4.2.1 Gonarezhou National Park

Spoor count surveys of the Gonarezhou National Park have been conducted since 2009 using the same methodology to obtain direct estimates of lion populations to compared actual lion densities with potential density estimates (Groom, 2009, Groom et. al. 2014). Table 5 below illustrates the growth of the lion population in the Park (Groom and Watermeyer, 2015).

Table 5: Population estimates of lion in the whole of Gonarezhou National Park (extrapolated from survey area) from 2009 – 2015 (Groom and Watermeyer, 2015).

2009	2010	2011	2012	2013	2014	2015
31	45	72	64	77	116	125

As with many lion populations anthropogenic factors can be key drivers of lion population dynamics, and in areas with high human impact lion numbers may be significantly lower than those predicted by prey biomass models. This was found to be the case in the Gonarezhou National Park. Groom et. al. (2014) concluded that high hunting quotas either within or around the protected area were the most likely cause of the low lion numbers, with quotas in some areas being as high as seven lions per 1,000km^2 in some years. Other factors included persecution, poisoning and problem animal control, as well as disease and competition with spotted hyaenas (*Crocuta crocuta*).

Following decisions to halt lion hunting, and reducing human-lion conflict, the lion population responded and steadily increased, reaching a density of 2.5 lions / 100km^2 in 2014 (as compared with 0.6 / 100km^2 in 2009). Relative to other populations (average over Kruger NP, Hwange NP, Selous GR and Serengeti NP = 9.6 lions / 100km^2) this is still low, suggesting the population could continue to increase further. Groom et. al. (2015) conclude that the lack of artificial water in Gonarezhou means that natural carrying capacity will be lower but based on prey biomass availability predictions of lion carrying capacity could support between 200 and 300 lions (Groom 2010). It is therefore still possible that the lion population in the park could at least double before reaching carrying capacity (especially because prey biomass is now greater than it was in 2010 – see Section 8.5 below).

4.2.2 Save Valley Conservancy

The African Wildlife Conservation Fund carries out an annual large carnivore spoor survey to assess population trends of the carnivores in the Savé Valley Conservancy (SVC) to aid management decisions. A standardised methodology is used to ensure consistency through time and comparability with other studies. Since 2008, the spoor surveys have been done using the same roads and the same observer. The results of these surveys are provided in Table 6 showing that the lion population has increased from 40 in 2005 to 284 in 2015 (Groom and Watermeyer, 2015, du Preez et al, 2016).

Table 6: Population estimates of lion in the whole of Savé Valley Conservancy from 2005 – 2015

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
40	50	52	76	114	143	105	130	115	182	284

The lion population has increased substantially in the last two years, and there are now an estimated 284 lions in the whole of the conservancy. This is a notable increase since the 2013 estimate of 115 lions and 2014 estimate of 182, and is perhaps a latent effect of no hunting for over several years. Of the 149 lion tracks encountered, 28% were big adult males with 53% identified as females/juveniles and 15% as young cubs (3% of tracks were unidentified). The number of lions in SVC equates to a density of 11.7 lions/100km². This is slightly higher than other population estimates of 9.6 lions/100km² (average over Kruger, Hwange, Selous and Serengeti).

4.2.3 Bubiana Valley Conservancy

After originally being eradicated by cattle ranchers in the area, 13 lions were reintroduced to the Bubye Valley Conservancy in 1999, and four young males broke into the Conservancy that same year. From the original 17 animals present in 1999, the Bubye Valley Conservancy lion population was estimated at approximately 280 individuals in 2009 when robust population surveys were initiated by a team from the University of Oxford Wildlife Conservation Research Unit (WildCRU), and this population has continued to grow. Today it is estimated that there are over 500 lions on the Bubye Valley Conservancy (Figure 3, du Preez et. al., 2016).

The exponentially increasing Bubye Valley Conservancy lion population currently exists at one of the highest densities in Africa (~0.190 lions/km^2: du Preez et al. 2015, du Preez et al. 2016), greater than that of the Serengeti, Tanzania (0.10 lions/km^2), Selous, Tanzania (0.080 – 0.130 lions/km^2: Creel and Creel 1997), Kruger National Park, South Africa (0.096 – 0.112 lions/km^2: Mills et. al. 1995), and Hwange National Park, Zimbabwe (0.027 lions/km^2: Loveridge et. al. 2007). This equates to the largest contiguous lion population in Zimbabwe.

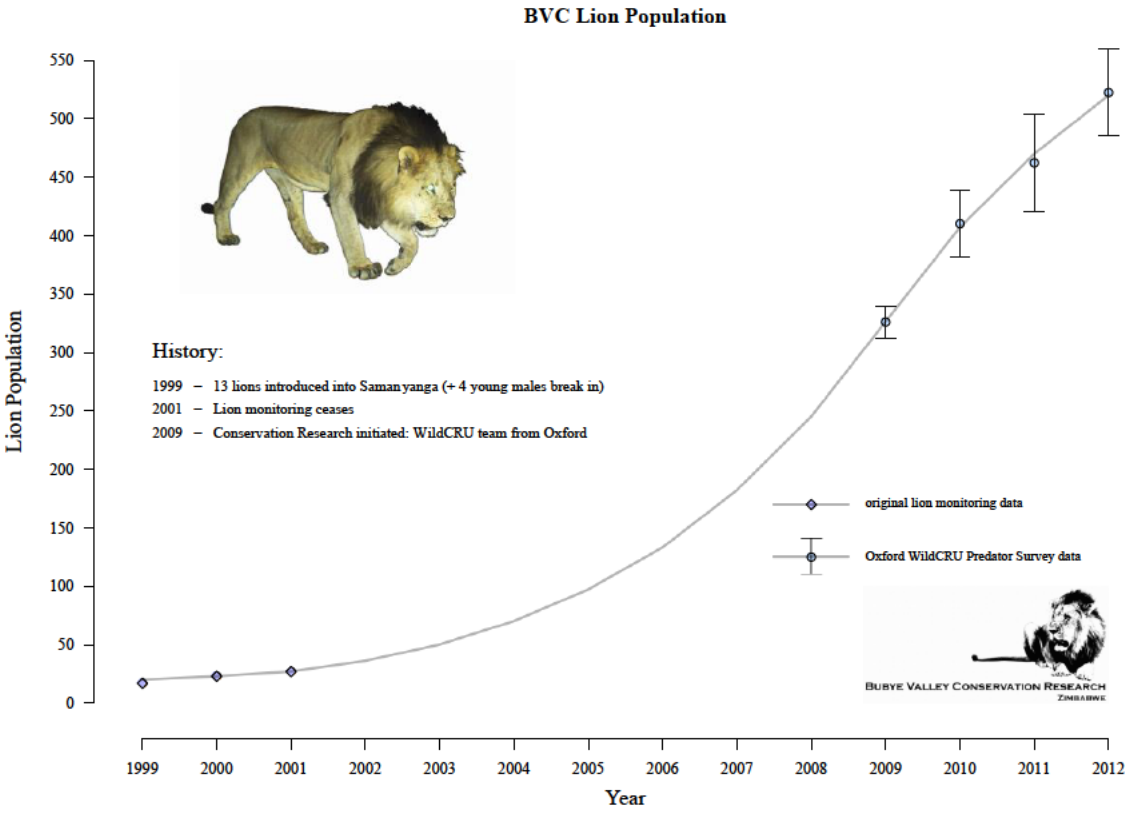


Figure 3: The Bubye Valley Conservancy lion population has increased exponentially since the original reintroduction of the species to the conservancy in 1999.

4.2.4 Mana Pools National Park

In conjunction with ZPWMA, Zambezi Society and the Cheetah Conservation Project, the Wildlife Conservation Research Unit (WILDCRU) based in Oxford (U.K.) conducted a camera trap and spoor count survey of Mana Pools National Park with the objective of:

- To undertake park wide surveys to estimate population density, distribution and habitat occupancy of common predator species in Mana Pools National Park.
- To contribute to Cheetah Conservation Project Zimbabwe's (CCPZ) cheetah monitoring protocol.
- To provide presence/absence data on all the larger mammal species.

A Facebook page was also created for the survey that was regularly updated on the progress of the survey (Facebook.com/Mana Pools Survey 2015).

The preliminary results of this survey identified 67 individual lions from the 267 images captured. When combined with the spoor count surveys, the population was estimated at 94 lions at a density of 4.5 lion/km^2 (Seymour-Smith and Loveridge, 2015),

4.2.5 Hwange National Park

The Hwange Lion Research Project undertaken by the Wildlife Conservation Research Unit (WILDCRU, Oxford University) works in association with the Zimbabwe Parks and Wildlife Management Authority. Since 1999 this project has identified over 600 lions and currently monitors approximately 15 prides and 12 male coalitions in a 5,000km^2 study area. This is one of the most intensive and long-term lion

projects in Africa. A key finding of this research programme has been to demonstrate that the way lion trophy hunting is managed can rapidly improve the status of lion populations by implementing a biologically sustainable system of allocating quotas. This project has also increase the understanding of human related impacts on lion populations (and vice-versa) along the park boundary. More recent research is focussed on understanding connectivity between Hwange NP and other areas such as parks in Botswana and in Zimbabwe.

This project was initiated because there was a perception that levels of sport hunting of male lions' in the hunting concessions surrounding the Hwange National Park were having a negative impact on the conservation of the population (Loveridge, et. al. 2007). Data collected between 1999 and 2004 suggest that this was indeed the case and this contributed to a suspension of sport hunting of lions in the area surrounding the Park between 2005 and 2009. This was a crucial shift in management policy for this species and an important step towards sustainable management and conservation of lions. Following the imposition of the hunting moratorium, lion densities increased (Figure 4).

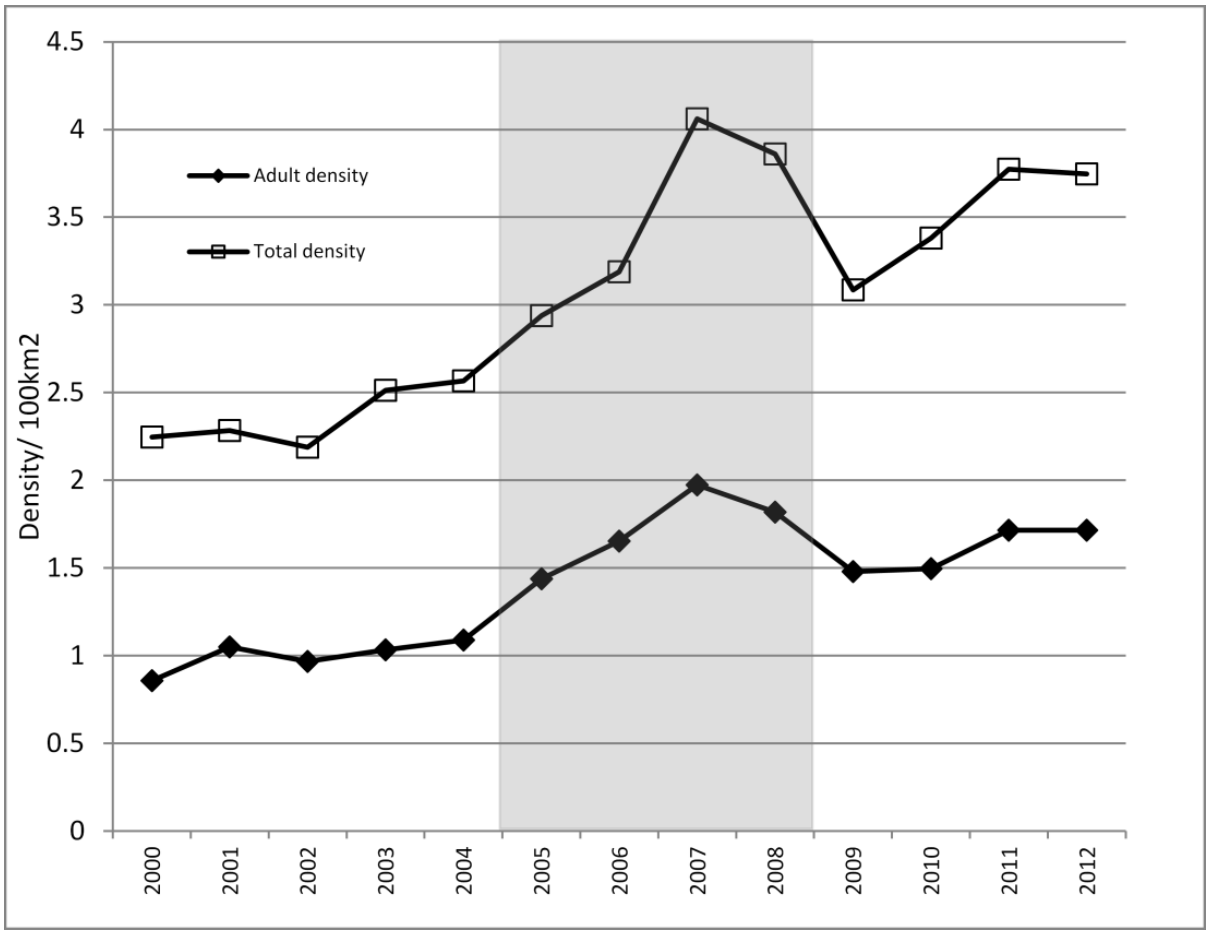


Figure 4: Lion densities in the Hwange area between 2000 and 2012

Following the lifting of the moratorium, and by implementing strict monitoring and hunting guidelines, the overall Hwange lion population has continued to show a positive trend, and is now estimated at over 550 animals.

4.2.6 Zambezi National Park and Units 6 and 7

Victoria Falls Wildlife Trust (VFWT) in collaboration with ZPWMA and the Hwange Lion Research Project has recently completed both spoor count transects and a camera trap surveys in Zambezi National Park, and Units 6 and 7 of the Matetsi Safari Area. The preliminary results of these surveys show that the lion population has increased since 2013 to approximately 67 (Rodger Parry, pers comm.).



Coalition males, Zambezi National Park, June 2016 (*Photo credit: Jessica Dawson, Victoria Falls Wildlife Trust)*

4.2.7 Chizarira National Park and Chirisa/Sengwa Safari Area

A survey was undertaken jointly by the Zimbabwe Parks and Wildlife Management Authority and the African Lion and Environmental Research Trust in September 2015 (Dr Norman Monks pers comm.). The survey area consisted of the 1,910 km^2 Chizarira National Park (a non-hunting area) and the adjoining 1,713 km^2 Chirisa/Sengwa Safari Area (a hunting area). No large carnivore counts using the call-up method had previously been conducted in these contiguous protected areas.

The survey method used the standardized protocol of audio broadcasts of a buffalo calf in distress. Spoor counts were not used for these surveys since previous research had shown that the call-up method was more precise, took less time, and was less costly to complete to achieve accurate results. Up to three stations were sampled nightly commencing just after sunset.

Twelve call-up sites were sampled. Response to the call-up stations by lions was low with only 2 of the 12 stations visited. The population abundance was estimated to be 31.6 (0.872 lion 100/km^2), suggesting a decline of 68.4% since 2004 when estimates of lion numbers were provided to Bauer and van der Merwe, (2004).

5 CONSERVATION IN ZIMBABWE

Zimbabwe Parks and Wildlife Management Authority (ZPWMA) falls under the Ministry of Environment, Water and Climate and it was established under the Parks and Wildlife Act of 1996 (Chapter 20:14) as amended by Act Number 19 of 2001. The rationale behind the establishment of the Authority was to allow it to retain all the revenue it generates to be ploughed back into conservation. The functions of the Authority are provided for in detail in section 4 of the Parks and Wildlife Amendment Act Number 19 of 2001. The Act gives the Authority power to control, manage and maintain Zimbabwe's wildlife resources.

Its **vision** is "*To be a World Leader in sustainable conservation*" and its **mission** is "*To conserve Zimbabwe's wildlife heritage through protection and sustainable utilisation of natural resources for the benefit of present and future generations*."

5.1 STAFF ESTABLISHMENT

The staff strength at the beginning of January 2015 was 2,043 and ended at 2,044 on 31, December 2015 (2015 Annual Report (unpublished). Fifty (50) rangers were recruited in 2015. The following is the staff status report as at 31st December, 2015 (Table 7).

Table 7: Summary Staff Establishment by Region

Position	Grade	HQ	VMU	Northern	Western	Southern	Central	Total
Executive	F & E	3	0	0	0	0	0	**3**
Department Managers/Sectional Heads	D3-D5	19	0	3	4	3	3	**32**
Ecologists/ Area Managers/Officers	D1-D2	11	1	19	19	13	4	**67**
Snr Rangers /Officers	C1-C5	29	6	64	89	49	34	**271**
Rangers/Clerical	B2-B5	33	12	507	461	310	197	**1,520**
Gen. Hands / Lodge Attendants	B1	2	2	30	66	33	17	**150**
TOTAL		**97**	**21**	**623**	**639**	**408**	**255**	**2,043**

The current remuneration levels have remained low with the lowest paid worker receiving a gross salary of $375 per month. The last salary increase of 23% was in January, 2014. A comparison with other Parastatals within the same parent ministry, shows that the Authority has the lowest salary scales.

5.2 TRANSPORT OPERATIONS

As indicated in Table 8, the total cost of operating the Parks transport fleet was is $1,547,172.82 (excluding insurance and licensing) in 2015. The existence of old and obsolete vehicles in the fleet increases costs as most of them require major component replacements thereby increasing vehicle downtime.

Table 8: Overall travel and fuel consumed by Region

Station	Km travelled	Fuel Consumed		Repairs & Maintenance Cost ($)	Total Cost ($)
		Litres	Cost ($)		
Head Office	1,489,294	190,644	272,620	136,419	409,039
Northern	1,429,260	149,577	213,895	147,113	361,007
Southern	1,075,077	110,111	157,458	59,548	217,006
Western	1,313,263	142,012	203,077	161,120	364,196
Central	392,885	47,995	68,632	127,288	195,920
TOTAL	**5,699,779**	**640,339**	**$915,684**	**$631,486**	**$1,547,172.**

Table 9 below summarises the status of the Authority's vehicle fleet as of 2015. Out of the fleet complement of 316 (including tractors and motor cycles), only 70% are in sound condition.

Table 9: Number of vehicles per region

Region	Runners	Non-Runner	Total	% of Non-Runner
Head Office	41	6	47	13
Northern	53	19	72	26
Southern	30	21	51	41
Western	80	39	119	33
Central	17	10	27	37
Total	**221**	**95**	**316**	**30**

The Authority also owns three aircraft: Bell Jet Ranger and Robinson R22 Beta 11 helicopters, and a Cessna 185. The Jet Ranger is based at Hwange National Park and is used for game capture and law enforcement. The remaining aircrafts are non-operational.

5.3 LAW ENFORCEMENT

A major component of the Authority's mandate is law enforcement. This has become increasingly more important with the escalation in illegal wildlife trade, particularly involving elephant and rhino. The Authority has an establishment of 2,146 rangers however by the end 2015, there were 1,448 rangers in post (67%). Of the 1,448 rangers in post, 1,004 are deployable for anti-poaching operations.

The level of effort of law enforcement over the last 3 year is summarised in Table 10. In 2015 there were 2,139 incursions detected, and arrest of 1,354 local and 129 foreign poachers. The number of armed contacts declined from 26 in 2014 to 23 in 2015, and number of poachers killed declined from 13 in 2014 to 11 in 2015. Recoveries made in the field included 25 rifles, 276 rounds of ammunition, 496 pieces of elephant ivory, 4 rhino horns and 5,133 wire snares.

Table 10: Detections, Arrests and Recoveries for 2013, 2014 and 2015

Year	No of Incursions	No of contacts		Number of poachers				Recoveries					Other recoveries and arrests		
				Killed		Arrested									
		Armed	Visual	Local	Foreign	Local	Foreign	Rifles	Ammunition	Ivory	Rhino horn	Snares	Gold	Poachers Camp	Dogs
2013	1842	27	344	9	0	1421	131	20	945	436	5	4415	93	264	180
2014	1571	26	362	10	3	4161	94	20	163	202	19	4864	221	186	272
2015	2139	23	356	6	5	1354	129	25	276	496	4	5133	134	339	167

5.3.1 Illegal Harvesting of Wildlife

Commercial wildlife poaching involving both local and foreign nationals continues to plague Zimbabwe, especially with respect to elephant and rhino located in the Zambezi Valley, Sebungwe, North-West Matabeleland, South-East Lowveld. The species targeted are shown in Table 11 and 12. Note that 21 lions were killed illegal between 2013 – 2015, with 6 animals killed through snaring in the area adjacent to Hwange National Park in 2015.

Table 11: Trends in wildlife poaching in the parks estate

Year	Illegally killed wildlife										
	Elephant	Buffalo	**Lion**	Kudu	Zebra	Impala	Warthog	Nyala	Eland	Crocodile	Waterbuc k
2013	293	65	**12**	65	21	67	22	5	6	2	15
2014	176	44	**2**	34	8	65	26	2	5	3	15
2015	317	78	**7**	76	21	92	46		9	17	6
2016*	101	23	**0**	23	22	54	12	1	4	1	5
Total	**807**	**210**	**21**	**200**	**72**	**278**	**106**	**8**	**24**	**23**	**41**

*To September 2016

Table 12: Illegally killed wildlife 2015 in the four regions

Region	Elephant	Buffalo	**Lion**	Kudu	Sable	Zebra	Croc	Impala	Eland	Warthog	B/Buck	waterbuck
Central	46	30	**0**	16	0	6	1	28	0	17	7	
Northern	75	6	**0**	6	0	0	0	0	0	0	0	0
Southern	65	38	**1**	42	0	9	4	31	4	25	1	6
Western	131	4	**6**	12	1	6	12	33	5	4	1	0
Total	**317**	**78**	**7**	**76**	**1**	**21**	**17**	**92**	**9**	**46**	**9**	**6**

5.3.2 Illegal trophy hunting – the "Cecil" effect

Professional hunter Theodor Bronkhorst was arrested for allegedly illegally hunting of a lion popularly known as 'Cecil' with a foreign client on Antoinette and Antoinette farm in Gwayi River Conservancy (which is adjacent to Hwange National Park). The same case involved Umguza Rural District Council in alleged illegal quota transfer[1]. At the time of writing, this case has not been brought before the court, and is still under judicial review[2].

The Authority immediately implemented the following measures in response to this incident:

- Hunting of lions, leopards and elephant in areas outside of Hwange National Parks required confirmation and authorization in writing by the Director-General of the Zimbabwe Parks and Wildlife Management Authority, and all hunts are to be accompanied by the Authority's staff whose costs will be met by the landowner.
- Bow hunting was suspended except with confirmation and authorization in writing by the Director-General of the Zimbabwe Parks and Wildlife Management Authority.
- Members of the hunting fraternity were reminded that it was illegal for quotas to be transferred from one hunting area to another. Any case of quota transfer would be regarded as poaching, and the Authority will not hesitate to arrest, prosecute, and ban for life any persons including professional hunters, clients and land owners who were caught on the wrong side of the law.

[1] This system facilitated the transfer of a quota from one property to another has since been suspended by the Authority.

[2] Note: This case has been dismissed by the court on 12th November 2016.

- 2015 hunting quotas and permits for Antoinette and Antoinette farm, Railway farm 33, Umguza Rural District Council and Kusile Rural District Council were suspended.
- Professional hunters' license for Theodor Bronkhorst was suspended.

5.4 Human Wildlife Conflict

The Authority is called upon to deal with human-wildlife conflict (HWC) issues across the country, and this continues to be a challenge. A total of 863 reports of problem wild animals causing threat to human life and property were received in 2015 compared to 1,637 reports in 2014 (Table 13). From these incidents, a total of 39 human fatalities by crocodiles, elephants, lions and buffaloes were recorded in 2015 compared to the 27 fatalities in 2014.

Table 13: Trends of Human and Wildlife Conflict Incidents

Year	Total Reports Received	People killed	People Injured	Cattle killed	Goats killed
2013	1 088	21	16	67	65
2014	1 637	27	24	217	129
2015	863	39	23	232	213
Total	**3 588**	**87**	**63**	**516**	**407**

The scale and species involved in HWC is summarised in Table 14. The authority received 200 problem lion reports and responded to 177. One person was killed by lion, and 206 livestock. The Authority elected to capture problem lion (6) rather than destroy the animals.

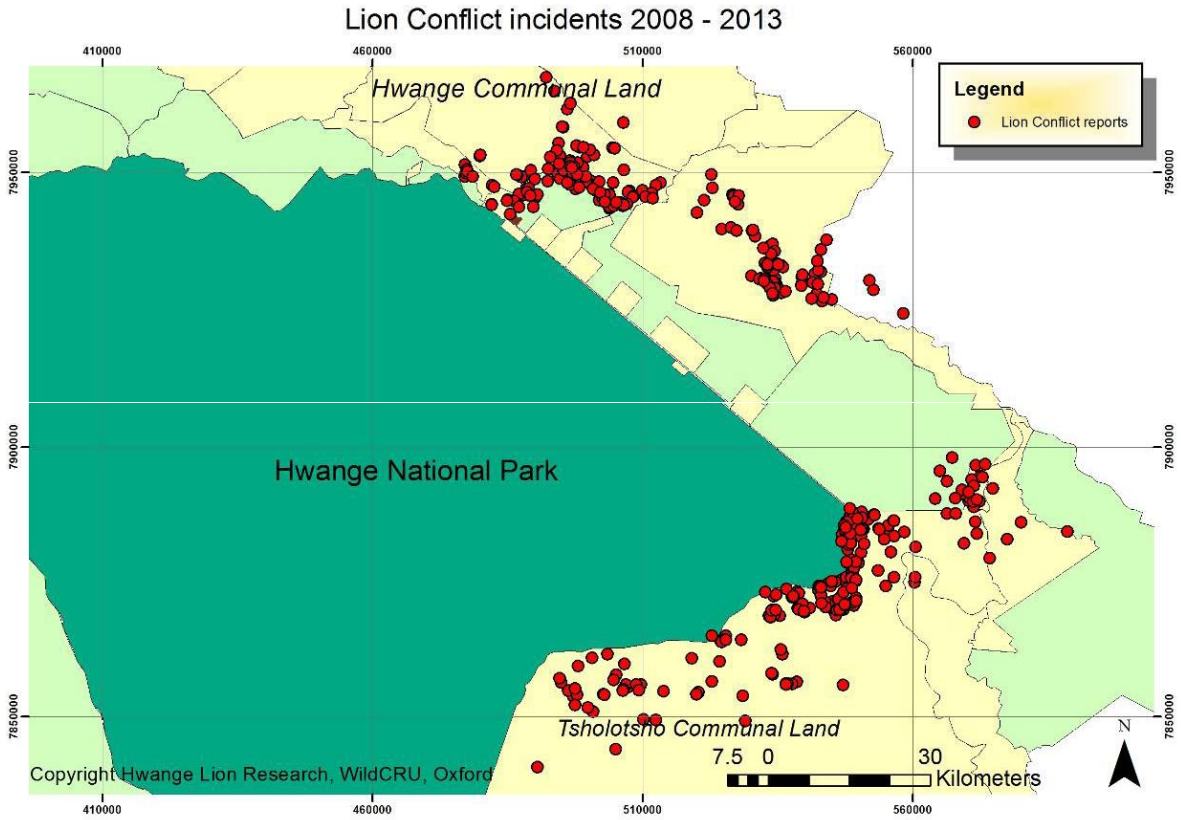
Table 14: Scale of countrywide human wildlife conflict in 2015.

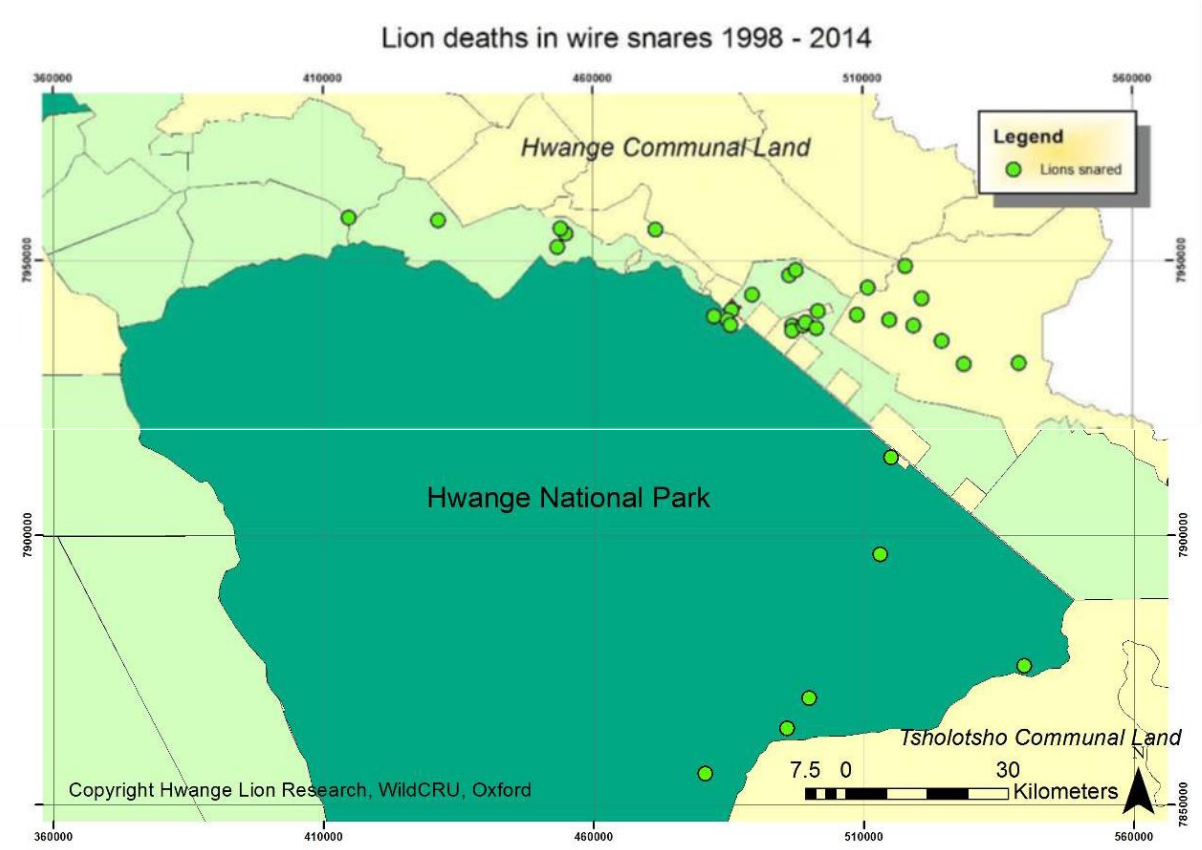
Species	Nature of problem	No of reports received	Reports attended	Number of animals eliminated		People		Livestock killed		
				Killed	Captured	Killed	injured	Cattle	Donkeys	Goats
Baboons	Damage to infrastructure, crop raiding, threat to humans	109	105	51	48	0	0		0	0
Buffalo	Threat to human life and crop raiding	46	40	0	15	2	1		0	0
Elephant	Threat to human life, crop raising, destroying property	216	177	0	38	4	5	0	0	0
Hippo	Threat to human life and crop raiding	131	87	0	34	0	0	0	0	0
Crocodile	Threat to human life and killing livestock	106	85	39	9	27	14	16	1	47
Hyenas	Killing livestock	36	18	0	7	0	0	68	2	54
Leopard	Killing livestock	19	11	0	1	0	0	32	0	33
Lion	**Threat to human life and livestock killing**	**200**	**177**	**0**	**6**	**1**	**0**	**115**	**12**	**79**
Total		**863**	**700**	**90**	**158**	**34**	**20**	**231**	**15**	**213**

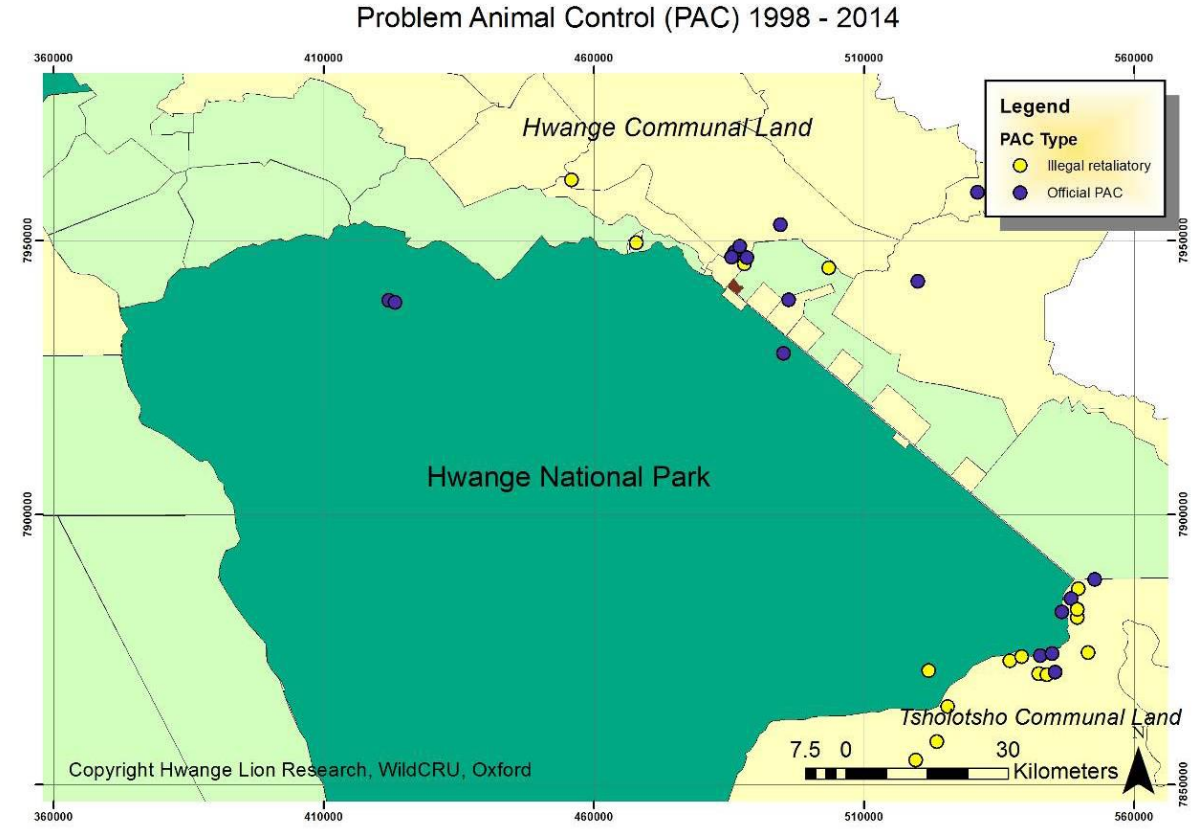
5.4.1 Case Study of Human- Lion Conflict from Hwange National Park

The following information has been extracted from the Hwange National Park Management Plan (ZPWMA, 2016) and is provided here to illustrate the challenges facing the management of lion populations residing adjacent to communal and commercial properties. Variations of the scenario described here apply to other areas of the country where hyaenas and lions are the most problematic carnivores in the communal areas adjacent to protected areas. Hyaenas are perceived to be more of a problem than lions as they account for large numbers of livestock (cattle, goats and sheep). The data presented here has been extracted from the WildCru Lion Research project in Hwange and considers only lions.

Since its inception in 2007 a significant component of the WildCru Lion Research project has focused on understanding the ecological and human socio-economic factors of conflict between the local agro-pastoralist people residing in Tsholotsho and Hwange Communal Land and lions. The project developed an intensive reporting system to record conflicts and has undertaken a detailed survey to record the baseline data on human wildlife conflict at the household level. Between 2007 and 2013 a total of 1,113 conflict incidents were recorded in the Hwange area in which 915 head of stock was lost to lions.







To mitigate this conflict, the project has initiated the "Long Shields Guardian Programme" whereby communities are notified of movements of collared into their areas via cell phone who then motivate the community to take appropriate action (i.e. moving the cattle, chase the lions etc.). In 2013 alone,

1,850 warnings were passed to the "Long Shields". In addition, the project is working on improving bomas and husbandry techniques as another way to lessen the conflict between lions and people, and although these actions may reduce the incidents of livestock marauding lions, cattle deaths still occur resulting in retaliatory killings or action on the part of National Parks to destroy the animals.

5.5 Trend in Financial Performance of the Authority

The average Income and Expenditure for the period 2010 – 2015 is shown in Table 15 that highlights the inability of the Authority to generate adequate revenue to cover both the capital and operating requirements. The average total income over this period is US$22.4 million (range US$16.5 – US$29.3 million). For the period ending December 2015, the Authority generated total revenue of $24,1million, which is 32% below the anticipated budget of $35.5 million. This includes a government grant of $716 000 and a donation of vehicles and equipment worth $2,1 million from the Government of China.

The average total expenditure for the period 2010 – 2015 is US$25.3 million (range US$18.1 – US$30.7 million). The Authority has thus incurred a loss of approximately US$2.8million/year. For the year ended December 2015, the Authority incurred a loss of US$5,4 million including depreciation.

The Authority is dependent on income from Conservation Fees (i.e. entry fees to Parks etc.) that accounted for 39% in 2015 (average 34%/year), hunting (13% in 2015) and leases (10% in 2015, Table 15).

Although individual salaries remained low, staff costs in 2015 were $20,7 million which is 71% of total revenue raised (average 64%). This is unsustainably high and leaves very limited resources for operation (16%), marketing (1%) and administrative expenses (7%, Table 15).

The major reasons for the budget deficits in the past six years can be attributed to:

- Declining income from hunting – this has been exacerbated by the recent bans imposed on elephant trophy imports into the United States by US Fish Wildlife Service (USFWS) and the much-publicised death of *Cecil the lion* that had a negative effect on revenue generated from hunting.
- Government Grant – The Authority has not received meaningful funding from the fiscus despite requests made by management that non-revenue generating activities which are of national nature be funded by Government.
- The Authority failed to dispose of its ivory stock pile due to the continued ban on ivory trade by CITES. The ivory stock which the Authority is currently holding exceeds 80 tons.

Table 15: Statement of Comprehensive Income for period 2010 – 2015 and the year ended 31 December 2015 (extracted from 2015 ZPWMA Annual Report).

Revenue	US$ 2015	%	Average 2010 - 2015	%
Conservation Fees Land	$7,879,987	33%	$6,506,508	29%
Conservation Fees River	$1,409,160	6%	$1,136,041	5%
Accommodation	$1,720,640	7%	$1,904,477	8%
Annual registration	$507,211	2%	$722,847	3%
Permits	$1,476,176	6%	$849,916	4%
Service and Facilities	$307,692	1%	$152,616	1%
Law enforcement (fines etc.)	$224,657	1%	$215,591	1%

Revenue	US$ 2015	%	Average 2010 - 2015	%
Hunting income	$3,256,698	13%	$5,049,089	22%
Fishing permits	$561,797	2%	$941,833	4%
Leases and rentals	$2,434,676	10%	$1,880,258	8%
Parks product sales	$623,084	3%	$767,347	3%
Examinations	$116,000	0%	$70,873	0%
Projects	$349,864	1%	$248,614	1%
Other income/donations	$2,555,729	11%	$907,169	4%
Government grant	$716,000	3%	$1,141,119	5%
Total	**$24,139,371**			
Expenditure				
Operational costs	$4,801,815	16%	$5,146,091	20%
Staff costs	$20,766,023	71%	$16,311,677	64%
Marketing and promotions	$212,406	1%	$147,334	1%
Administration costs	$2,056,681	7%	$2,631,019	10%
Depreciation	$1,531,000	5%	$1,069,138	4%
Total expenditure	**$29,367,925**		**$25,305,258**	
Operating surplice/deficit	**-$5,365,082**		**-$2,810,962**	

The Authority receives considerable support from many local and international NGOs who undertake a variety of routine management activities e.g. supply and maintain artificial game water supplies, provide logistic support to law enforcement operations. This is in addition to the support provided by hunting operators that hold concessions in the Safari Areas.

6 STAKEHOLDER INVOLVEMENT IN LION MANAGEMENT AND CONSERVATION

There are several private sector initiatives that are directly or indirectly involved with lion management and conservation both inside and outside the Parks estate. These stakeholders are represented by companies from the consumptive and non-consumptive sectors of the industry.

6.1 BENEFICIARIES OF WILDLIFE BASED LAND USE

Various forms of wildlife based land use occur in Zimbabwe that benefit different segments of the community depending on the authority for the land. Table 16 summarises these broad categories. The Authority is the direct beneficiary from the use of wildlife in National Parks and Safari Areas while the Forestry Commission is the beneficiary in Forestry Areas. In terms of the Act, Communal CAMPFIRE areas are the primary beneficiaries where the income generated from hunting is shared between the Rural District Council and Community Wards (see below). Similarly, private conservancies and land owners are the primary beneficiaries.

Collectively, these different management regimes contribute to the overall conservation of the wildlife both inside and outside the Parks Estate, and is supported through the existing policy and legal framework that facilitates incentives to promote wildlife based land use.

Table 16: Direct beneficiaries from Wildlife Based Land Use

Land category	Direct Beneficiary
National Parks and Safari Areas	Zimbabwe National Parks and Wildlife Management Authority
Forestry Areas	Forestry Commission
Communal Campfire Areas	Rural District Council and Wards
Private Conservancies	Private Landowners

6.2 CONTRIBUTION OF THE PRIVATE SECTOR

A questionnaire was circulated to all safari hunting operations to gather data on:

- Area and land category where hunting takes place
- Payments in terms of concession fees
- Number of people employed
- Approximate value of investment in assets
- Approximate costs of the hunting operations
- Hunter days generated through various packages
- Indication of the prey base

Data from 18 companies that have been allocated lion on quota and offer these trophies as part of their hunting packages is summarised below (Table 17). These data indicate that

- The average hunting concession covers 1,590km^2 and generates $178,488 in concession fees annually.
- Each company on average employs 109 people of which 24 are seasonal staff (22%). Law enforcement staff make up 26% of the staff complement.
- On average, each company has invested approximately $1.3 million in fixed and moveable assets (buildings, tents, vehicles, equipment etc.).
- On average, each company incurs approximately $1 million in expenses annually, with staff wages (24%) and operating expenses (27%) forming the bulk of these costs.
- Lion safaris contribute approximately 9% (126 hunter days) to the 3-year average number of hunter days generated (1,405) with the bulk of hunter days generated from buffalo safaris (see below for more details on the financial significance of this contribution).
- On average, each hunting area supports 2,000 large mammals, 3,000 medium sized mammals and 6,000 small sized mammals. However, there are large differences between state, forestry, CAMPFIRE and conservancies areas. State areas tend to support more large animals (buffalo, giraffe) while conservancies support greater numbers of medium and small animals.
- Observations on the status of lion populations indicates that each area supports on average 5 prides of 7 animals (i.e. 35 lions) although there is a wide variation in these numbers with more prides occurring in the conservancies than on Forest and CAMPFIRE areas. In these areas, the operators report that lion are transient/migratory rather than permanent.
- All areas report incidents of human-lion conflict, including incidents of snared animals.

Table 17: Summary of 18 hunting company statistics where lion hunting occurs

Companies (N=18)	**Total**	**Average**	
Total Hunting Area (ha)	2,872,932	159,607	
Concession fee	$2,141,860	$178,488	
Number people employed			
Owner/Manager	65	4	3%
Administration	59	3	3%
Camp Maintenance	308	17	16%
Safari operations	295	17	16%
Professional Hunters	82	5	4%
Skinners	59	3	3%
Trackers	138	8	7%
Law enforcement	449	28	26%
Seasonal/Casual staff	379	24	22%
Average Staff employed/company		**109**	
Approximate Asset Value (US$)	**$21,557,610**	**$1,347,351**	
Major Expense Items			
Central Government Licenses:	$415,700	$25,981	3%
ZNWMA Fees:	$1,932,472	$128,831	13%
Community Development:	$525,378	$35,025	4%
Law Enforcement:	$1,319,562	$87,971	9%
Staff wages & Welfare:	$3,601,439	$211,849	24%
Administrative costs:	$1,870,267	$116,892	13%
Operating expenses:	$3,986,619	$249,164	27%
Management and Marketing costs	$661,974	$41,373	4%
Any other costs	$411,693	$25,731	3%
Overall costs	**$14,725,104**	**$922,818**	
Hunter days generated over 3 years			
Lion	2,137	126	9%
Leopard	4,565	269	19%
Buffalo	10,344	608	43%
Elephant	3,131	184	13%
Plains game	999	59	4%
Total Hunter days	**25,294**	**1,405**	
Prey base status			
Large mammals (Buffalo, Giraffe)	28,190	2,014	
Medium mammals (Eland, zebra, kudu, waterbuck etc.)	53,273	3,552	
Small mammals (Bushbuck, warthog, impala)	82,297	5,878	
Status of lion population			
Number of prides	71	5	
Average pride size	80	7	

Companies (N=18)	Total	Average	
Number of cubs	243	19	
Number Coalition males	89	7	
Monitoring of lion population			
Natural deaths	4	1	
Reports of Human-Lion Conflict	33	5	
Incidents of infanticide recorded	6	2	

6.3 CAMPFIRE COMMUNITY PROGRAMMES

The right to exploit and benefit from wildlife was extended to communal areas through granting of Appropriate Authority Status over their wildlife resources to Rural District Councils in 1982. The intention was to return rights of access to natural resources through legislative change, devolve responsibility and economic empowerment. The CAMPFIRE model focuses on three main criteria:

- Voluntary interest in participation by communities and their Rural District Councils (RDCs),
- Presence of wildlife populations capable of producing sustainable and economically significant revenues.
- Benefit sharing for local communities based on:
    - The number of animals harvested within a local community's area each hunting season.
    - The extent of wildlife habitat present within a local community's area annually.

Currently 58 Rural Districts have been granted the Appropriate Authority status to manage wildlife resources in their areas, however only 16 are actively engaged in some form of wildlife based land use (see Figure 5).

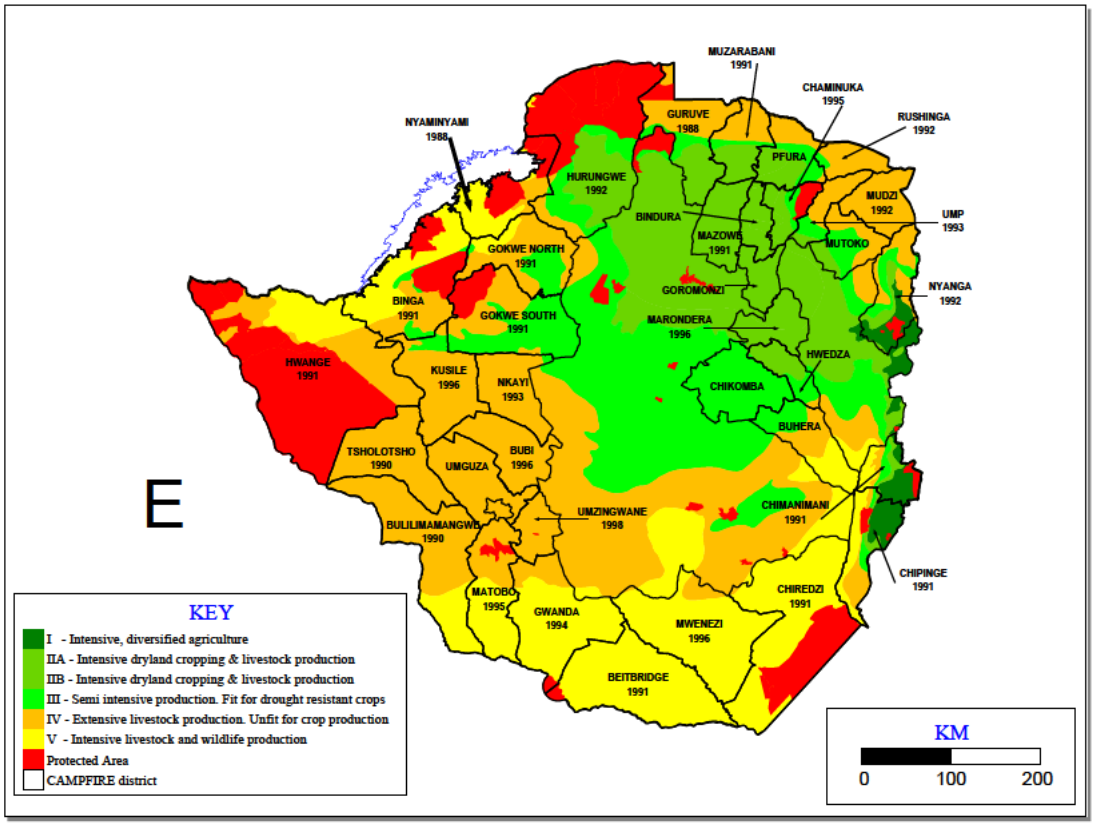


Figure 5: Map of Zimbabwe showing CAMPFIRE districts and year of establishment

The performance of ten key CAMPFIRE Districts is summarised below to illustrate the level of benefits that flow to RDCs, Wards and households, and the role that income from lion play in this process.

1. OVERALL QUOTA ALLOCATION, UTILISATION AND INCOME GENERATION FROM KEY SPECIES: All Districts: 2010 - 2015

	Elephant	Lion	Leopard	Buffalo	Hippo	Crocodile	Total
Quota	1,079	140	487	2050	602	471	
Offtake	655	45	193	908	270	305	
% Utilisation	61%	32%	40%	44%	45%	65%	
Total income N=6 years)	**$7,129,658**	**$240,000**	**$532,675**	**$2,263,150**	**$464,000**	**$441,903**	**$11,071,386**
Average/year	**$1,188,276**	**$40,000**	**$88,779**	**$377,192**	**$77,333**	**$73,651**	**$1,845,231**
Percentage	64%	2%	5%	20%	4%	4%	

The overall income generated over a 6-year period was US$11 million. An overall quota of 140 lions (average 23/year) were allocated to the CAMPFIRE programme over which 45 (32%) were utilised (8 per year). This generated US$240,000 or 2% of the overall income.

2. SOURCE OF CLIENTS AND GROSS INCOME TO SAFARI OPERATIONS:2010 - 2015

Origin of Clients	USA	Canada	South America	Europe	Asia	Middle East	Oceania	Africa	Total (N=6 years)
Total	**880**	**16**	**54**	**456**	**82**	**9**	**51**	**131**	**1679**
Percentage	51%	1%	3%	27%	5%	1%	3%	8%	
Total	**$8,624,059**	**$150,987**	**$543,003**	**$5,201,168**	**$550,062**	**$781,076**	**$394,208**	**$567,897**	**$16,812,459**
Average/year	**$1,462,508**	**$25,165**	**$90,500**	**$866,861**	**$91,677**	**$130,179**	**$65,701**	**$94,650**	**$2,802,077**
Percentage contribution	**51%**	**1%**	**3%**	**31%**	**3%**	**5%**	**2%**	**3%**	

Hunting clients from the USA are by far the most numerous (880 over 6 years) contributing 51% (or US$8.6 million) of the estimated US$16 million generated from hunting in CAMPFIRE areas from 2010 - 2015.

3. INCOME TO DISTRICTS: 2010 - 2015

	Hides (US$)	Trophy fees (US$)	Percentage of daily rate	Hunting concession fees	Photographic (lease fees/bed night levy)	Other (vehicle hire, grinding mill etc.)	Total	Average (N=6)
Total	$131,741	$10,618,127	$1,277,525	$862,721	$737,613	$731,218	$14,358,945	$2,393,158
Percentage	1%	74%	9%	6%	5%	5%		

The CAMPFIRE districts that benefit from hunting rely heavily on trophy fees (74%) as their primary source of income.

4. INCOME TO WARDS, VILLAGES AND HOUSEHOLDS: 2010 – 2015

Overall Income to CAMPFIRE Wards: 2010 - 2015						
	No Concessions	Area (ha)	Number Wards	Number Villages	Number Households	Gross Income
Total	**26**	**2,288,284**	**62**	**603**	**56,297**	**$5,946,370**
Income (n=6 YEARS)	**$228,706.55**	**$3**	**$95,909.20**	**$9,861.31**	**$105.6**	

Income generated at the District level is then disbursed to Wards. Since 2010, this is estimated to be approximately US$5.9 million. The available data shows that 62 wards representing 603 villages (or 56,297 households) received the equivalent of US$95,909/ward (or US$105/household).

These levels of income are not sufficient to make a significant impact at the individual level, and require that the Districts and Wards channel these revenues into activities that benefit the overall community. This is achieved through supporting several communal projects such as schools, clinics, water provisions etc.

5. DISTRICT EXPENDITURE AND COMMUNITY BENEFITS: 2010 - 2015

	Administration	Law Enforcement	Compensation	Management	Social Services	Other	Total
Total	**$2,486,268**	**$1,778,100**	**$67,600**	**$682,740**	**$1,084,779**	**$779,030**	**$6,878,517**
Average	**$414,378**	**$296,350**	**$11,267**	**$113,790**	**$180,796**	**$129,838**	**$1,146,420**
Overall costs	**$5,014,708**				**$1,084,77**	**$779,039**	
Percentage	**73%**				**16%**	**11%**	

At the District level, 73% of the revenues from hunting are channelled towards administration, law enforcement, compensation and general management while limited funds are used to support social services (16%).

6. WARD EXPENDITURE AND COMMUNITY BENEFITS

	Administration costs					Community Benefits				
	Meetings & Admin	Wages/salaries	Compensation schemes	Management activities	Project Management Costs	Social services	Food security	Direct cash benefits	Other	Total
Total	**$553,260**	**$815,639**	**$56,432**	**$312,178**	**$345,762**	**$2,468,216**	**$223,659**	**$216,077**	**$139,565**	**$5,302,709**
Overall costs	**$2,083,271**					**$2,907,952**			**$139,565**	
Percentage	**39%**					**55%**				

At the Ward level, where communities are directly involved, the tendency is to channel most the income towards community benefits (55%) rather than administration which is seen to be the responsibility of the local government. This means that the bulk of the income from hunting is used to support social services such as schools, clinics, irrigation schemes etc. where the impact at the community level (village, household) is far greater (Figure 6).



Figure 6: Bhemba Clinic in Ward 2 of the Tsholotsho Communal Area (top) and Masera Secondary School (Beitbridge, bottom) that are supported by funds generated through the CAMPFIRE programme

Lessons learnt

1. Quota utilisation of lion (32%) is low in CAMPFIRE areas, equating to 8 lion/year.

2. Trophy fees from key species (elephant, lion etc.) contributed $1,845,231/year to CAMPFIRE revenues:
    a. Elephant (64%) and buffalo (20%) are major contributors
    b. Lion and leopard contribute 7%

3. Income from the sale of safaris generate approximately $2,802,077/year
    a. Hunters from USA contribute 51% and Europe 31% of this income.

4. Income to Districts from a variety of wildlife related revenue streams is approximately $2,510,783/year:
    a. Trophy fees are responsible for 74% of this income, of which lion play a small role.
    b. Fees from photographic tourism are responsible for 5%.

5. Wards receive $5,830,244 (57%) from district trophy fees. These revenues are used to support a variety of social services that benefit a large proportion of the local community.

The cessation of import of lion (and elephant) trophies into the USA has had a significant impact on these revenue streams and consequently on the benefits reaching communities at the local level. These revenues cannot be replaced through alternative revenue streams.

7 Management and Administration of the Safari Hunting Industry in Zimbabwe

7.1 Performance of the industry

To fully account for earnings in the Hunting Sector, the Reserve Bank of Zimbabwe, in collaboration with all the relevant stakeholders, introduced the Tourism Receipts Accounting System (TRAS2) in January 2015. The TRAS2 is a web-based system which links Safari Operators, Zimbabwe Parks and Wildlife Management Authority, Taxidermists, Shipping Agents, International Marketing Agents and Reserve Bank for the purposes of authorizing hunts, capturing hunting data, monitoring hunting quota utilization and tracking hunted trophies.

On an annual basis, Exchange Control Division of the Reserve Bank of Zimbabwe attends the SCI Conventions to achieve the following objectives: -

1. To assess regional price differentials of same hunts at the SCI Convention and the reasons thereof;
2. To present Form TRAS2 systems updates to the users including international marketing agents;
3. To engage international marketing agents of sport-hunting (standardised international marketing agreements, payment arrangements and follow up on overdue export receipts);
4. To obtain relevant insights on governing of the hunting sector; and
5. To come up with an effective mechanism to fully account for export proceeds from the hunting sector.

7.1.1 Global earnings of the industry

The TRAS2 system was introduced in January 2014, and has since recorded a total of $44.6 million ($18.9 million in 2015 compared to $25.9 million in 2014) as shown in Figure 7. The figures are inclusive of daily rates, trophy fees and other incidental revenue. In line with other regional

countries offering safari hunting, the market is dominated by the USA (59%) and Europe (25%) with the remainder of the market taken by the Americas (Canada, Argentina etc.), Asia, Africa, Oceania and Africa (mostly South Africa). Appendix III illustrates the distribution of total hunting revenue by country of destination (Chitauro, 2016).

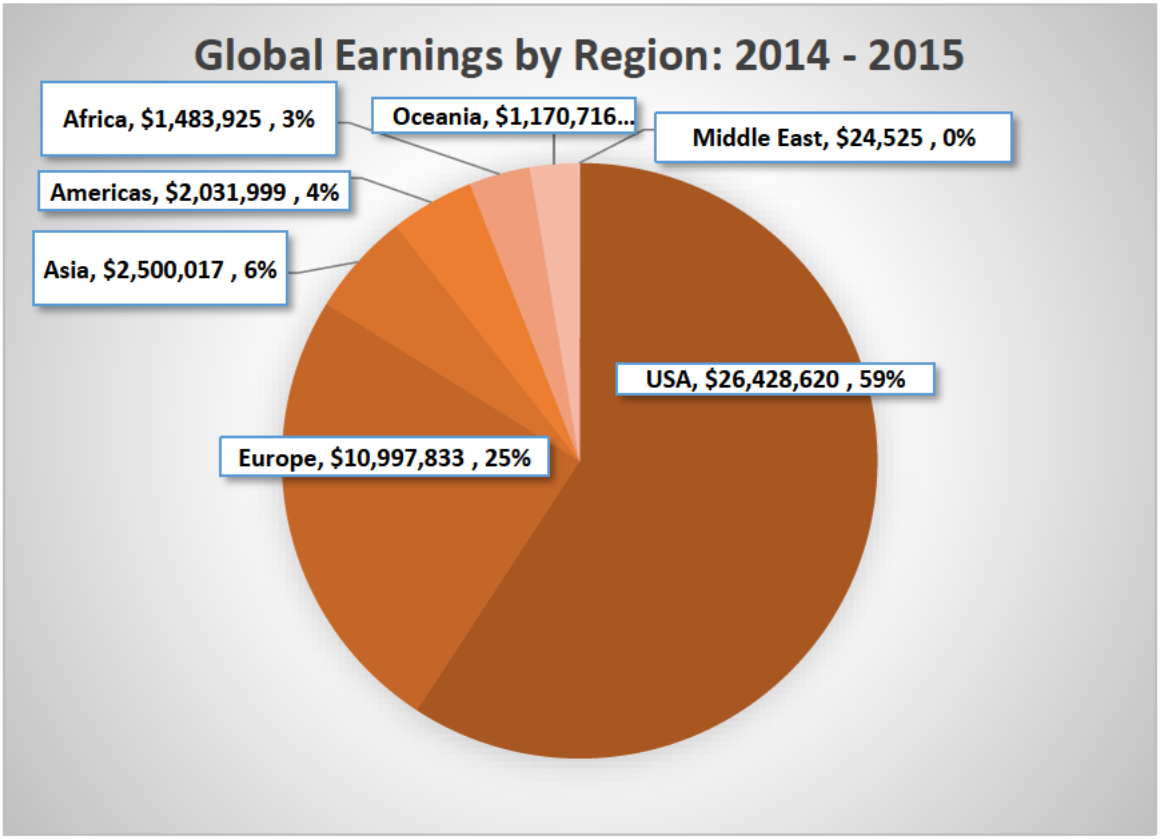


Figure 7: Breakdown of source of hunting income (2014 and 2015) from various regions in the world (adapted from Computerised Exports Payments Exchange Control System, CEPECS - TRAS2)

7.1.2 Quota allocation, Utilisation and Total Trophy Fees Earned

The total income from the sale of trophies in 2014 and 2015 is shown in Table 18. The income in 2015 (US$8.2 million) is less than that in 2014 (US$11.1 million) because of the import restrictions of elephant and lion into the USA.

Table 18 also provides data on the quotas allocated in 2015 and the number of level of utilisation. The complete list of species is provided in Appendix III (Chitauro, 2016). These data show that levels of utilisation for all species varies from 10 – 40% for most mammals and far less for birds etc.

Table 18: Summary of the revenue generated from the 11 most common species utilised for hunting, and the percentage utilisation in 2015 (adapted from Computerised Exports Payments Exchange Control System, CEPECS - TRAS2)

Species	2014	2015	Total	2015 Quota	Utilised	% Utilised
Buffalo	$2,528,559	$1,962,570	$4,491,129	1,635	482	29%
Elephant (Tusks)	$2,042,610	$1,447,090	$3,489,700	246	64	26%
Elephant (Tuskless)	$1,444,040	$229,860	$1,673,900	462	113	24%

Species	2014	2015	Total	2015 Quota	Utilised	% Utilised
Lion	**$630,950**	**$753,000**	**$1,383,950**	**82**	**49**	**59%**
Leopard	$714,100	$668,490	$1,382,590	530	151	28%
Zebra	$594,239	$555,744	$1,149,983	2,480	600	24%
Sable	$456,615	$309,260	$765,875	718	78	11%
Kudu	$341,092	$357,963	$699,055	2,503	289	12%
Waterbuck	$293,903	$256,133	$550,036	988	156	16%
Hippo	$310,321	$217,470	$527,791	303	83	27%
Impala	$277,198	$242,624	$519,822	8,594	1,261	15%
Other Species	$1,465,560	$1,287,845	$2,753,405			
Grand Total	**$11,099,187**	**$8,288,049**	**$19,387,236**			

7.1.3 Total trophy fees generated by land category

The ZPWMA allocated quotes to all owners and occupiers of land in terms of SI 26. Any person utilising wildlife on these properties is required to submit a TRAS2 form to process any export of trophies and other animal products. Approximately 262 companies/properties submitted returns in 2014 and 2015. From these data, it is possible to determine the income generated from trophy fees and daily rates per company. To protect the privacy of the individual companies, these data have been arranged to show the level of income generated by different land categories from trophy fees (Figure 8),

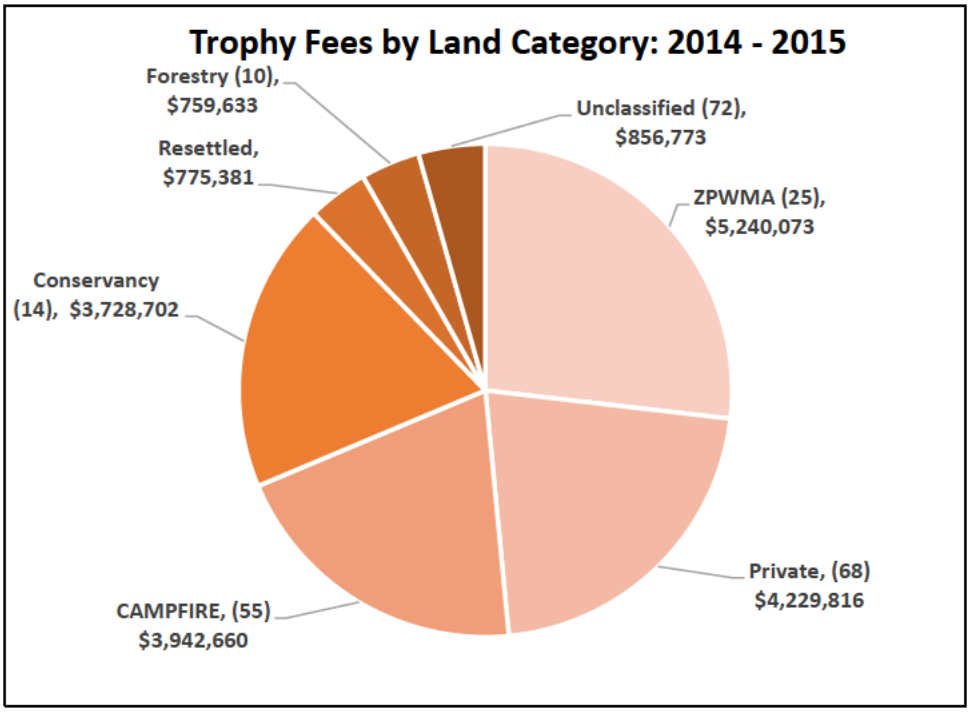


Figure 8: Hunting Trophy Fee Earnings by Land Categories (2014 - 2015). Note that from the description provided in the database, it was not possible to allocate some individual properties to a specific category. These have been recorded as unclassified (adapted from Computerised Exports Payments Exchange Control System, CEPECS - TRAS2).

Overall, approximately US$10.7 million was generated in 2014 and US$8.7 million in 2015 from the 62 species on offer. The ZPWMA represented by 25 properties that it either offers on tender to the private sector or operates as hunting areas itself generated the largest income from trophy fee sales

(US$5.2 million). The 14 Conservancies accounted for US$3.7 million while the 68 private properties are recorded as generating US$4.2 million. The CAMPFIRE areas (N=55) generated US$3.9 million.

Together with the income from daily rates (US$13,190,372 in 2014 and US$9,684,396 in 2015 (gross US$22,874,768), extracted from Computerised Exports Payments Exchange Control System, CEPECS - TRAS2), these funds are used to pay for several operational expenses including employment, law enforcement, administration and management.

7.5 Quota Setting Process

The process for quota setting follows procedures agreed to by all stakeholders (ZPWMA, 2014).

- Step 1: Allocate existing quota to each block/hunting area

The starting point for implementation of age-restrictions and adaptive quota management was to allocate existing lion quotas. This quota would then be managed adaptively in line with the age of lions hunted. In future, it is envisaged that fixed quotas for lions would fall away as quotas would be based on the age of lions hunted in the previous year.

- Step 2: Hunters complete and submit return forms and photos after each lion hunt

The data would be compiled into a database by a ZPWMA representative (currently Ms Roseline Mandisodza-Chikerema, Senior Ecologist, ZPWMA). Export permits for trophies will not be issued unless completed hunt return forms (all the required photographs and the first upper premolar) is provided to ZPWMA for aging and monitoring purposes. Furthermore, because the following year's quotas will be based on the ages of the lions hunted in the current year, operators must submit their lion hunt returns and photographs soon after the hunt. At the end of the season, all the teeth would be taken to a dentist to have x-rays conducted to allow for measurement of the size of the pulp cavity.

- Step 3: ZPWMA and Panel of experts assign an age value to each lion trophy

Lion trophies will be aged by ZPWMA, with input from lion scientists and representatives from the hunting industry at a trophy aging session. This is conducted at the end of each hunting season.

- Step 4: Calculate the next years' quotas based on a points system for the ages of lions hunted

A quota setting meeting is held where lion quotas are established for each area based on the age of lions hunted in those areas the year before. This programme commenced in 2014, and so the ages of lions hunted in 2014 will affect the lion quotas in 2015. Table 19 summaries the trend in lion quota allocations since 2002 while Table 12 provides a detailed overview of the lion trophies taken in 2015.

Table 19: Summary of lion quota allocations and offtake since 2002 (Data provided by ZPWMA)

Year	Lion Allocated Quotas	Female Offtake	Male Offtake	% Utilisation
2002	126	22	49	56%
2003	138	5	11	6%
2004	155	4	9	8%
2005	108	3	20	21%
2006	124	1	17	14%

Year	Lion Allocated Quotas	Female Offtake	Male Offtake	% Utilisation
2007	117	0	9	7%
2008	90	0	17	18%
2009	111	0	9	8%
2010	98	12	30	43%
2011	121	20	38	48%
2012	101	18	27	44%
2013	101	1	34	34%
2014	101	0	37	26%
2015	82	0	49	60%
2016	81	0	33	41%

Table 20: Analysis of lion trophies taken on various properties in 2015

Hunting Area Name	Sex	Killed Wounded	Grid Ref	Date Shot	Trophy Size
Sapi Area	M	KILLED	35l0783	03/06/2015	
Matetsi Safari Area - Unit 3	M	KILLED	307551	05/04/2015	61.31
Antoinette & Antoinette Extension	M	KILLED	187159	02/07/2015	26 7/16"
Tsholotsho District Area 2-South	M	KILLED	S1926181 E02652250	27/10/2015	25 6/8 inches
Hurungwe Safari Area - Rifa	M	KILLED	35K178113	10/05/2015	24.5
Deka Tail	M	KILLED	651 480	10/04/2015	60.38 cm
Hurungwe Safari Area - Nyakasanga	M	KILLED	s15.56.457 e029.15.584	07/06/2015	26
Msaise	M	KILLED	VN204700	14/05/2015	23
Mapari	M	KILLED	VN798124	09/06/2015	23SCI
Ngamo/Sikumi	M	KILLED	456923	09/05/2015	
Deka Safari Area	M	KILLED	278493	26/06/2015	61.5
Mbire (Guruve) South Area 2	M	KILLED	919056	09/08/2015	25.3
Bubye Valley Conservancy	M	KILLED	0194090 7625410	21/02/2015	25"
Bubye Valley Conservancy	M	KILLED	9337	29/03/2015	26"
Bubye Valley Conservancy	M	KILLED	31129	07/04/2015	25
Woodlands Farm	M	KILLED	644972	22/05/2015	25"
Bubye Valley Conservancy	M	KILLED	35K 453 159	10/05/2015	23.625
Bubye Valley Conservancy	M	KILLED	36K 908 852	25/04/2015	25"
Chewore Safari Area - North	M	KILLED	TT015643	05/06/2015	25
Bubye Valley Conservancy	M	KILLED	36K 227 593	12/05/2015	26"
Matetsi Safari Area - Unit 4	M	KILLED	4.05E+12	09/06/2015	24
Matetsi Safari Area - Unit 5	M	KILLED	865505	09/06/2015	25.25
Gunundwe	M	KILLED	822094	11/06/2015	
Bubye Valley Conservancy	M	KILLED	36K 004 971	24/06/2015	25.5625

Hunting Area Name	Sex	Killed Wounded	Grid Ref	Date Shot	Trophy Size
Bubye Valley Conservancy	M	KILLED	942 151	25/06/2015	12
Kusile District Area 1	M	KILLED	S185604.9 E0271547.4	02/07/2015	
Mokore Ranch	M	KILLED	VN110030	15/07/2015	15"
Bubye Valley Conservancy	M	KILLED	36K 229 607	29/07/2015	26"
Bubye Valley Conservancy	M	KILLED	191 623	25/07/2015	27.0625
Nyaminyami District Area 2 (Omay)	M	KILLED	657019PM	18/07/2015	24 1/8"
Matetsi Safari Area - Unit 5	M	KILLED	862 451	15/07/2015	25 8/16 inches
Matendere	M	KILLED	781021	26/07/2015	23.875
Matetsi Safari Area - Unit 1	M	KILLED	740726	13/08/2015	25
Bubye Valley Conservancy	M	KILLED	213 602	15/08/2015	15
Sango	M	KILLED	62691	23/08/2015	23.125
Sango	M	KILLED	320548	27/08/2015	
Dande Safari Area	M	KILLED	945352	13/10/2015	24in
Hurungwe Safari Area - Rifa	M	KILLED	35k062038	30/09/2015	25.25
Bedford	M	KILLED	190429	06/09/2015	
Ngamo/Sikumi	M	KILLED	456919	07/09/2015	
Bubye Valley Conservancy	M	KILLED	206 622	23/09/2015	26"
Hammond	M	KILLED	35k880103	17/10/2015	23.375
Kazuma/Panda Masuei	M	KILLED	s18.44144 & E025.64434	09/10/2015	
Nyaminyami District Area 1 (Omay)	M	KILLED	PM453354	13/11/2015	26"
Chewore Safari Area - South	M	KILLED	ST967260	25/10/2015	
Riverside Ranch	M	KILLED	35k227702	31/10/2015	24.78
Matetsi Safari Area - Unit 6	M	KILLED	18.06.55.68.25.22	03/12/2015	
Chewore Safari Area - South	M	KILLED	QN975310	06/12/2015	
Sapi Area	M	KILLED	Mtawatawa	11/06/2015	24"

7.6 POINTS SYSTEM FOR ADAPTIVELY MANAGING LION QUOTAS IN ZIMBABWE

The points system used to adaptively manage lion quotas has been developed following similar systems that have been implemented in Tanzania and northern Mozambique. The systems that are in place in Tanzania and Niassa differ slightly, but both lion quotas are set per the age of the lions harvested during the previous hunting season (Begg and Begg, 2008; Tanzania Wildlife Division 2013). The Tanzanian system is more punitive with significant quota reductions, trophy confiscation and fines for non-compliance, whereas the Niassa system is more accommodating but nevertheless can result in quota reductions if five-year-old lions are hunted. The latter was aimed at a means of accommodating the difficulty of telling five-year-old lions apart from four year olds.

After reviewing the Tanzanian and Mozambican age restriction systems and debating possible models for application in Zimbabwe, an adaptive quota management system for lion hunting based on the ages of lions hunted was agreed on in July 2013 in Harare, Zimbabwe, during a meeting hosted

by the Zimbabwe Parks and Wildlife Management Authority (ZPWMA) and an independent non-governmental conservation organisation. The approach adopted by Zimbabwe recognises four as opposed to three key age categories (Table 21).

Table 21. Proposed points system for lion age restrictions and quota setting in Zimbabwe

	≥6 years	**No trophy**	**5 years' old**	**4 years' old**	**<4 years**	**Failure to submit hunt return/incomplete hunt returns**
For quotas of 3/more	4	3	3	2	-3	0
For quotas of 2	4	3	3	2	0	0
For quotas of 1	6	3	3	2	0	0
Quota setting process	These points are added up and divided by 3 to yield the quota for next year					

During 2013, operators were requested to submit hunt returns and photos as a trial run to get the system up and running. In 2014 operators were requested to do the same but were informed that the age of the lions hunted in 2014 would determine their lion quotas in 2015. The 2015 lion hunt results would thus also determine the 2016 quota. The key distinction of the Zimbabwean system is that the quota will not be affected if they hunt animals that are five years old. This position was adopted after considering various the population models that suggested that the hunting animals of five years of age or older is predicted to be comparatively safe from a population perspective (Whitman et al. 2007). Moreover, after reviewing aging techniques, the consensus was that professional hunters could be distinguish between lions that are five or above. The system therefore rewards operators with increased quotas if they hunt animals of six years and older, but it does not penalize them if they hunt animals of five years. Neither are they penalised if they do not shoot a lion that they have on quota, however, the quotas will be reduced if they hunt animals younger than five years or if they failed to complete hunt returns.

Lions are aged by triangulating multiple different aging characteristics, including:

- The degree of facial scarring;
- The teeth colour and degree of wear;
- The mane development (particularly regarding the shape around the ear and the mohawk);
- Through post mortem analysis of the width of the pulp cavity of the second premolar (which becomes narrower with age).

7.6.1 Results of the Adaptive Lion Quota Management System: 2013 to 2016

In 2013, only 28% of the lions hunted were 5 years or older, in 2014 that figure had risen to 49% and in 2015 to 77.3% (Figure 5). The proportion of lions hunted that were less than 5 years of age dropped overall between 2013 and 2015 (Figure 9).

In 2015 the Zimbabwe national lion hunting quota was set at 82 lions. Of this 82, only 49 were hunted in 2015, and based on the resultant score from aging the trophies, and the fact that operators chose not to hunt lions of inadequate age (see Figures 9, 10 and 11), the recommended quota for 2016 was set at 81. In 2015 there was a marked increase in the age of lions hunted. Notably, only one lion of <4 years of age was hunted and the large majority of lions were 5 years or older (Figure 9).

As was agreed upon at the 2013 lion management meeting in Harare, the CAMPFIRE areas in which lions occur are currently exempted from the age restrictions. This approach was adopted as a means of ensuring that impoverished communities obtain the opportunity to benefit from the presence of lions, recognising the potential negative impacts the species has on the livelihoods of livestock farmers.

Using these figures and estimating the average value of a lion safari at approximately US$ 80,000 then a 50% offtake would generate approximately US$ 2,800,000 annually. If management costs are approximately $150 km^2, then the lion safaris alone can support 18,600 km^2 of wildlife habitat in Zimbabwe.

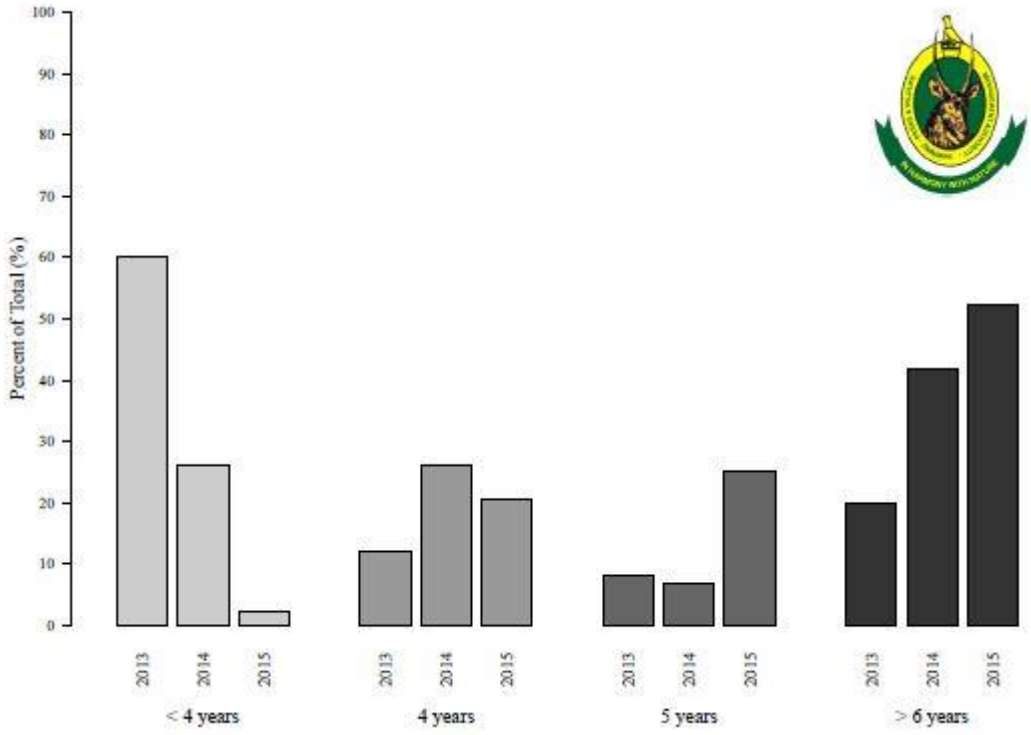


Figure 9: The percentage of lions hunted in each age class in 2013, 2014 and 2015 in Zimbabwe.

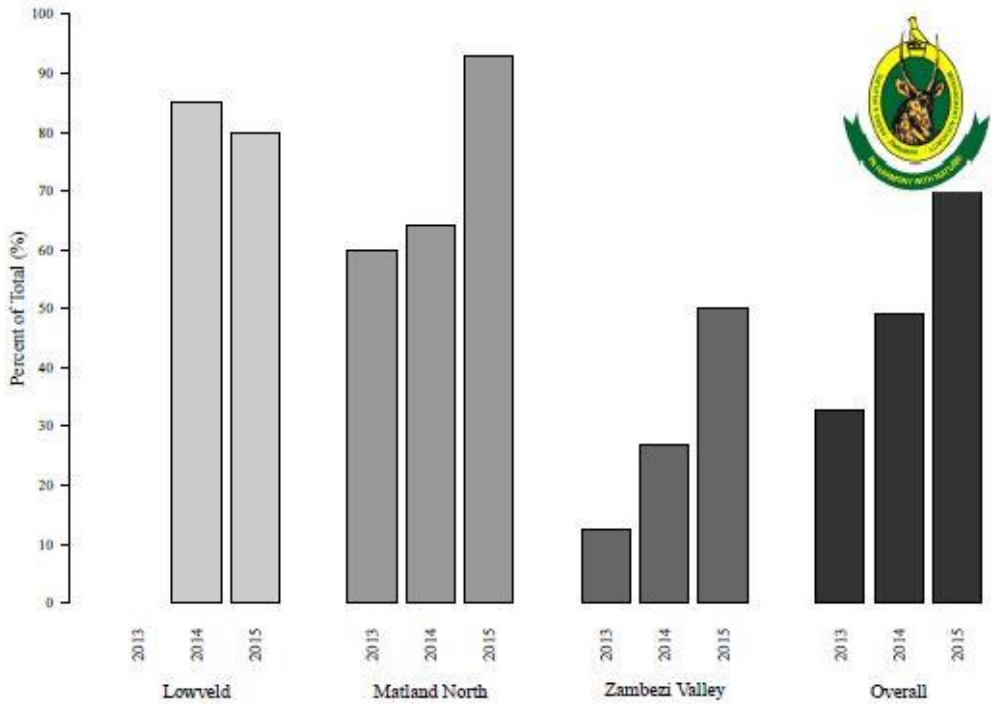


Figure 10: The proportion of lions hunted that were 5 years or older in the three main lion-hunting areas of Zimbabwe.

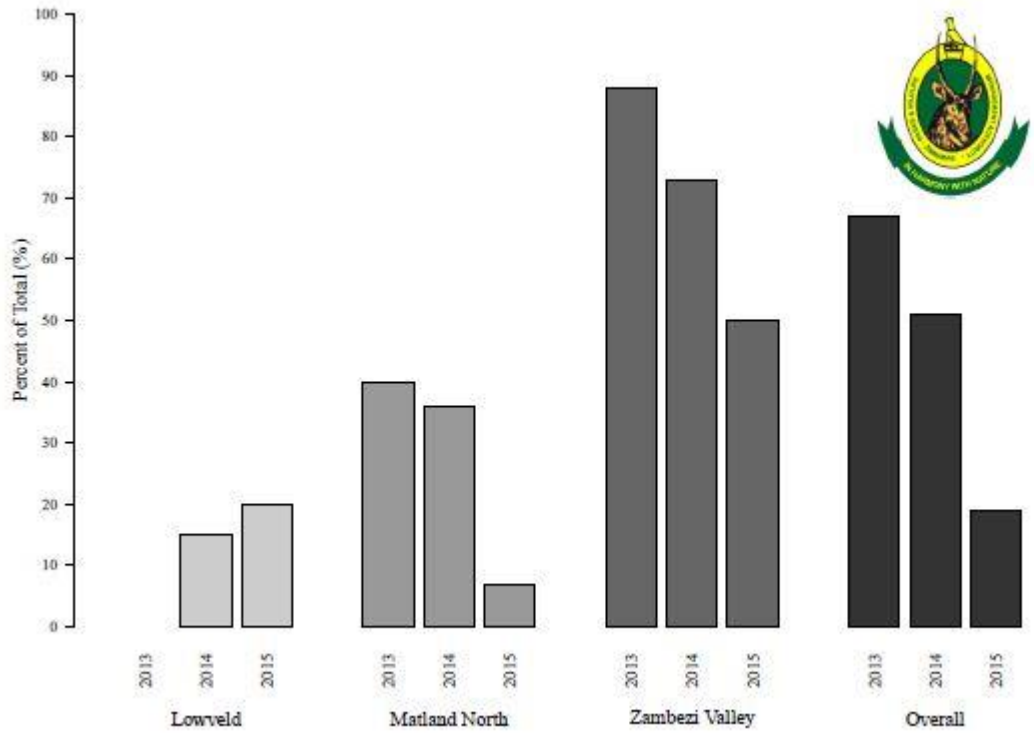


Figure 11: The proportion of lions hunted that were less than 5 years of age in the three main lion-hunting areas of Zimbabwe.

7.6.2 Case study: Safari Hunting surrounding Hwange National Park

The Hwange National Park is surrounded by hunting areas that fall under the Authority, Forestry Land, Private Land and Communal Land. The ZPWMA is responsible for setting and administrating quotas in conjunction with stakeholders for the safari areas, forestry areas, communal lands and private properties.

The Matetsi Safari Area to the north of Hwange National Park was established in the 1970s when several unsuccessful private sector mixed faming properties were expropriated, compensated and the resultant block of land turned over to safari hunting – a largely untried venture at that time on a large scale. An intensive monitoring system was set in place to gauge the effectiveness of the scheme and this continues to this day (Crossmary et al. 2013, Figure 12). The seven concessions (six given over to safari hunting) are leased on five year terms and concessionaires pay a 5 year "right to lease" fee, an annual rental, a fixed quota fee (payable if animals are shot or not) and a supplementary quota fee which allows additional animals to be bought as per need.

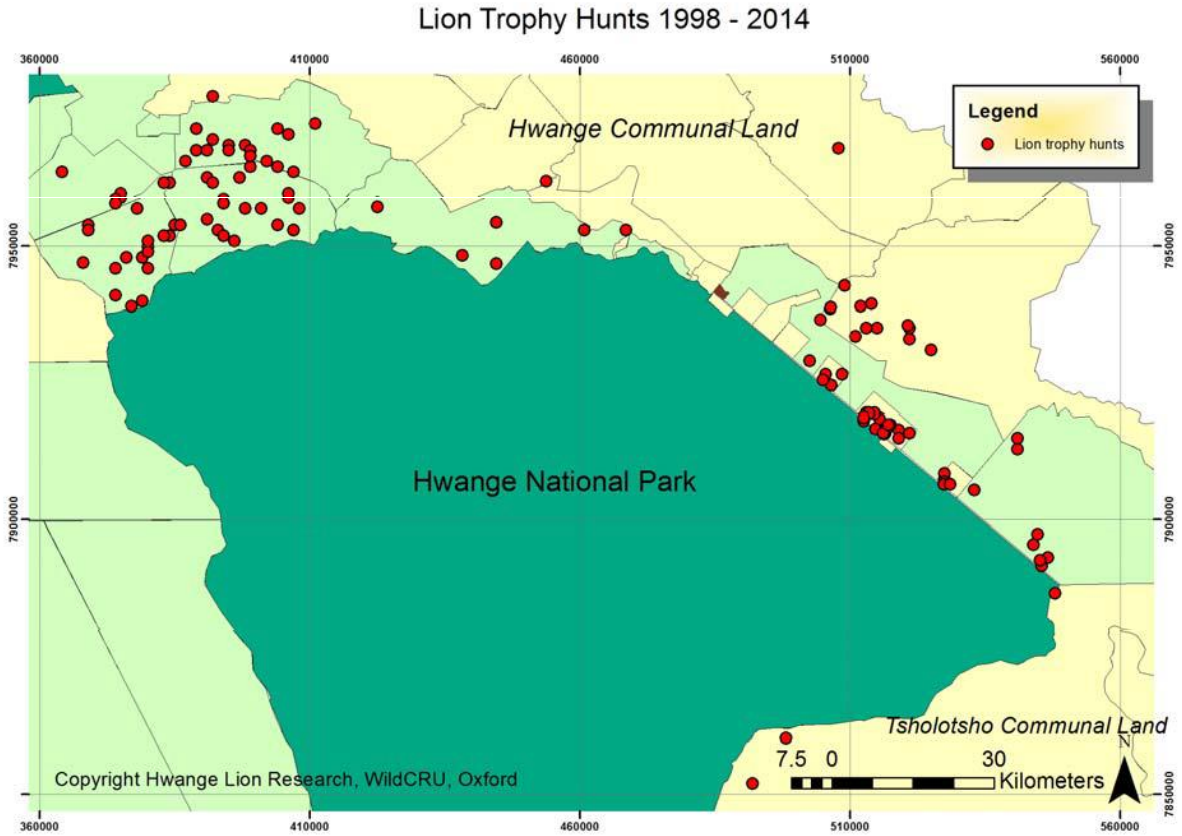


Figure 12: Record of where lion have been hunted on the land surrounding the Hwange National Park since 1998 (data extracted from the Hwange National Park Management Plan).

8 THREATS AND MITIGATION

The consensus of the scientific and animal welfare community is that the populations of lion in Africa has declined by 43% in the last two decades, with the greatest declines having occurred in west Africa. The exception to this are the populations of southern Africa, notably South Africa, Namibia, Botswana and Zimbabwe that are home to 24- 33% of the overall population has increased (Funston et. al. 2016).

Nonetheless, as is the case in other range states, the greatest threats to lion in Zimbabwe are from habitat loss, snaring and retaliatory killings where livestock are involved.

8.1 HUMAN-LION CONFLICT

The main source of illegal killing of lions is a result of Human-Lion conflict. The human population of Zimbabwe has increased since 1960 (estimated at 13 million). There is considerable pressure to convert land to agro-pastoral production, and the pressure is expected to increase. It is not unexpected therefore that the incidence of Human-Lion conflict will increase. ZPWMA records show that 200 attacks occurred on humans and 150+ on livestock (cattle, goats, sheep, dogs etc.) were killed in 2015 (see Table 13 above).

Retaliation for these livestock losses is usually done poisoning or hunting. The exact number of lions killed in this way is difficult to assess, but may number over 50/year. These indiscriminate killings pose the most significant threat to the species, and is of major concern to the management authorities. For example, the Area Manager for Hwange National Parks reported that 6 lions were killed on the Hwange National Parks boundary in 2016, and the Authority responded to several problem animal attacks on livestock.

In accordance with the Parks and Wildlife Act of 2001 when a lion attacks a human or kills livestock, it shall be eliminated. However, despite the numerous incidents reported across the country, less than 10 lions are killed through official "problem animal control" (PAC).

8.2 HABITAT LOSS

Zimbabwe supports substantial populations of lions outside of its protected areas and extensive conservancies. Moreover, despite its expanding human population, many of the protected areas are still intact however, the threat to lions from habitat loss exists in the Sebungwe and the South East Low Veld where the fragmented nature of the protected areas is compounded by an increasing human and livestock populations surrounding these areas. In these areas, habitat loss, reduction in prey populations and killing of problem lions are the major threats to long term lion survival.

Due to the large size of the protected area system in the Zambezi Valley and North West Matabeleland, threats are limited to lion range which extends into adjacent settled areas. The huge natural prey base in these protected areas, reduced killing of problem animals associated with lions preying on livestock in adjacent settled areas.

The potential and real loss of habitat and the fragmentation of range and conflicts with people in the absence of effective incentive mechanisms to maintain such habitat is probably the second greatest threat to lions after retaliatory killings. Increasing livestock numbers is reducing the available habitat in buffer areas adjacent to the protected areas, and increasing the incidents of human-lion conflicts. Lions are being more and more regarded as a liability and economic cost to rural communities. Reversing this trend is difficult under normal circumstances, and this has been made that much more difficult with the cessation of lion hunting. Integrating income from lions into rural economies, and demonstrating that lions contribute to the welfare and development of people is regarded as one strategy to mitigate against this. The involvement and empowerment of rural people in natural resource management through the CAMPFIRE programme that strives to provide economic and financial incentives through sustainable use, is one of the main driving forces behind changes in attitudes towards wildlife in communities where lion-livestock conflicts occur.

8.3 ILLEGAL TRADE IN LION PRODUCTS

Very few lions are poached in Zimbabwe (not to be confused with retaliatory killings). Records, mainly from anti-poaching reports, are for impoundment of body derivatives such as skins, teeth/claws, body

fats and bones. These may be sought after for local traditional medicinal use. Poaching mainly occurs along the boundaries of the protected areas where lions are incidentally snared as non-target prey.

The illegal trade in lions and their products (i.e. bone trade) is very insignificant. There are no records of people found in possession of illegally acquired lion specimens in Zimbabwe, and anyone found in possession of illegally acquired lion specimens is required to pay a fine US$5000 or faces a mandatory jail sentence. On conviction for lion poaching, courts may ask the accused to pay a compensation fee of US$20 000.

8.4 BUSHMEAT POACHING

Poaching for bushmeat is an important livelihood component of rural communities in Zimbabwe and a vast literature exists on this subject (see Lindsey et. al. 2015a and 2015b). Poverty stands as the major driver of illegal hunting, and the livelihoods of illegal hunters have been augmented considerably through revenue generated from bushmeat sales. Illegal hunters use bushmeat both for supplementing household protein and for economic gain.

Poaching for bushmeat does not seem to have impacted directly the overall lion's status in Zimbabwe, but more research is needed to fully understand its impact on lion. However, lions are often inadvertently caught in snares set for animals targeted by bushmeat poachers. Where possible, lions caught in snares are captured and treated (Figure 13).





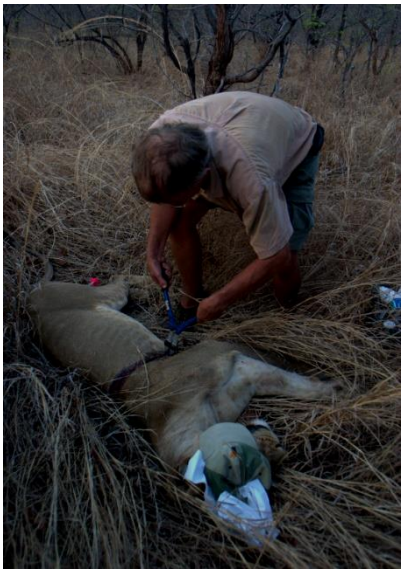




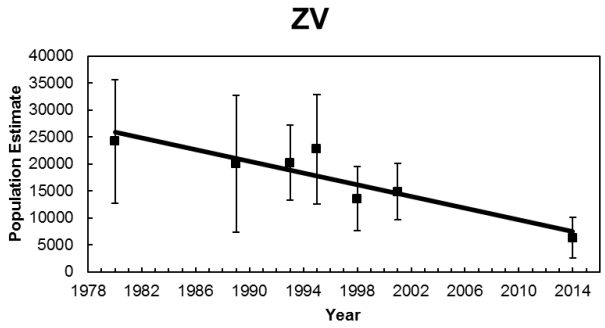
Figure 13: Young lioness being treated by the Victoria Falls Conservation Trust after a snare was removed from around the chest (Source: S. Edwards)

8.5 PREY ABUNDANCE

The extent to which bushmeat poaching outside of the Parks Estate is depleting lion's prey is not known. Prey abundance is still high in all protected areas where lions occur, and as abundance of prey species is highly correlated with lion density (Hayward et al 2007), data on the main prey species for lion, extracted from the 2014 aerial surveys of elephants and other large herbivores (Dunham et. al., 2015, 2015a, b, c, d) are shown in below (ZV = Zambezi Valley, NW Mat = North West Matabeleland).

The overall long term trends show that most population status of most prey species has declined in recent years. There are many possible explanations for these declines, but probably the most critical factor has been droughts, especially that experienced in 2005.

Buffalo


ZV
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35000
30000
25000
20000
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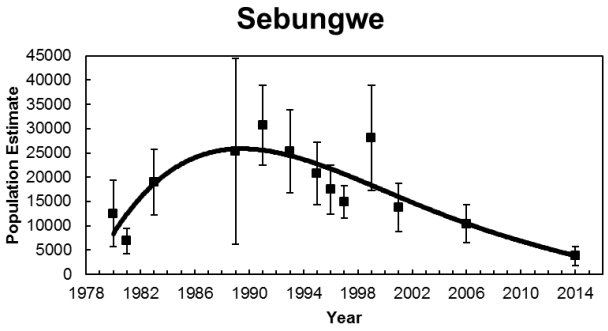
10000
5000
0
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year


Sebungwe
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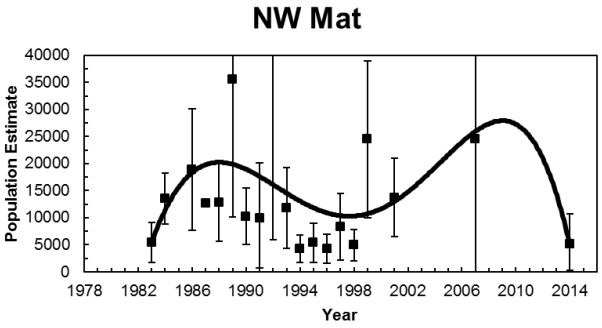
Year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Population Estimate
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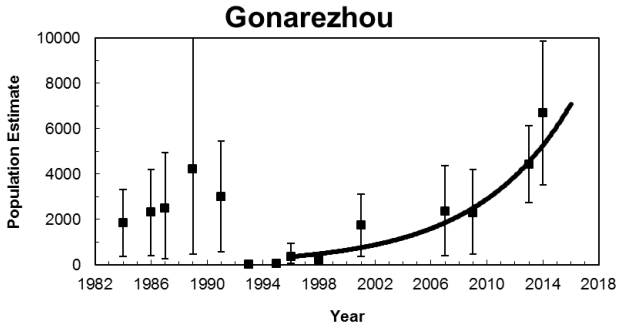
Year


Gonarezhou
Population Estimate
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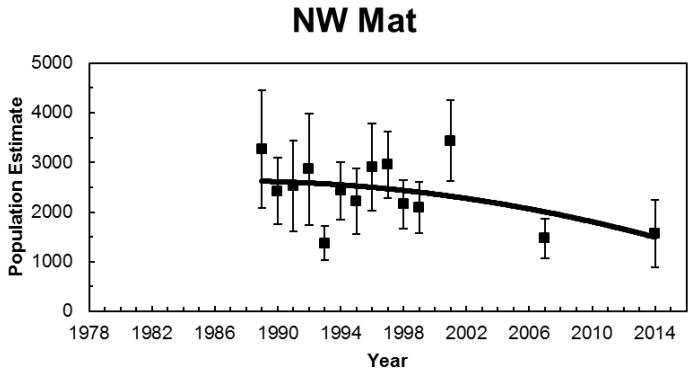
1982 1986 1990 1994 1998 2002 2006 2010 2014 2018
Year

Giraffe


NW Mat
Population Estimate
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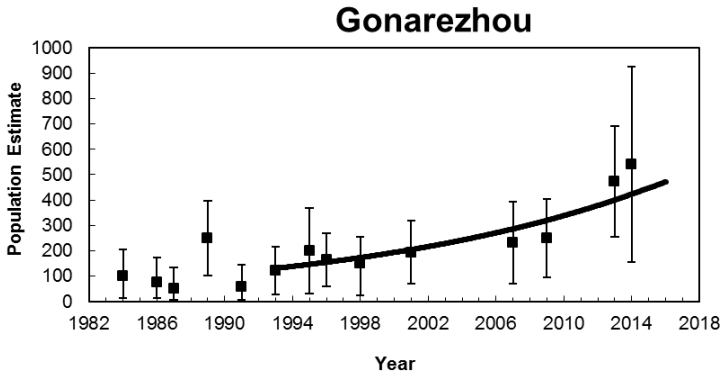
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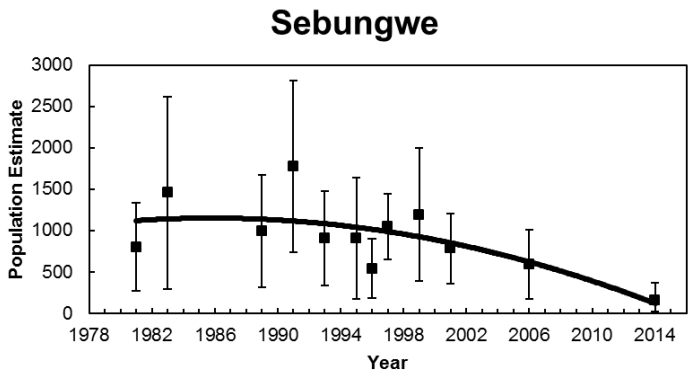
Sable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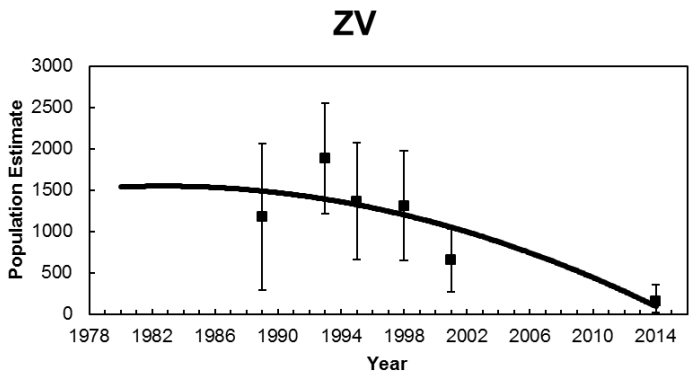
Year


ZV
Population Estimate
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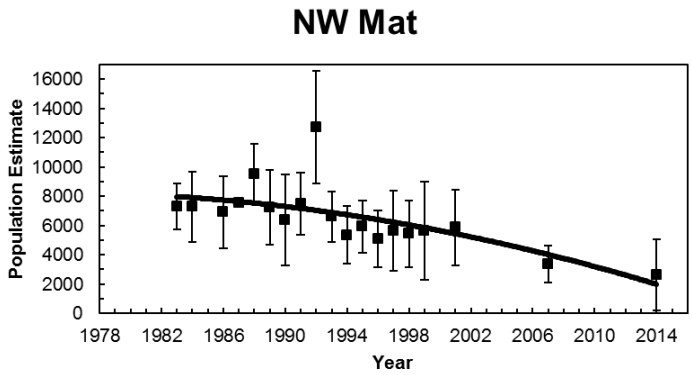
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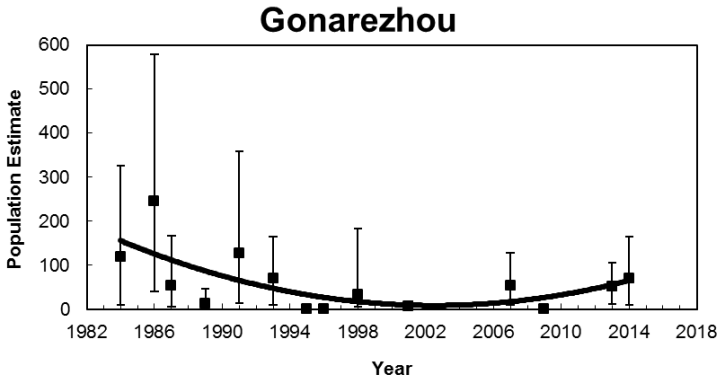
Gonarezhou
Population Estimate
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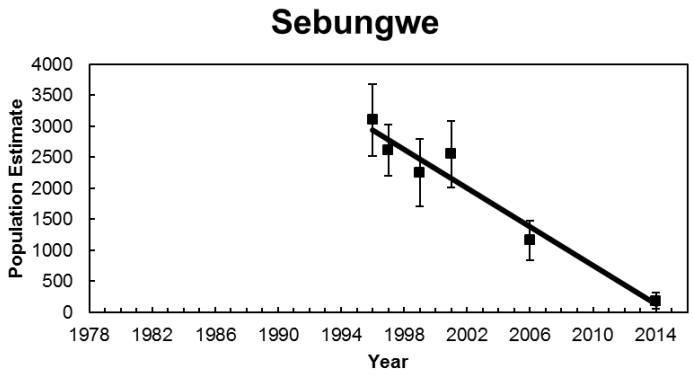
Year

Kudu


Sebungwe
Population Estimate
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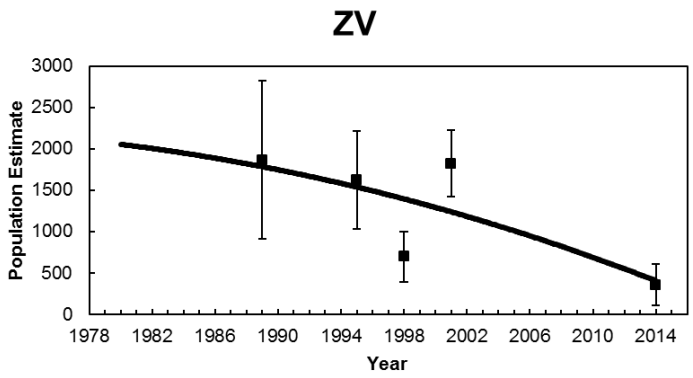
Year


ZV
Population Estimate
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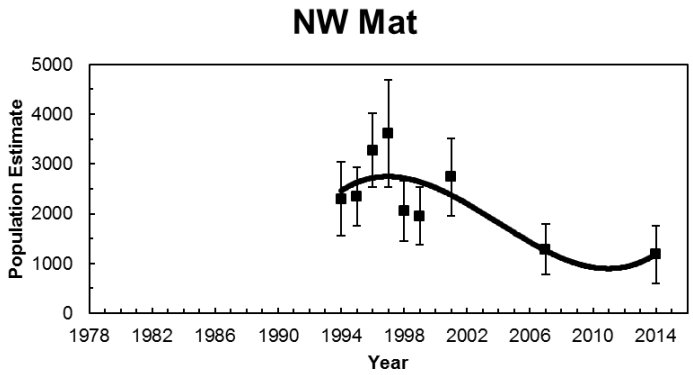
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year


NW Mat
Population Estimate
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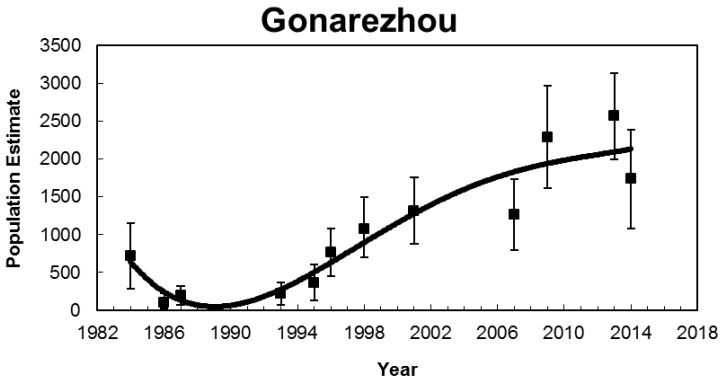
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year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2500
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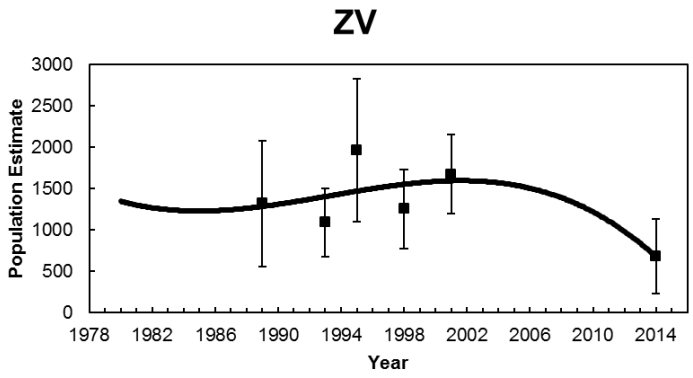
1500
1000
500
0
1982 1986 1990 1994 1998 2002 2006 2010 2014 2018
Year

Zebra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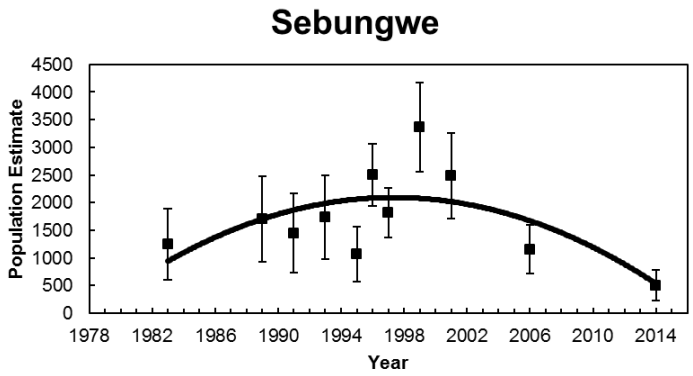
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2000
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1000
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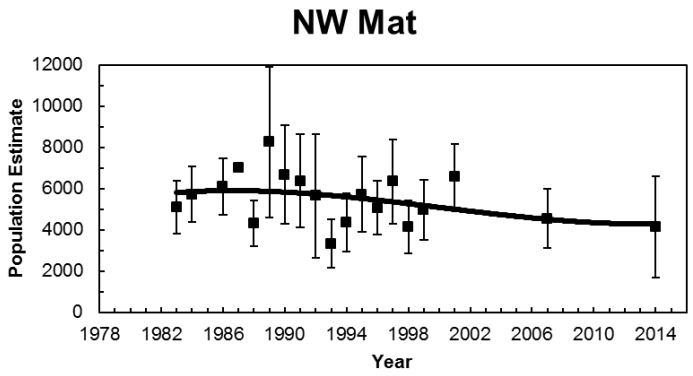
Year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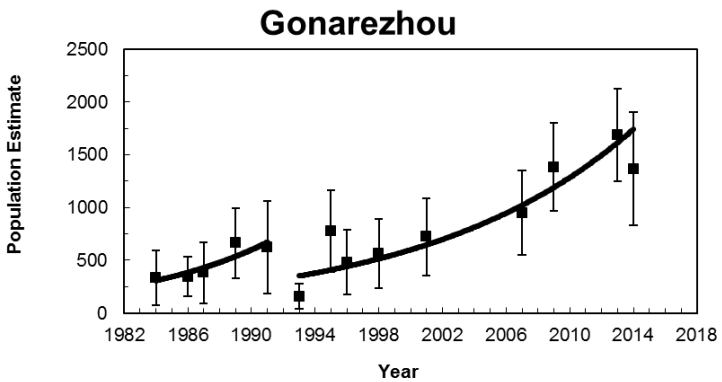
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1500
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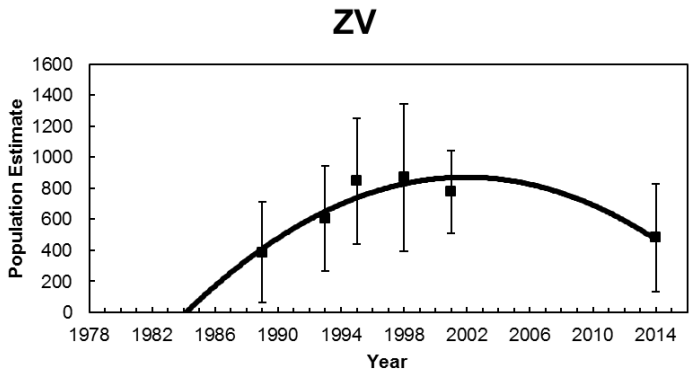
1982 1986 1990 1994 1998 2002 2006 2010 2014 2018
Year

Waterbuck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Population Estimate
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1000
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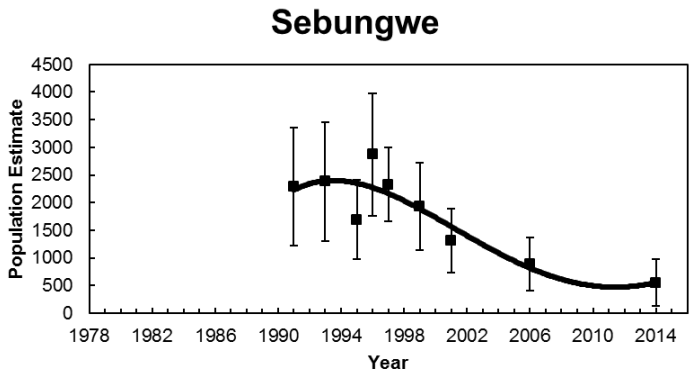
Sebungwe
Population Estimate
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4000
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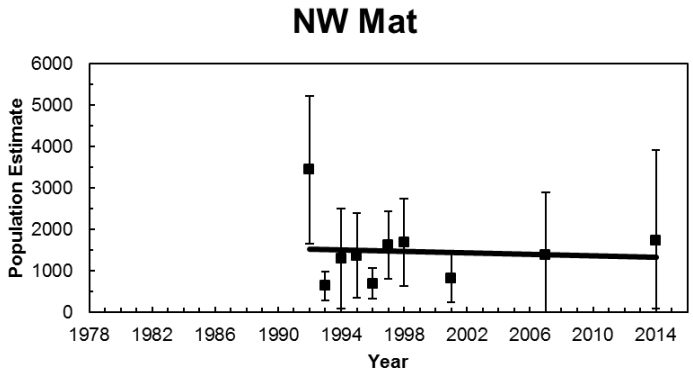
NW Mat
Population Estimate
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5000
4000
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2000
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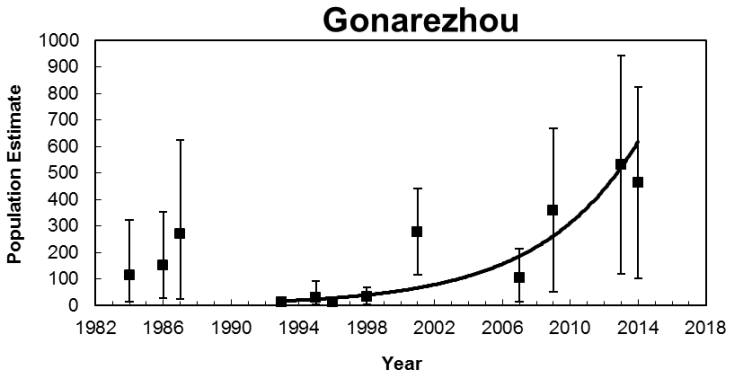
Gonarezhou
Population Estimate
1000
900
800
700
600
500
400
300
200
100
0
1982 1986 1990 1994 1998 2002 2006 2010 2014 2018
Year

9 ASSESSMENT OF THE ENHANCEMENT AND NON-DETRIMENT FINDINGS

The assessment of the enhancement and non-detrimental findings for lion in Zimbabwe is presented here using the "IUCN SSC GUIDING PRINCIPLES ON TROPHY HUNTING AS A TOOL FOR CREATING CONSERVATION INCENTIVES. VER. 1.0. IUCN SSC (2012)" as a guide. Zimbabwe recognises the importance of these principles to guide and manage trophy hunting as a legal, regulated conservation activity which provides a critical tool to secure a sound social, economic and ecological conservation scenario.

Biological Sustainability: Trophy hunting can serve as a conservation tool when it:

	Principle	**Remarks**
1	***Does not contribute to long-term population declines of the hunted species or of other species sharing its habitat, noting that a sustainably harvested population may be smaller than an unharvested one***	Considering the latest available estimate of lion population size in Zimbabwe (1,800 – 2,000), trophy hunting harvests a yearly mean of 2.7% of adult male lions. This figure has decreased since the establishment of age restriction rules on lion hunting. This low offtake is sustainable and generates significant financial and other benefits to ZPWMA, Communities and Private Sector.
2	***Does not substantially alter processes of natural selection and ecosystem function; that is, it maintains "wild populations of indigenous species with adaptive gene pools." This generally requires that hunting offtake produces only minor alterations to naturally occurring demographic structure. It also requires avoidance of breeding or culling to deliberately enhance population-genetic characteristics of species subject to hunting that are inconsistent with natural selection***	Safari hunting in does not substantially alter natural selection or ecosystem processes. The limited quota, as further limited by age restrictions, ensures that hunting offtakes do not negatively affect natural processes. This age-based policy was adopted in part to mitigate any social or population impacts from limited safari hunting. (Whitman et al. 2004).
3	***Does not inadvertently facilitate poaching or illegal trade of wildlife***	Safari hunting in Zimbabwe does not facilitate poaching or illegal trade. Poaching and illegal trade in lion products is currently very low suggesting that the existence of licensed, regulated hunting is helping control poaching and not facilitating it. Hunting operators are in the frontlines against poaching, and are obligated through their concession lease agreements to assistance with anti-poaching. Operators spend significant resources on this, and work in close cooperation with the ZPWMA to combat all forms of illegal wildlife trade. Even where anti-poaching is not a legal prerequisite, operators fund their own anti-poaching teams and support government rangers and community scouts e.g. in Sengwa and Dande Safari Area

	Principle	Remarks
4	***Does not artificially and/or substantially manipulate ecosystems or their component elements in ways that are incompatible with the objective of supporting the full range of native biodiversity***	Hunting in Zimbabwe has created financial incentives for the development and retention of wildlife across Safari Areas, Forestry Areas, Communal CAMPFIRE Areas and private Conservancies thereby supporting biodiversity over 145,000km^2 where hunting is a primary land use. Hunting areas on private and communal land outside of the protected areas also serve as buffer zones for many national parks and safari areas which would be converted to other land uses if these were abandoned.

Net Conservation Benefit: Trophy hunting can serve as a conservation tool when it

	Principle	Remarks
1	***Is linked to identifiable and specific parcels of land where habitat for wildlife is a priority (albeit not necessarily the sole priority or only legitimate use); and on which the "costs of management and conservation of biological diversity [are] internalized within the area of management and reflected in the distribution of the benefits from the use"***	Zimbabwe has identified Safari Areas within the Parks Estates where maintaining habitats and wildlife populations is the priority. These gazetted protected areas cover approximately 17,000km^2 where, without safari hunting, it would be difficult to secure and maintain natural ecosystems and prey bases for lions. In addition to these areas, lion occur on 66% (approximately 11,000km^2) of the land set aside as Conservancies. The operational and law enforcement costs incurred by hunting companies on a yearly basis ranges from US$300,000 to US$500,000 per hunting concession, which includes the expense of camps, salaries, anti-poaching, fuel, community assistance, etc. Many of the government's costs of maintaining Safari Areas are transferred to the private sector through the obligations of their concession agreements. Revenues from hunting in communal CAMPFIRE areas are used to support a range of social services (e.g. schools, clinics, irrigation schemes etc.) while operators cover the costs of anti-poaching, maintenance and development, and contributions to communities living nearby (e.g. through boreholes, grinding mills etc.).

		In private hunting areas and conservancies, the costs and benefits of wildlife in the area are internalized and distributed within the area of management. Critically, most of the Conservancies have elected to manage and conserve endangered species, such as black rhino, and offset the costs of this by conducting sustainable hunting of lion and other key trophy species.
2	***Produces income, employment, and/or other benefits that generate incentives for reduction in pressures on populations of target species, and/or help justify retention, enhancement, or rehabilitation of habitats in which native biodiversity is prioritized. Benefits may create incentives for residents to co-exist with such problematic species as large carnivores, herbivores competing for grazing, or animals considered to be dangerous or a threat to the welfare of humans and their personal property***	Hunting produces direct and indirect income, employment, and other benefits that generate incentives that reduce the threats to wildlife populations. Approximately US$44 million accrued to the country from the revenues of trophy hunting over the last two years. This could have been 5% higher if it were not for restrictions on the export of elephant and lion trophies. This revenue pays for the daily wildlife conservation work in all sectors of the wildlife industry, including research projects, surveys, anti-poaching, and other services. Of this amount, approximately 20% is paid directly to the ZPWMA which is then used to support its management activities, including anti-poaching budgets. Local communities benefit from hunting income through leasing the right to hunt and the sale of trophy fees in CAMPFIRE areas as well as from voluntary contributions and meat. Over the last 6 years, payments from hunting operations generated approximately US$16 million. The nature of the hunting industry does not require large numbers of people to be employed. Nonetheless, the average hunting company employs approximately 80 people on a permanent basis and 20 on a seasonal basis. This equates to approximately 3,000 people who would not otherwise secure any form of employment because of the lack of opportunities in the remote areas where hunting takes place.
3	***Is part of a legally recognized governance system that supports conservation adequately and of a system of implementation and enforcement capable of achieving these governance objectives***	All wildlife species in Zimbabwe, including the African lion, are protected under the Parks and Wildlife Act of 1996 (Chapter 20:14) as amended by Act Number 19 of 2001 which came into operation on the 1st of June 2002 through a Statutory Instrument 144C of 2002. The Act that was originally passed by Parliament in 1975 was a unique move in Africa, if not globally, that promoted the rapid development of the country's wild life industry and lead to the partial

		extension of the principle to the Communal Lands through the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) in the 1980s. The Act provided a legal basis for the devolution of Authority through granting Appropriate Authority Status to the communal areas to manage the wildlife resources for their own benefit. The Act was subsequently revised in 1996 and 2001 with the latest revision paving the way for the establishment of the current Parks and Wildlife Management Authority to replace the former Department of National Parks and Wild Life Management. Following the introduction of the Parks and Wild Life (General) (Amendment) Regulations, 1998 (No.2), i.e. Statutory Instrument 26 of 1998, the administration of the wildlife industry experienced increasing centralisation of controls on wildlife management and utilisation on alienated and communal land. The Parks and Wildlife Management Authority is mandated by the Parks and Wildlife Act [Chapter 20:14], with the responsibility of conserving Zimbabwe's wildlife heritage through effective, efficient and sustainable protection and utilisation of natural resources for the benefit of present and future generations. The Authority was established to allow it to retain the revenue that it generates to fund its operations and thereby reducing its dependence on Treasury. This entailed introducing a commercial dispensation and putting in place effective revenue generation and financial management systems. The ZPWMA has the mandate to manage the entire wildlife population of Zimbabwe, whether on state, private and communal land.

Socio-Economic-Cultural Benefit

	Principle	**Remarks**
1	***Is premised on appropriate resource assessments and/or monitoring of hunting indices, upon which specific quotas and hunting plans can be established through a collaborative process. Optimally, such a process should (where relevant) include local communities and draw on local/indigenous knowledge. Such resource assessments (examples might include counts or indices of population performance***	Zimbabwe implements an adaptive quota setting quota system that uses inputs from monitoring data and input from a variety of stakeholders including ZPWMA field and research staff, local communities, hunting operators, and independent biologists. Quotas are set based on population estimates or trend analyses, monitoring data, hunt return data, research work and indices as may be reflected in various reports by field personnel.

	such as sighting frequencies, spoor counts) or hunting indices (examples might include trophy size, animal age, hunting success rates and catch per hunting effort) are objective, well documented, and use the best science and technology feasible and appropriate given the circumstances and available resources	For lions, specifically, the ZPWMA together with the Safari Operators Association (SOAZ), the Zimbabwe Professional Hunters Association (ZPHGA) and invited independent scientists (such as Panthera) review the returns from the current hunting season and assign points as per the lion aging criteria. The overall quotas allocated and actual offtake have been reduced in recent years as a precautionary measure, including implementing moratoriums in some regions where lion densities have declined. These measures, i.e., age, population trends, maximum overall numbers and levels of utilisation has resulted in lower quotas thus underlining Zimbabwe's commitment to sustainable hunting.
2	***Involves adaptive management of hunting quotas and plans in line with results of resource assessments and/or monitoring of indices, ensuring quotas are adjusted in line with changes in the resource base (caused by ecological changes, weather patterns, or anthropogenic impacts, including hunting offtake)***	Quotas are set adaptively in line with the results of monitoring trends and on regulatory compliance. If an underage lion is harvested, the quota for that area is removed in the next season to allow the population to age and to penalize the non-compliance. In this way, Zimbabwe ensures responsible and sustainable offtakes that have limited impact on the lion population.
3	***Is based on laws, regulations, and quotas (preferably established with local input) that are transparent and clear, and are periodically reviewed and updated***	Safari hunting in Zimbabwe is regulated through the National Parks and Wildlife Act and supporting Regulations that specify when, where and how animals are hunted. Both the professional hunters and the hunting client are licensed in terms of these regulations, and all returns are lodged electronically and tracked through the Reserve Bank TRAS-2 system. As described above, quotas are established in a transparent and participatory way.
4	***Monitors hunting activities to verify that quotas and sex/age restrictions of harvested animals are being met***	The monitoring of the lion hunting is carried out through the implementation of a specific database and a specific safari return form. All hunting permits issued by (and compulsorily returned to) the ZPWMA are registered on a specific database that has been developed under the auspices of the Exchange Control Division of the Reserve Bank that records all parameters related to hunting safaris, including records of lion hunting. The database is accessible to the ZPWMA who can extract reports on all lion hunting activities for all areas in the country. Since 2013, all professional hunters conducting lion hunting safaris are required to fill in the return form for both successful and unsuccessful safaris that

		captures a broad range of general information on the safari (client name, duration, date, payments etc. For the successful lion hunting safaris, additional information related to hunting effort and success, trophy skull measures (total length and width) and specified photographs are taken of the physical features (mane etc.) and upper and lower jaws. These return forms and trophy photographs are compulsory. No CITES export permit can be issued without compliance. All data forms are reviewed by the ZPWMA together with a committee appointed by the SOAZ and ZPHGA to ensure the offtakes and subsequent exports are not detrimental to the survival of the species. Zimbabwe also requires that a ZPWMA ranger accompany all lion safaris both on state land and private land.
5	***Produces reliable and periodic documentation of its biological sustainability and conservation benefits (if this is not already produced by existing reporting mechanisms).***	The Exchange Control Division of the Reserve Bank publishes a detailed report that summarises all data related to sport hunting. This includes country of origin of clients, gross income from daily rates and trophy fees (by company), average trophy and safari values, and the contribution of key species to the overall income generated through hunting. The ZPWMA also produces annual reports that highlight the performance of the hunting industry, listing the challenges that it faces. It also submits periodic reports to CITES.

Accountable and Effective Governance

	Principle	**Remarks**
1	***Is subject to a governance structure that clearly allocates management responsibilities***	The governance structure is described in the Parks and Wildlife Act and its subsidiary regulations that clearly provides for institutional arrangements and administration defining the management responsibilities within the relevant Government Authority.
2	***Accounts for revenues in a transparent manner and distributes net revenues to conservation and community beneficiaries according to properly agreed decisions;***	The equitable distribution of costs and benefits take into consideration the role of stakeholders in relation to the land category. Benefit sharing to communities under the CAMPFIRE programme is determined through an approved ratio that channels 55% of all income from hunting to the Ward level. This institution is monitored at the local level by the Rural District Councils that guide Ward

		Wildlife Committees with respect to community projects and services. At national level this is monitored by Ministry of Rural Development, Preservation and Promotion of Culture and Heritage Safari operators contribute substantially and voluntarily, over and above the prescribed fixed contribution, especially where this involves anti-poaching efforts and community developments. They provide funding, equipment and the technical expertise for repairs, transportation, and other social services (schools, boreholes). In addition, hunting companies collaborate with both ZPWMA and District anti-poaching teams to remove snares, participate in serious wildlife crime investigations and arrest poachers.
3	***Takes all necessary steps to eliminate corruption;***	Anti-corruption efforts in Zimbabwe are governed by the following legislation: • The Prevention of Corruption Act (1983); • Public Service Act (1995); • The Ombudsperson Amendment Act (1997); • Anti-Corruption Commission Bill (2004); • The Criminal law (Codification and Reform) Act (2004); • Bank Use Promotion and Suppression of Money Laundering Act (2004); • Criminal Procedure and Evidence Amendment Act (2004); and • Criminal Law (Codification and Reform) Act of 2006 The Zimbabwean Anti-Corruption Commission (ACC) was established after the passing of the Anti-Corruption Commission Bill in June 2004. The Commission is a signatory to the Southern Africa Development Community (SADC) Protocol as well as the African Union (AU) and United Nations Convention on Anti-Corruption.
4	***Ensures compliance with all relevant national and international requirements and regulations by relevant bodies such as administrators, regulators and hunters.***	The CITES Management Authority of Zimbabwe, the ZPWMA, ensures compliance of safari hunting to CITES guidelines and provisions.

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11 APPENDICES

11.1 ANNEX I: SUMMARY OF NATIONAL PARKS ESTATE, FORESTRY, COMMUNAL AND PRIVATE LAND WHERE LION ARE KNOWN TO OCCUR

1. National Parks Estate

Type of Land	Name of Park	District	Area (hectares)	Presence of lion
NP	Chizarira	Binga	191,000	Yes
NP	Gonarezhou	Chiredzi	505,000	Yes
NP	Matusadonha	Nyaminyami	140,700	Yes
NP	Chimanimani	Chimanimani	17,110	No
NP	Mana Pools	Hurungwe	219,600	Yes
NP	Kazuma Pan	Hwange	31,300	Yes
NP	Hwange	Hwange	1,465,100	Yes
NP	Victoria Falls "A"	Hwange	1,904	No
NP	Victoria Falls "B"	Hwange	436	No
NP	Zambezi	Hwange	56,010	Yes
NP	Rhodes Nyanga	Nyanga	47,150	Migratory
NP	Rhodes Matopos	Matobo	42,400	No
Total Area National Parks (ha)			**2,717,710**	
Botanical Gardens	Pioneer Reserve	Beitbridge	38	No
Botanical Gardens	Tolo River Reserve	Beitbridge	44	No
Botanical Gardens	South Camp Reserve	Beitbridge	26	No
Botanical Gardens	Chisekera Hot Springs	Chiredzi	95	No
Botanical Gardens	Mawari Raphia Palm	Mt. Darwin	34	No
Botanical Gardens	Tingwa Raphia Pan	Mt. Darwin	290	No
Botanical Gardens	Haroni Forest	Chimanimani	20	No
Botanical Gardens	Rusitu Forest	Chimanimani	150	No
Botanical Gardens	Sebakwe Acacia Karoo	Kwekwe	60	No
Botanical Gardens	Sebakwe Great Dyke	Kwekwe	165	No
Botanical Gardens	Sebakwe Mountain Acacia	Kwekwe	53	No
Botanical Gardens	Mazowe "A"	Harare	43	No
Botanical Gardens	Mazowe "B"	Harare	3	No
Botanical Gardens	Bunga Forest	Mutare	495	No
Botanical Gardens	National Botanic Garden	Harare	67	No

Type of Land	Name of Park	District	Area (hectares)	Presence of lion
Botanical Gardens	Vumba Botanic Garden	Mutare	200	No
Botanical Gardens	Ewanrigg Botanic Garden	Goromonzi	286	No
Total Area of Botanical Gardens and Botanical Reserves:			**2,069**	
Sanctuary	Maninii Pan	Chiredzi	300	No
Sanctuary	Melsetter Eland	Chimanimani	1,800	No
Sanctuary	Mbaze Pan	Nkayi	40	No
Sanctuary	Nyamanyetsi (Nyamanechi)	Guruve	2,840	No
Sanctuary	Mushandike	Masvingo	12,900	No
Sanctuary	Rhodes - Bulawayo	Matobo	1,100	No
Total Area Sanctuaries			**18,980**	
Safari Area	Tuli	Beitbridge and Gwanda	41,600	Yes
Safari Area	Chete	Binga	108,100	Yes
Safari Area	Chipinga (Chipinge)	Chipinge	26,100	No
Safari Area	Malapati (Malipati)	Chiredzi	15,400	Yes
Safari Area	Chinsa	Gokwe	171,300	Yes
Safari Area	Hartley (Chegutu)	Chegutu	44,500	No
Safari Area	Charara	Kariba and Hurungwe	169,200	Yes
Safari Area	Hurungwe	Hurungwe	289,400	Yes
Safari Area	Doma	Makonde	94,500	Yes
Safari Area	Umfurudzi	Shamva	76,000	No
Safari Area	Dande	Guruve	52,300	Yes
Safari Area	Chelvore (Chewore)	Hurungwe	339,000	Yes
Safari Area	Sapi	Hurungwe	118,000	Yes
Safari Area	Deka	Hwange	51,000	Yes
Safari Area	Matetsi	Hwange	295,500	Yes
Total Area of Safari Areas:			**1,891,900**	
Recreational	Chibwatata	Binga	6	No
Recreational	Kavira	Binga	50	No
Recreational	Lake Kariba	Binga, Nyaminyami and Hwange	287,200	Yes

Type of Land	Name of Park	District	Area (hectares)	Presence of lion
Recreational	Ngezi	Kadoma	5,800	No
Recreational	Umfuli (Mfurudzi	Chegutu	12,700	No
Recreational	Lake Robertson (Manyame Lake)	Chegutu, Makonde and Harare	11,200	No
Recreational	Lake Cunningham	Insiza	4,172	No
Recreational	Chinhoyi Caves	Makonde	120	No
Recreational	Manjirenji	Zaka	3,400	No
Recreational	Bangala	Zaka and Masvingo	2,700	No
Recreational	Sebakwe	Kwekwe	2,600	No
Recreational	Robert McIlwaine (Chivero)	Harare	6,180	No
Recreational	Umzingwane	Umzingwane	1,233	No
Recreational	Kyle (Mutirikwi)	Masvingo	16,900	No
Recreational	Lake Matopos	Matobo	2,900	No
Total Area of Recreational Parks, Lakes and Dams			**357,161**	

Total Area National Parks (ha)	2,717,710
Total Area of Botanical Gardens and Botanical Reserves:	2,069
Total Area Sanctuaries	18,980
Total Area of Safari Areas:	1,891,900
Total Area of Recreational Parks, Lakes and Dams	357,161
Total Ha	**4,987,820**

2. Forestry Land

Land	Name	District	Area (ha)	Presence of lion
Forestry Areas	Fuller	Hwange	23,300	Yes
Forestry Areas	Panda Masuie	Hwange	33,500	Yes
Forestry Areas	Kazuma	Hwange	24,000	Yes
Forestry Areas	Mvutu	Hwange	2,100	No
Forestry Areas	Sikumi	Hwange	54,400	Yes
Forestry Areas	Gwayi	Lupane	144,265	Yes
Forestry Areas	Lake Alice	Lupane	39,000	No
Forestry Areas	Ngamo	Lupane	102,900	Yes

Land	Name	District	Area (ha)	Presence of lion
Forestry Areas	Chisengu	Lupane	4,006	No
Forestry Areas	Glencoe	Lupane	2,050	No
Forestry Areas	Lionhills	Lupane	2,747	No
Forestry Areas	Martin (i)		400	No
Forestry Areas	Martin (ii)		4,400	No
Forestry Areas	Mudima		6,355	No
Forestry Areas	Nyambewa		5,484	No
Forestry Areas	Tandai		5,450	No
Forestry Areas	Tarka		4,343	No
Forestry Areas	Gwampa	Nkayi	47,000	No
Forestry Areas	Chesa	Nkayi	14,250	No
Forestry Areas	Inseze	Nkayi	35,200	No
Forestry Areas	Inseze Extension	Nkayi	8,400	No
Forestry Areas	Umgusa	Nkayi	32,200	No
Forestry Areas	Umzibani	Nkayi	2,471	No
Forestry Areas	Kavira	Binga	28,200	Yes
Forestry Areas	Mzolo	Binga	67,200	No
Forestry Areas	Sijarira	Binga	25,600	Yes
Forestry Areas	Bembesi	Binga	55,100	No
Forestry Areas	Molo	Binga	2,900	No
Forestry Areas	Mtao	Chirumanzu	8,170	No
Forestry Areas	Chirindu	Chirumanzu	950	No
Forestry Areas	Gungunyana	Chirumanzu	1,650	No
Forestry Areas	Mafungabusi	Chirumanzu	82,100	No
Forestry Areas	Mudzongwe	Chirumanzu	1,420	No
Forestry Areas	Ungwe	Chirumanzu	567	No
Forestry Areas	Nyangu	Chirumanzu	16,600	No
Forestry Areas	York	Chirumanzu	1,455	No
Forestry Areas	Banti	Mutare	2,219	No
Forestry Areas	Stapleford	Mutare	24,600	No
Rhodes Estate	Erin	Nyanga	10,700	No
Rhodes Estate	Sauerdale North	Nyanga	214	No

Land	Name	District	Area (ha)	Presence of lion
Total Forest Areas (ha)			**927,866**	

3. CAMPFIRE Districts

District	Natural Region	Total Area (km^2)	Area of CF Wards (km^2)	Number of Wards	CF Wards	District Pop (persons)	Presence of lion
Beitbridge	5	12,935	4,595	21	6	80,946	Migratory
Binga	3,4&5	12,308	7,930	27	21	87,802	Migratory
Bubi	4	5,547	88	12	2	36,614	Migratory
Bulilimamangwe	4&5	12,574	1,530	33	10	156,641	Migratory
Chaminuka	2a,2b,3,4&5	2,752	380	26	2	94,047	No
Chimanimani	1,2a,3,4&5	3,419		28		110,836	No
Chipinge(Gazaland)	1,2a,3,4&5	5,223	408	33	2	336,893	Migratory
Chiredzi(Gaza Khomanani)	5	17,748	3,633	32	9	183,228	Yes
Chiweshe(Mazowe)	2a	4,482	375	29	5	198,319	No
Gokwe North	3,4&5	7,359	2,523	25	4	164,558	Migratory
Gokwe South	3&4	11,138	1,308	28	6	238,581	Migratory
Goromonzi	2a	2,504		26		147,126	**No**
Mbire (Guruve)	2a,3&4	7,810	4,215	28	14	135,637	Yes
Gwanda	4&5	10,792	2,283	23	6	112,984	No
Hurungwe	2a,3,4&5	19,895	2,793	40	9	246,902	Yes
Hwange	4&5	29,934	4,021	27	15	71,707	Yes
Hwedza	2b&3	998				69,981	No
Kusile(Lupane)	3&4	7,780	2,885	24	11	94,469	Migratory
Marondera	2a&2b	3,554		24		104,601	No
Matobo	4&5	7,278	1,233	26	4	89,281	No
Mudzi	4	4,222	1,009	18	2	109423	No
Mutoko	2b,3&4	4,052		29		122,941	No
Muzarabani	2a,3&4	4,322	2,540	17	9	69,851	Migratory
Mwenezi	4&5	12,933		31		101,354	Migratory
Nkayi	4	5,333	2,628	23	6	113,302	Migratory
Nyaminyami(Kariba)	4&5	6,327	3,532	16	11	27,717	Yes
Nyanga	1,2b,3&4	5,738	253	37	1	128,439	Migratory
Pfura(Mt. Darwin)	2a,2b,3&4	1,771				164,362	No
Rushinga	3&4	2,408		17		75,332	No
Tsholotsho	4	7,823	5,354	20	8	111,828	Yes
UMP Zvataida	2b,3&4	2,682	619	15	2	86,302	No
Umzingwane	4	1,074				62,954	No

District	Natural Region	Total Area (km²)	Area of CF Wards (km²)	Number of Wards	CF Wards	District Pop (persons)	Presence of lion
Zivagwe	4	2,363				65,752	No
TOTAL/AVERAGE		247,078	56,135	735	165	4,000,710	

4. Conservancies

	Name of Conservancy	District	Area (hectares)	Presence of lion
Conservancies	Malilangwe	Chiredzi	40,000	Yes
Conservancies	Save	Chiredzi	344,200	Yes
Conservancies	Chiredzi River	Chiredzi	28,500	No
Conservancies	Bubye Valley	Matabeland South	374,000	Yes
Conservancies	Bubiana	Matabeland South	130,000	No
Conservancies	Gwayi	Hwange	150,897	Migratory
Conservancies	Midlands Black Rhino	Midlands	85,000	No
Other	Matetsi Farms	Hwange	155,627	Migratory
Total Area of Conservancies			**1,308,224**	

11.2 ANNEX II: SUMMARY OF PRIMARY LEGISLATION AND REGULATIONS

11.2.1 The Policy for Wild Life of 1992

This policy provides for Government to maintain a protected area network known as the Parks and Wild Life Estate for the conservation of the nation's wild resources and biological diversity. According to the policy, government will use the Estate to promote a rurally based wild life industry and will harmonise the management of the Estate with the efforts of neighbouring communities that are developing wild life as a sustainable form of land use. The policy vests executive responsibility for the Parks and Wildlife Estate in the Department of National Parks and Wild Life Management (DNPWLM). It provides for the following categories of protected area: National Park; Safari Area; Sanctuary; Recreational Park, Botanic Reserve and Botanic Garden.

- The objectives of the Parks and Wild Life estate will be to:
- Preserve representative samples of Zimbabwe's aquatic and terrestrial flora and fauna and their physical environments;
- Protect areas of scenic beauty and special interest;
- Preserve rare, endangered and endemic species;
- Conserve water catchments;
- Provide opportunities for public education and the advancement of scientific knowledge;

and, without prejudice to any of the above:

- Encourage public use related to the enjoyment and appreciation of these areas; and
- Generate economic activity within the Estate and surrounding areas to enhance rural development.

The policy commits the DNPWLM to an adaptive management strategy in which research and monitoring are incorporated as integral components of management. It states that where sport

hunting is an objective in a protected area, quotas will be set to the maximum sustainable level at which trophy quality can be maintained and the hunting can be marketed. In terms of the policy the emphasis of tourism in parks should be low density and high quality tourism. An EIA must be carried out for major developments such as construction of roads, powerlines, buildings or dams.

With respect to Wildlife Conservation, the Policy states that the Government of Zimbabwe aims to encourage the conservation of wild animals and their habitats outside the Parks and Wild Life Estate recognising that this is only likely to be successful if wild life can be used profitably and the primary benefits accrue to people with wild life on their land. "*Recognising that much of Zimbabwe does not consist of good arable land, Government regards wild life management in all its diverse forms as a legitimate land use which may be the most appropriate or highest-valued form of development in many areas*". The policy also states that Government will take the necessary legal and enforcement measures to prevent the illegal use of wildlife.

Addressing community rights to natural resources the Policy states that government intends to "*transform land use in remote communal areas through its Communal Areas Management Programme for Indigenous Resources (CAMPFIRE), under which rural peoples have the authority to manage their wild life and other natural resources and benefit directly from so doing*". Further government will "*ensure that wildlife is not undervalued to the people living with it by permitting them to use it sustainably for their own gain as they are able to do with other natural resources and agricultural products*".

The policy states that the mechanism for communities to gain rights over wild life will be through the granting of Appropriate Authority to Rural District Councils (under the Parks and Wildlife Management Act of 1975). For this authority to be granted, the Minister will require:

1. An acceptable management plan from councils in which objectives for wild life are stated and preliminary intentions for achieving these objectives are outlined;
2. An acceptable institutional plan which outlines clearly the methods by which councils intend a) to involve wild life producer communities in district level management and b) to devolve the decision-taking process in local wild life management and the distribution of wild life benefits to producer communities;
3. The department to assist councils in managing their wild life and to coordinate the activities of NGOs who are assisting councils;
4. The approval by the department of all annual quotas of wild life killed or sold in communal lands during the interim period while councils develop their management capacity;
5. The presentation of annual reports from Councils to the Director and to their constituents detailing the year's performance in wild life management in their district.

The policy provides for the Minister to withdraw Appropriate Authority from a council not conforming to conditions and objectives under which it was granted.

11.2.2 Wildlife Based Land Reform Policy

In 2004 there was a move to revise the Policy for Wildlife to cater for the Land Reform programme. The revised policy, known as the Wildlife-Based Land Reform Policy, has not however been formally accepted by Government. Nonetheless, it is important to summarise what was envisioned at that time since this has influenced the way the management of wildlife outside of the Parks Estate has unfolded.

The vision of this reformed policy is to ensure profitable, equitable and sustainable use of wildlife resources, particularly in areas where agricultural potential is limited. It states that "*the policy has*

been developed in the context of Zimbabwe's Land Reform Programme and is underpinned by recognition that wildlife is a viable land-use option, that it can facilitate attainment of equity objectives and that it is feasible. This policy is complemented by existing natural resources legislation and the state protected area system."

The policy also states that the key issues that were taken into consideration were:

- The State will continue to make provision for wildlife management outside the protected area system, including setting aside certain core zones for wildlife production. Wildlife should be the only permitted primary land use option in these areas.
- Outside core zones, wildlife production, amongst other land use options, will be encouraged. The most profitable and ecologically sustainable land use option must be allowed to evolve in response to changing economic influences, notwithstanding the need to ensure food security in these areas.
- The scale of wildlife operations must be allowed to vary from intensive to extensive, depending on agro-ecological settings.
- All beneficiaries of wildlife operations, whether individually or jointly, must equitably share the costs of production.
- Wildlife management responsibility and authority must be devolved to the most appropriate level for efficient resource management and production incentives must be maximized for landholders.
- Security of tenure over resources is key to successful wildlife-based land reform. These core areas should be identified.

The aims of the Wildlife-Based Land Reform Policy are listed as:

1. To facilitate the indigenisation of the wildlife sector and to ensure more equitable access by most Zimbabweans to land and wildlife resources and to the business opportunities that stem from these resources.
2. To maintain a proportion of land outside state protected areas under wildlife production.
3. To enhance diversity of land uses through wildlife production.
4. To promote secure and equitable tenure.
5. To develop and implement appropriate institutional arrangements for wildlife-based land reform.

The policy recognized that wildlife production can be at different scales, which are dependent on several factors that include the type of wildlife, management regime and ecological conditions. Three categories are highlighted in the policy:

1. Intensive production systems with captive or semi-captive species such as crocodiles and ostriches (1 – 100 hectares).
2. Semi-intensive to semi-extensive production systems with free-ranging "plains game" populations (1,000 to 10,000 hectares).
3. Extensive production systems incorporating "big game" populations (over 10,000 hectares).

The Wildlife Based Land Reform Policy promotes two land redistribution models:

1. A state leasehold approach which is based on the reallocation of leasehold leases.
    a. This approach entails the acquisition of the entire land-holding with compensation for infrastructure, wildlife, etc.,

   b. The land will be reallocated to lessees under terms and conditions that will ensure sustainable wildlife management, on-going investment and capacity-building in that area.
2. A corporate equity model that involves transfer of shares within a land-owning company.
   a. The transfer of shares will be in accordance with the Indigenisation goals and sound business principles;
   b. Proposals from stakeholders must outline realistic ways in which new entrants can increase their shareholdings well beyond an initial level, over a reasonable time scale.
   c. The proposals must make provision for immediate allocation of shareholdings to new participants.

The Policy document also acknowledges that the two approaches can be applied in combination and shall be considered on a case by case basis, and that the State may from time to time consider other approaches that meet the objectives of the Wildlife Based Land Reform Policy.

11.2.3 Parks and Wild Life Act Chapter 20:14 of 1996 as amended in 2001:

This is the pivotal Act with respect to wildlife management in Zimbabwe. The Act includes the following sections:

1. Parks and Wildlife Board
2. Parks and Wildlife Estate and Parks and Wildlife Land
3. National Parks
4. Botanical Reserves and Botanical Gardens
5. Sanctuaries
6. Safari Areas
7. Recreational Parks
8. Specially Protected Animals
9. Specially Protected Indigenous Plants
10. Indigenous plants
11. Hunting, removal, viewing and sale of animal products
12. Protection of animals and Indigenous plants on alienated land
13. Fish Conservation
14. Evidence, prevention and detection of offences and additional penalties and forfeitures
15. Inspectors, Officers, employees and advisory committees
16. General

The Act also defines the different types of land (Alienated land):

a. “Private Land” means land the ownership of which is vested in any person other than the President.
b. “State Land” means land vested in the President other than Communal Land or trust land vested in the President.
c. “Trust land” means any land, other than Communal land held in trust by the President or a statutory body or by a person, whether solely or jointly with others, by virtue of his being the holder of some office in a statutory body.

The Parks and Wildlife Act of 1975 (as amended) states that the purposes of National Parks are:

1. To preserve and protect the natural landscape and scenery.
2. To preserve and protect wild life and plants and the natural ecological stability of wild life and plant communities for the enjoyment, education and inspiration of the public.

Establishment of Protected Areas: The Act enables the President to declare National Parks on State land or Trust Land if the trustees give their consent (Section 22). The Act enables the Minister acting on the authorisation of the President to acquire land for the Parks and Wild Life Estate either compulsorily or by agreement in terms of the procedures contained in the Communal Land Act and the Land Acquisition Act. The Act gives the Minister the power to manage National Parks, control entry and authorise or restrict certain activities and carry out various conservation measures. The Act provides for the provision of facilities and services for tourists in National Parks or to lease out such facilities or services. The Act allows the Minister to issue a permit for hunting in National Parks.

The Act makes provision for the establishment of Botanical Reserves and Botanical Gardens (Section 26) on State Land or Trust Land for the preservation and protection of rare or endangered indigenous plants or representative plant communities for the enjoyment, education and benefit of the public.

A third category of protected area is a Sanctuary which may be established by the President on State Land or Trust Land (Section 31) to afford special protection to all animals or a particular species of animal in the sanctuary for the enjoyment and benefit of the public. The Minister may provide tourism facilities and services in a Sanctuary or lease facilities or services. The Minister may also issue permits for hunting or the removal of game from a sanctuary for certain purposes.

In terms of the Act the President may establish Safari Areas on State Land or Trust Land as part of the Parks and Wild Life Estate (Section 36) for the preservation and protection of the natural habitat and the wild life in these areas in order that facilities and opportunities may be afforded to the public for camping, hunting, fishing, photography, viewing of animals, bird watching and similar activities. The Minister may lease sites in safari areas for various purposes and may grant hunting or other rights. Hunting or removal of wildlife in a safari area may only take place with a permit.

The fifth category of protected area provided for by the Act is a Recreational Park (Section 41), which may be established by the President for the purpose of preserving and protecting the natural features for the enjoyment, benefit and recreation of the public. The Minister may designate areas within Recreational Parks which can be alienated or leased for the provision of tourism facilities and services.

Prospecting and mining are prohibited in National Parks, Botanical Reserves, Botanical Gardens, Sanctuaries or Recreational Parks without a permit issued by the Minister and with the consent of the Minister of Mines (Section 119). The Environmental Management Act of 2002 also makes provision for land to be acquired by the State for conservation purposes. According to Section 109 the President may acquire land or set land aside for the improvement or proper management of the environment. In the absence of an agreement with the land owner the President may acquire the land in accordance with the procedures under the Land Acquisition Act. The President may set aside any area of Communal Land for the conservation or improvement of natural resources or for the protection of irrigation works or sources of water supplies provided that no such area shall be set aside until the Minister responsible for the administration of the Communal Land Act is satisfied that suitable provision has been made elsewhere for the inhabitants who will be affected by the setting aside of the area (Section 110).

Specially Protected Animals and Plants: The Act makes provision for the Minister to declare certain animals as specially protected (Section 44). In terms of the Act, no-one may hunt, have in their possession, or sell a live specially protected animal or the meat or trophy from such an animal without a permit. The trophy of any specially protected animal must be surrendered to the state if not obtained by a permit. The Act specifies the purposes for which the Minister may issue a permit for use of

specially protected animals (Section 46), but provides the Minister with some flexibility as he/she may issue a permit for any purpose which in the opinion of the Minister is in the interests of the conservation of animals.

The Act also makes provision for the declaration of specially protected indigenous plants (Section 49). No person may pick a specially protected plant without a permit, although the owners or occupiers of land or a person acting under their authority may pick a specially protected plant for cultivation, forestry, building construction or the construction of roads and other infrastructure. No person may sell a specially protected plant without a permit unless the person is a recognised dealer in specially protected indigenous plants or a member of a recognised horticultural society and the purchase is from a member of the same or other recognised society. The Act specifies the purposes for which the Minister may issues permits for the picking or sale of specially protected indigenous plants. The Act also stipulates that no person may pick or sell indigenous plants without a permit (Section 55) provided that the appropriate authority for any land may pick or sell or authorise others to pick or sell indigenous plants (Section 56). If the Minister deems it necessary for the conservation of an indigenous plant, the Minister may prohibit the picking or selling of that plant (Section 57).

Hunting and removal of animals: The Act prohibits hunting, removal of an animal or any part of an animal or the sale of an animal without a permit unless by an appropriate authority for the land (Section 59), which is the owner of freehold land, a Rural District Council on communal land, the Forestry Commission on state forests and the DNPWLM on the parks and Wildlife Estate. The appropriate authority for the land may issue permits to others to use the wild life (except for specially protected species). If the Minister deems it necessary for the conservation of a animal, he/she may prohibit the hunting or removal of such animals in a specific area (Section 60) and may serve a notice to prohibit a specific person from hunting, conducting photographic tourism, or being in the possession of a weapon used for hunting save for self-defence. The Minister does not have to give reasons for such prohibitions. The Act enables the killing of an animal without a permit for self-defence (Section 61).

The Act prohibits anyone from conducting of hunting or photographic safaris within the parks and wild life estate or on forest land without holding a professional hunter's licence or a professional guide's licence (Section 65). No person may manufacture an article from a trophy, process a trophy or sell or otherwise dispose of a trophy or an article manufactured from a trophy from an animal that has been hunted in contravention of the Act (Section 73).

If the Minister believes it in the interests of conservation, he/she may declare any animal that is not a specially protected animal as a protected animal and any indigenous plant that is not a specially protected plant as a protected plant (Section 77) on alienated land within the area of an environment committee established in terms of the Environmental Management Act of 2002 and the Rural District Councils Act of 1988. No person may, without a permit, hunt an animal or pick an indigenous plant that has been declared protected. The Minister may also restrict the extent of hunting animals or picking of indigenous plants on alienated (private freehold) land in the area of an environment committee if the Minister believes that the hunting of animals or picking of plants is unsustainable. The Minister may authorise an environment committee to reduce the numbers of problems animals on any alienated land within its area if the number of such animals is sufficient to cause excessive damage or nuisance. Section 79 gives environment committees the power to restrict hunting on alienated land if it believes that hunting is unsustainable.

The Minister may declare any person to be the appropriate authority for any waters (Section 83) and may declare controlled fishing waters (Section 84) for which the Minister may make regulations for

the control, regulation, restriction of prohibition of fishing. Unless the Minister designates areas of water where a permit is not required, no-one except the appropriate authority for that water may fish in any water without a permit. Section 87 regulates the means of fishing by prohibiting the use of explosives, firearms and poisons. Section 88 controls the introduction into any water of fish and plants that are not native to that water. No-one except the appropriate authority for a water may fish commercially and sell the fish without a permit (Section 90). The minister may ban fishing by specific persons in any area in the interests of conservation (Section 96).

Enforcement: The Act provides for the powers of conservation officials, and police officers in relation to enforcing the Act. It provides for penalties for various offences and for the Minister to make regulations on a wide range of issues and activities. The Act provides for the highest penalties to be awarded for the unlawful killing of a rhinoceros or other specially protected game specified by the Minister in an
official notice and for the unlawful possession or trade in rhino horn, ivory or the trophy of any other specially protected animal specified by the Minister in an official notice (Section 128).

The Environmental Management Act of 2002 provides the Minister responsible for the Environment to regulate the use of wetlands. In terms of Section 113 of the Act the Minister may declare any wetland to be an ecologically sensitive area and may impose limitations on development in or around such area. Further, no person may without authorisation in terms of the Act:

a. reclaim or drain any wetland;
b. disturb any wetland by drilling or tunnelling in a manner that has or is likely to have an adverse impact on any wetland or adversely affect any animal or plant life therein;
c. introduce any exotic animal or plant species into the wetland. Section 114 enables the Minister to serve an order on the owner, occupier or user of land under which they must take measures, construct such works or refrain from specific activities in order to protect the environment.

Biological Diversity: Further the Act enables the Minister to take such measures as may be necessary for the conservation of biological diversity and the implementation of Zimbabwe's obligations under the United Nations Convention on Biological Diversity adopted in 1992 and may, in so doing (Section 116):

a. identify the components of the biological diversity of Zimbabwe;
b. determine the components of biological diversity which are threatened with extinction;
c. prepare and maintain an inventory of the biological diversity of Zimbabwe;
d. determine actual and potential threats to the biological diversity and devise such measures as are necessary for preventing, removing or mitigating the effect of those threats;
e. devise measures for better protection and conservation of rare and endemic species of wild fauna and flora;
f. develop national strategies, plans and programmes for the conservation of the biological diversity of Zimbabwe;
g. promote the integration of conservation and sustainable use of biological diversity into relevant sectoral policies, plans and programmes;
h. require in writing any developer, including the government, to integrate the conservation and sustainable utilisation of the biological diversity in any project the implementation of which has or is likely to have detrimental effects to the biological diversity of Zimbabwe;
i. protect indigenous property rights of local communities in respect of biological diversity with scientific knowledge;

j. support the integration of traditional knowledge on conservation of biological diversity with scientific knowledge;
k. prohibit or restrict access by any person to or the exportation of any component of the biological diversity of Zimbabwe.

The Minister may also take such action or measures as may be necessary for the conservation of the biological diversity of a specific locality and may:

a. promote such land use methods as are compatible with the conservation of the biological diversity of that locality;
b. select and manage environmental protection areas for the conservation of the various terrestrial and aquatic ecological systems;
c. establish and manage buffer zones near environmental protection areas;
d. prohibit or control the importation of and introduction into the wild of exotic animal and plant species;
e. identify, promote and integrate traditional knowledge into the conservation and sustainable utilisation of the biological diversity of that locality; and
f. determine special measures for the protection of species, ecosystems and habitats faced with extinction.

Community rights to natural resources: The Act provides for land holders to acquire rights over wildlife through the granting of "appropriate authority" status. Thus, the owners of private freehold land are deemed to be the appropriate authority over wildlife on their land (Section 2). Communities acquire rights over wildlife through Rural District Councils (RDCs). A 1982 amendment to the Act provides for the Minister to appoint an RDC as the appropriate authority for wild life on the communal land within the jurisdiction of the RDC (Section 108). The Act states that no person may hunt any animal on any land or remove any animal or part of an animal except in term of a permit issued by the appropriate authority for that land [Section 59(2)]. The appropriate authority may hunt any animal on the land, remove any animal or part of an animal from the land and may issue permits to others to hunt or remove animals from the land. RDCs are then expected to apply the guidelines contained in the 1992 Wildlife Policy to devolve the decision-taking process in local wild life management and the distribution of wild life benefits to producer communities (i.e. smaller and more localised groups of people with wildlife on their land). Further policy guidelines state that RDCs
are expected to distribute a percentage of income derived from wildlife use to producer communities and to allow these communities to be responsible for several wildlife management activities. Because of the existing administrative system of local government, producer communities had to be represented by Ward Development Committees (WADCOs) and Village Development Committees (VIDCOs) which are advisory bodies to Councils.

In this way, various legal entities are granted authority over wildlife outside the Parks Estate. These authorities include private land-owners (where the land is held under an agreement of purchase or lease), forest land (such as Forestry Commission estates). For Communal Land, the Rural District Councils (RDC) may be appointed the Appropriate Authority. The Minister of Environment grants this authority, with input from the Zimbabwe Parks and Wildlife Management Authority. If appropriate authority is not granted, the authority remains vested in Central Government. This Appropriate Authority clause in the Act, paved the way for the implementation of the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE)[3].

Statutory Instruments: There are several statutory instruments (SI) that regulate the wildlife sector:

[3] Note that the CAMPFIRE programme is about to undergo a comprehensive review that will impact on future policies.

- SI 362 of 1990: This legislation provides in sections 66-75 for the Regulation of Manufacture, Processing and Dealing in trophies.
- SI 76 of 1998: Parks and Wild Life (Import and Export) (Wild Life) Regulations specifically deals with Import and Export of wildlife products. This legislation was enacted to ensure compliance with CITES requirements for export and import of wild flora and fauna. These provide for the following:
    - Section 3 deals with the Control of Import and Export of wild life and trophies and lays down a general prohibition on the import into or export from Zimbabwe of any "wild life" or trophy of "wild life" except in accordance with either a certificate issued in terms of section 5 by the Director or Director of Customs, or an open general permit:
    - Section 5 deals with Permits and Certificates and is consistent with CITES legislation.
    - Section 15 deals with Offences and Penalties. Any person who contravenes any of the provisions of subsection 1 shall be guilty of an offence, and liable to a fine or imprisonment. To effectively ensure compliance, the Zimbabwe Parks and Wildlife Management Authority deployed a permanent team of officers based at all ports of exit and entry to assist border control officials in monitoring and inspection of all wildlife exports.
- SI 26 of 1998: The regulation provides for the monitoring of all hunting activities in the country to ensure compliance by all Safari Operators and international clients and to ensure that the TR2 Form. (Tourism Hunting Return Form) is duly completed.
- Trapping of Animals (Control) Act Chapter 20:21: The Act provides for the control, restriction and regulation of the construction, possession and use of certain traps for the purpose of trapping animals; to control the sale and disposal of certain animals, to include lions and to provide for matters incidental to or connected with the foregoing.
- SI 92 of 1992: Parks and Wild Life (Payment for Hunting of Animals and Fish) Notice, 2009: This instrument provides for compensation values of various wildlife forms to include animals and fish. It acts as an additional deterrent measure in matters where poaching cases are being dealt with in accordance with the law. The compensation value for illegal hunting of lion is USD 5 000, 00.
- SI 93 of 2009: Parks and Wild Life (Payment for Trapping of Wild Animals) Notice, 2009. This instrument provides for the payment of compensation to the state or game owners in the event that one is convicted for illegally trapping wild animals on various land categories. The compensation value for illegal hunting of lion is USD 5 000, 00.
- SI 40 Of 1994: Parks and Wildlife (Appropriate Authorities for Communal Land) Notice, 1994. This SI facilitates the granting of Appropriate Authority status to various Rural District Councils. This legislation devolved authority to Rural District Councils and gave rights to local communities to sustainable utilize wildlife and other natural resources in their areas of jurisdiction.

11.2.4 The Rural District Councils Act Chapter [29:13] 2002

The Rural District Councils Act is important in the wildlife sector as it provides for a legal entity (in Communal Lands) responsible for wildlife resources. Since the land in Communal areas is not privately owned by the communities and given that most of the communities do not constitute a legal entity, the Appropriate Authority status is conferred to the Rural District Councils (RDCs). Thus the RDCs act as custodians of the wildlife resources on behalf of the communities.

Efforts are now underway in some areas to form Community Development Trusts. There is scope for these Community Development Trusts to be used as vehicles to further devolve authority from the District level to the sub-district level, which will provide more income at a community level and therefore increase conservation support from the community as they will have a true vested interest.

The feasibility of granting Appropriate Authority to these Trusts in Zimbabwe needs to be assessed and piloted. The major challenge with these Trusts is that of financial sustainability as they do not have adequate funds to cater for their activities. Capacity-building of all Trust members is also a key requirement to ensure institutional sustainability.

In the Rural District Councils Act, there are three key terms that will be described further: Ward, Ward Development Committee and Communal Land. According to the Act, a "Ward" (an administrative unit) means a ward into which a council area is divided or re-divided. Several villages make up a ward. In the Act, a "Ward Development Committee" means a village development committee established in terms of Section 58 of the Act. A Ward Committee is made up of members who are elected from the community to represent the community in discussions/meetings with the Rural District Council. The Act further defines three different types of Wards. These are, Commercial Ward, Communal Ward and Resettlement Ward. The Commercial Ward is a large-scale commercial ward or a small-scale commercial ward. A Communal Ward is a ward consisting wholly or mainly of Communal Land. A Resettlement Ward is a ward consisting wholly or mainly of Communal Land (as in the case of the Communal Ward). It is important to establish whether in practice, the RDCs make
this distinction of the wards or whether they are all considered simply just as wards.

The "Communal Land" is defined as any land that is Communal Land in terms of the Communal Land Act [Chapter 20:04]; and any other land that was within the area of a district council on the 19th August 1988.

11.2.5 The Forest Act of 1948

This Act establishes the Forestry Commission and places demarcated forests under its control. The commission is responsible for the control, management and exploitation of state forests including the leasing of timber harvesting rights. The Act also gives the Minister the power to regulate the commercial use of timber from indigenous trees on other land.

As the appropriate authority for the Forest Areas, the Commission is also responsible for the management and conservation

11.3 Annex III: Analysis of Total Revenue by Country of Destination

Destination	2014	2015	Total
United States	$14,485,835	$11,942,785	$26,428,620
Russian Federation	$1,444,729	$861,925	$2,306,654
China	$1,416,196	$441,759	$1,857,955
Germany	$1,100,534	$698,450	$1,798,984
Canada	$620,852	$474,935	$1,095,787
South Africa	$513,070	$576,035	$1,089,105
France	$825,975	$158,291	$984,266
Australia	$671,527	$259,136	$930,663
Spain	$488,616	$321,064	$809,680
Austria	$519,322	$201,073	$720,395
India	$302,653	$241,741	$544,394
United Kingdom	$357,317	$183,888	$541,205
Italy	$181,956	$343,197	$525,153
Hungary	$418,824	$104,262	$523,086
Mexico	$252,263	$266,543	$518,806

Destination	2014	2015	Total
Norway	$300,645	$119,831	$420,476
Denmark	$132,690	$194,435	$327,125
Switzerland	$171,991	$123,828	$295,819
Sweden	$196,575	$80,014	$276,589
Ukraine	$80,432	$163,604	$244,036
Czech Republic	$104,450	$137,456	$241,906
Neatherlands	$89,042	$105,227	$194,269
Nigeria	$171,830	$0	$171,830
Bulgaria	$21,865	$123,469	$145,334
Argentina	$106,529	$24,888	$131,417
Finland	$65,768	$63,223	$128,991
Brazil	$56,785	$59,886	$116,671
Honduras	$104,683	$0	$104,683
Poland	$38,911	$62,015	$100,926
New Zealand	$17,880	$81,127	$99,007
Mauritius	$56,225	$36,945	$93,170
Chile	$91,374	$0	$91,374
Belgium	$9,340	$80,355	$89,695
Portugal	$78,470	$0	$78,470
Columbia	$77,944	$0	$77,944
Slovakia	$69,420	$0	$69,420
Botswana	$59,401	$0	$59,401
Pakistan	$54,208	$0	$54,208
Namibia	$20,298	$18,862	$39,160
Latvia	$37,611	$0	$37,611
Estonia	$12,078	$23,586	$35,664
Slovenia	$20,620	$11,200	$31,820
Kenya	$14,302	$16,957	$31,259
Dominican Republic	$30,463	$0	$30,463
Belarus	$0	$29,430	$29,430
Kazakhstan	$0	$28,460	$28,460
Romania	$0	$20,112	$20,112
United Arab Emirates	$19,629	$0	$19,629
Lao Peoples Democratic Republic	$15,000	$0	$15,000
Bolivia	$0	$11,553	$11,553
Lithuania	$9,164	$0	$9,164
Costa Rica	$5,900	$0	$5,900
Qatar	$4,896	$0	$4,896
Grand Total	**$25,946,088**	**$18,691,547**	**$44,637,635**

11.4 ANNEX IV: ANALYSIS OF TOTAL REVENUE BY SPECIES

Species	$2,014	$2,015	Total	2015 Quota	Utilised	% Utilised
Buffalo	$2,528,559	$1,962,570	$4,491,129	1,635	482	29%
Elephant (Tusks)	$2,042,610	$1,447,090	$3,489,700	246	64	26%
Elephant (Tuskless)	$1,444,040	$229,860	$1,673,900	462	113	24%
Lion	$630,950	$753,000	$1,383,950	82	49	59%
Leopard	$714,100	$668,490	$1,382,590	530	151	28%
Zebra	$594,239	$555,744	$1,149,983	2,480	600	24%
Sable	$456,615	$309,260	$765,875	718	78	11%
Kudu	$341,092	$357,963	$699,055	2,503	289	12%
Waterbuck	$293,903	$256,133	$550,036	988	156	16%
Hippo	$310,321	$217,470	$527,791	303	83	27%
Impala	$277,198	$242,624	$519,822	8,594	1,261	15%
Crocodile	$284,650	$202,705	$487,355	211	70	33%
Eland	$179,470	$187,990	$367,460	1,659	132	8%
Wildebeest	$180,665	$170,350	$351,015	2,189	220	10%
Giraffe	$158,385	$157,410	$315,795	880	135	15%
Nyala	$130,840	$117,175	$248,015	174	38	22%
Bushbuck	$116,011	$94,936	$210,947	1,082	125	12%
Warthog	$98,975	$89,820	$188,795	3,060	208	7%
Hyeana	$75,648	$54,503	$130,151	1,702	118	7%
Klipspringer	$44,130	$40,441	$84,571	823	59	7%
Bush Pig	$18,226	$30,370	$48,596	1,972	69	3%
Tsessebe	$19,800	$19,500	$39,300	186	15	8%
Baboon	$24,909	$13,664	$38,573	8,017	264	3%
Reedbuck	$23,265	$12,731	$35,996	371	20	5%
Steenbok	$13,790	$15,070	$28,860	927	31	3%
Jackal	$9,656	$15,889	$25,545	2,179	105	5%
Civet	$8,850	$11,368	$20,218	1,034	29	3%
Grysbok	$9,435	$8,585	$18,020	632	31	5%
Eland	$16,750	$0	$16,750	1,659	132	8%
Genet	$6,020	$14,183	$20,203	1,136	38	3%
Duiker, Grey	$2,774	$12,523	$15,297	2,005	53	3%
Duiker, Blue	$7,991	$0	$7,991	-	-	-
Honey Badger	$3,681	$3,625	$7,306	622	15	2%
Wild Cat	$3,160	$4,180	$7,340	812	19	2%
Guinea Fowl	$5,496	$968	$6,464	29,174	121	0%
Porcupine	$4,123	$1,473	$5,596	857	9	1%
Serval	$2,670	$2,410	$5,080	536	6	1%
Egyptian Goose	$3,025	$60	$3,085	4	-	0%
Cheetah	$2,560	$0	$2,560	42	-	0%
Ant Bear	$900	$1,651	$2,551	39	6	15%
Francolin	$1,166	$609	$1,775	22,449	109	0.5%

Species	2014	2015	Total	2015 Quota	Utilised	% Utilised
Dove	$1,321	$418	$1,739	34,485	63	0.2%
Monkey, Vervet	$885	$800	$1,685	3,677	15	0.4%
Ostrich	$1,200	$0	$1,200	14	-	0%
Mongoose	$508	$690	$1,198	279	3	1%
Sandgrouse	$456	$688	$1,144	8,088	78	1%
Oribi	$500	$500	$1,000	82	2	2%
Duiker, Red	$950	$0	$950	-	-	-
Caracal	$900	$0	$900	351	-	0%
Bushbaby	$850	$0	$850	-	-	-
Bontebok	$700	$0	$700	-	-	-
Waterfowl	$0	$400	$400	40	2	5%
Springhare	$60	$120	$180	-	-	-
Gemsbok	$105	$0	$105	6	-	0%
Hyrax	$75	$20	$95	371	1	0.3%
Duck	$29	$20	$49	10,779	13	0.1%
Aardwolf	$0	$0	$0	-	-	-
Blesbok	$0	$0	$0	40		0%
Rabbit	$0	$0	$0	252	-	0%
Hare	$0	$0	$0	138	3	2%
Lichtenstein's Hartebeest	$0	$0	$0	5	-	0%
Red Hartebeest	$0	$0	$0	7	-	0%
Grand Total	**$11,099,187**	**$8,288,049**	**$19,387,236**			

From: Jones, Lisa
To: Mike Moore
Cc: Craig Hoover; Tim Vannorman; Kessler, Danielle
Subject: Questions on permits issued
Date: Monday, November 20, 2017 11:54:36 AM

Hi Mike,

We're getting some questions from the Hill about how many permits have been issued for our recent lion findings, in addition to elephants. Danielle provided me with stats for elephants.

Do you have stats handy on how many permits have been issued for lions for Zimbabwe, Zambia, and South Africa?

Thanks so much!

Lisa

Lisa Hummon-Jones
Congressional and Legislative Affairs Specialist
U.S. Fish and Wildlife Service
703-358-2536 (o)
202-365-7255 (c)

From: "SOAZ1" <soaz1@mweb.co.zw>
Date: July 7, 2017 at 12:16:41 PM GMT+2
To: "ZPHGA Admin" <(b) (6)
Subject: The United States of America has lifted its ban on hunting trophies from Zimbabwe

US lifts ban on hunting trophies from Zimbabwe



The United States of America has lifted its ban on hunting trophies from Zimbabwe, allowing the country to resume exports later this year, the environment minister said today.

On April 4, 2014, the US Fish and Wildlife Service announced an interim suspension of imports of sport-hunted African elephant trophies hunted in Zimbabwe, which it later extended to 2015 and "indefinitely into the future," because the government's measures to protect the animals did not enhance the survival of the species.

The decision was challenged by the US Safari Club and the powerful National Rifle Association but a US District Court upheld the ban.

Environment, Water and Climate Minister Oppah Muchinguri- Kashiri said that according to the provisions of the waiver, Zimbabwe would start exporting the outstanding trophies in the second quarter of 2017.

"All the trophies which were being held in the country will be exported this year but under strict conditions. We have been given an opportunity to export again into the US," she said.

The US ban preceded the controversial killing of the hugely popular Cecil, a 13-year-old male lion which lived in Zimbabwe's Hwange National Park, by Walter Palmer, a US trophy hunter in July, 2015.

The killing led to calls for tighter controls on hunting trophy imports by mainly western countries.

Zimbabwe hosts hunters from various countries including Russia, the United States, Hungary, Spain and Germany who pay to shoot animals such as lions, elephants and leopards, earning the country millions in revenue.

United States provide the bulk of the hunters and the existence of the ban has had negative effects on hunting revenue.

Bookings for the 2017 hunting season, which runs between April and November each year, are up 20 percent from the previous year's $70 million, despite the embargo by the US.

The 2016 hunting season was depressed as most hunters stayed away due to uncertainty over proposals by some Western countries to impose stricter hunting controls on elephants and lions by mostly African countries.- **The Source**

Stanley Mudawarima

Safari Operators Association of Zimbabwe (SOAZ)
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--
Mary Cogliano, Ph D
Supervisory Biologist & Policy Specialist
Division of Management Authority
U S Fish and Wildlife Service
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Falls Church, VA 22041-3803
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--
Craig Hoover
Chief, Division of Management Authority
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Falls Church, VA 22041-3803
ph: 703-358-2162
www.fws.gov/international

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From: Vannorman, Tim
To: Sellars, Roslyn
Cc: Thomas Irwin; Bell, Gloria; Michael Gale; Craig Hoover
Subject: Re: Greg"s Role & Justification for the African Wildlife Consultative Forum
Date: Monday, October 16, 2017 4:16:43 PM

Roslyn,

I am currently trying to arrange specific meetings with Government officials, the US Embassy and NGOs, but do not have any definitive meetings arranged. As soon as I get more definitive arrangements, I will let you know.

On the sessions Greg could miss in order to meet with people, I would think that on Wednesday, 11/14, he should attend the Official Opening (9-10am) and Session 3: The Conservation Equation in Africa (4:30-5pm). Other sessions on Wednesday cover the lions in southern Africa and research efforts. On Thursday, 11/15, Greg could probably miss the morning sessions (leopard status review), but should attend the afternoon sessions until he has to leave for the airport (sessions on International trade and CITES).

For the write up, I would suggest the following:

Mr. Sheehan has been invited to participate in the African Wildlife Consultative Forum, held in Arusha, Tanzania, Nov. 12-17, 2017. The Forum, held annual in one of the Southern African countries, is a venue for the Directors of various national wildlife agencies to gather to discuss wildlife issues of mutual interest/concern. It is expected that the Wildlife Agency Directors from Tanzania, Zimbabwe, Zambia, Mozambique, South Africa, and Namibia will attend the forum. Since the United States citizens are the major hunting clientele for African safari hunts and importers of protected wildlife species that require import authorization from the USFWS, Mr. Sheehan, as Acting Director of FWS, has been invited to represent the USFWS at the meeting. Mr. Sheehan will have the opportunity to have one-on-one meetings with representatives of Safari Club International Foundation and each of the country's Directors, as well as meet with staff from the U.S. Embassy and representatives of several NGOs that have worked with FWS or received grants through the African Elephant Conservation Act. The forum, itself, will provide Mr. Sheehan an opportunity to participate in discussions with all of the countries present the current status of lions and leopards in each of the countries during the forum sessions on Wednesday, November 14, and Thursday, November 15. As the Acting Director of FWS, it is important that Mr. Sheehan attend the forum to confirm FWS' commitment to supporting strong conservation efforts for trophy species, such as elephants, lions, leopards, and black rhinoceros.

Tim

On Mon, Oct 16, 2017 at 10:26 AM, Sellars, Roslyn <roslyn_sellars@fws.gov> wrote:

> Tim
> Just checking on the status of a justification and blurb on Greg's role at the meeting. I need to send this info to the DOI travel approvers this week.
> Roslyn
>
> On Thu, Oct 12, 2017 at 2:52 PM, Sellars, Roslyn <roslyn_sellars@fws.gov> wrote:
>
> > Greg also mentioned that he would like meetings with Tanzanian government officials and NGOs (e.g., Ministry of Natural Resources and SCI Foundation Africa) while in Tanzania. Is that possible?
> >
> > We also need a detailed justification for Greg's attendance and his role at the meeting.

Greg mentioned the justification should include details on meetings with the above listed government officials/NGOs.

Sorry for the multiple emails, but I am hoping to get a package together early next week for Greg's travel. I have flights for Greg. I will send the itinerary in a separate email.

Roslyn

On Thu, Oct 12, 2017 at 1:04 PM, Sellars, Roslyn <roslyn_sellars@fws.gov> wrote:

> Greg plans to attend for only 11/14 and 11/15. He also asks if meetings could be arranged concerning FWS projects during those 2 days. He needs to know which sessions he could miss in order to do these side meetings or he could do them in the evening.
>
> Roslyn
>
> ---------- Forwarded message ----------
> From: **Vannorman, Tim** <tim_vannorman@fws.gov>
> Date: Thu, Oct 12, 2017 at 12:38 PM
> Subject: Fwd: African Wildlife Consultative Forum
> To: "Sellars, Roslyn" <roslyn_sellars@fws.gov>
>
> in country contact for Tanzania.
>
> Tim
>
> ---------- Forwarded message ----------
> From: **Friberg, Samuel** <samuel_friberg@fws.gov>
> Date: Tue, Oct 3, 2017 at 12:25 PM
> Subject: Re: African Wildlife Consultative Forum
> To: "Vannorman, Tim" <tim_vannorman@fws.gov>
> Cc: "Sveom, Heather K (Dar es Salaam)" <SveomHK@state.gov>
>
> Thank you Tim,
>
> I currently have other obligations, but this could change. Please let me know what you need from the Embassy for assistance. I have included Heather Sveom, my counterpart who is also working on illegal wildlife trafficking issues.
>
> Please see her contact info below:
>
> Heather Sveom
> Environment, Science, Technology & Health Associate
> Embassy of the United States of America
> Dar es Salaam, Tanzania
> SveomHK@state.gov<mailto:SveomHK@state.gov>
> Office: +255 22 229 4292
> Cell: +255 (0)68 567 7461

Sam Friberg

Senior Special Agent
Regional Wildlife Law Enforcement Attaché
United States Embassy -- Dar es Salaam, Tanzania
U.S. Fish and Wildlife Service, Office of Law Enforcement
Office: +255 22 229 4402
Mobile: +255 78 889 1570
USA Mobile: 703 209 9150
Email:
samuel_friberg@fws.gov
FribergSS@state.gov

On Mon, Oct 2, 2017 at 7:57 AM, Vannorman, Tim <tim_vannorman@fws.gov> wrote:

> Sam,
>
> I wanted to alert you to this meeting in mid-November, in case you have not heard about it yet. Every year (except last year), Safari Club International Foundation sponsors a meeting of Southern and Eastern African wildlife departments to get together. Ed Newcomer went to the meeting in South Africa in 2016.
>
> At this point, I will be attending for Division of Management Authority (I will probably go a few days earlier so that I can talk to the Tanzanians about lion and elephant hunting and the findings that my office needs to make). Greg Sheehan, Acting Director, FWS, may be going as well. Is this something you might attend? I have not brought it up with SCIF, but don't think there would be an issue.
>
> Let me know your thoughts and if there is a need for any coordination.
>
> Tim
>
> ---------- Forwarded message ----------
> From: **Goergen, Joseph** <jgoergen@safariclub.org>
> Date: Tue, Sep 19, 2017 at 1:34 PM
> Subject: Re: African Wildlife Consultative Forum
> To: "Vannorman, Tim" <tim_vannorman@fws.gov>
> Cc: "Lewis, Matthew" <mlewis@safariclub.org>
>
> Dear Tim,
>
> I just wanted to follow up on Matt¹s email with the registration form and an updated draft agenda. We have officially invited the African governments and expect a good number in attendance.
>
> The Government of Tanzania and Safari Club International (SCI) Foundation

are pleased to officially invite you to the 15th African Wildlife Consultative Forum (AWCF) being held on 13-17 November 2017 at the Mt. Meru Hotel in Arusha, Tanzania. We hope that the USFWS will participate in this meeting to discuss the future of Africa¹s wildlife.

As you will see in the registration form, self-paid accommodation can be book through Mrs. Helen Angelides at helen@dmstz.com. Please let me know if you have any questions.

Please confirm the attendance of USFWS¹s delegation as soon as possible. Participants must RSVP to me with the completed registration form. Thank you.

First for Wildlife,
Joe

On 9/7/17, 1:23 PM, "Lewis, Matthew" <mlewis@safariclub.org> wrote:

>Hi Tim,
>
>We are happy to hear that Director Sheehan is considering attending. It
>would encourage African governments to send director-level delegates,
>which would make for a more productive meeting.
>
>We have worked up a draft agenda, but keep in mind that it is tentative
>and subject to change. The main items that will not change, however, are
>the focus on lion and leopard conservation, which we hope will result in
>a very productive dialogue about those species and their current status.
>
>I have attached an invitation letter for the Director as well as the
>draft agenda. Please let us know if there's anything else we can do that
>would help your approval process, as we would really like to see Director
>Sheehan in attendance, however we welcome any level of participation FWS
>is able to provide. We have tentative participation from CITES, UN
>Environment and IUCN as well, and are looking at inviting appropriate
>Tanzania-based NGO's. It is our hope that this will be the best-attended
>AWCF yet, and the most productive.
>
>Thanks for your interest in attending and we hope to see you soon.
>
>Best,
>Matthew
>
>
>_____
>From: Vannorman, Tim [tim_vannorman@fws.gov]
>Sent: Wednesday, September 06, 2017 3:29 PM
>To: Goergen, Joseph
>Cc: Lewis, Matthew

>Subject: Re: African Wildlife Consultative Forum
>
>Dear Matt and Joe,
>
>I have passed your e-mail up the chain and, to my understanding, Greg
>Sheehan is considering attending (but he has a lot of hurdles that would
>need to be cleared for him to attend).
>
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>the AWCF. Please see the attached Save the Date Letter to the 15th AWCF,
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><tim_vannorman@fws.gov<mailto:tim_vannorman@fws.gov><mailto
:tim_vannorman@
>fws.gov<mailto:tim_vannorman@fws.gov>>>
>Date: Monday, July 24, 2017 at 10:01 AM
>To: "Lewis, Matthew"
><mlewis@safariclub.org<mailto:mlewis@safariclub.org><mailto:mlewis@safaric
>lub.org<mailto:mlewis@safariclub.org>>>
>Cc: Joseph Goergen
><jgoergen@safariclub.org<mailto:jgoergen@safariclub.org><mailto:jgoergen@s
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>just back from AC29 in Geneva, which was uneventful but productive.
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>association agenda. We expect this to be the largest AWCF to date.
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>Joe will send you the save the date info, and we could direct that to
>Acting Director Sheehan as well.
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>Looking forward to seeing you again and I hope you can participate.
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>Best regards,
>
>Matthew
>
>Matthew D. Lewis
>
>Director of Conservation
>Safari Club International Foundation
>501 2nd Street NE
>Washington, D.C. 20002
>202-543-8733 (tel)
>Email:
>mlewis@safariclub.org<mailto:mlewis@safariclub.org><mailto:mlewis@safaricl
>ub.org<mailto:mlewis@safariclub.org>>
>www.safariclubfoundation.org<http://www.safariclubfoundation.org><http://w
>ww.safariclubfoundation.org>
>[cid:F706898D-A98B-4447-AAF5-9E63E045B482]
>
>From: "Vannorman, Tim"

><tim_vannorman@fws.gov<mailto:tim_vannorman@fws.gov><mailto
:tim_vannorman@
>fws.gov<mailto:tim_vannorman@fws.gov>><mailto:tim_vannorman
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>lub.org>>>>, "Tacconelli, Michelle"
><mtacconelli@safariclub.org<mailto:mtacconelli@safariclub.org><mailto:mtac
>conelli@safariclub.org<mailto:mtacconelli@safariclub.org>><mailto:mtaccone
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>afariclub.org<mailto:mtacconelli@safariclub.org>>>>
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>Thanks,
>
>Tim
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>
>--
>Timothy J. Van Norman, Chief
>Branch of Permits
>Division of Management Authority
>U.S. Fish and Wildlife Service
>(703) 358-2350
>
>

>Sign
>up<http://visitor.r20.constantcontact.com/d.jsp?llr=m55c7tjab&p=oi&m=11098
>42295756&sit=xuh7is8gb&f=e7b4b07a-db5e-4e42-a2db-9b122d99f7b2> for our
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>[http://www.fws.gov/Chesapeakebay/Masrc/logos/usfws.gif][https://cites.org
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>[http://www.fws.gov/Chesapeakebay/Masrc/logos/usfws.gif][https://cites.org
>/eng/system/files/CoP17_Rhino_hp.jpg]
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>/eng/system/files/CoP17_Rhino_hp.jpg]

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From: Sellars, Roslyn
To: Vannorman, Tim
Cc: Thomas Irwin; Bell, Gloria; Michael Gale; Craig Hoover
Subject: Re: Greg"s Role & Justification for the African Wildlife Consultative Forum
Date: Monday, October 16, 2017 4:27:57 PM

This is just what we need. Thanks Tim, this is very helpful.

Roslyn

On Mon, Oct 16, 2017 at 4:16 PM, Vannorman, Tim <tim_vannorman@fws.gov> wrote:

> Roslyn,
>
> I am currently trying to arrange specific meetings with Government officials, the US Embassy and NGOs, but do not have any definitive meetings arranged. As soon as I get more definitive arrangements, I will let you know.
>
> On the sessions Greg could miss in order to meet with people, I would think that on Wednesday, 11/14, he should attend the Official Opening (9-10am) and Session 3: The Conservation Equation in Africa (4:30-5pm). Other sessions on Wednesday cover the lions in southern Africa and research efforts. On Thursday, 11/15, Greg could probably miss the morning sessions (leopard status review), but should attend the afternoon sessions until he has to leave for the airport (sessions on International trade and CITES).
>
> For the write up, I would suggest the following:
>
> Mr. Sheehan has been invited to participate in the African Wildlife Consultative Forum, held in Arusha, Tanzania, Nov. 12-17, 2017. The Forum, held annual in one of the Southern African countries, is a venue for the Directors of various national wildlife agencies to gather to discuss wildlife issues of mutual interest/concern. It is expected that the Wildlife Agency Directors from Tanzania, Zimbabwe, Zambia, Mozambique, South Africa, and Namibia will attend the forum. Since the United States citizens are the major hunting clientele for African safari hunts and importers of protected wildlife species that require import authorization from the USFWS, Mr. Sheehan, as Acting Director of FWS, has been invited to represent the USFWS at the meeting. Mr. Sheehan will have the opportunity to have one-on-one meetings with representatives of Safari Club International Foundation and each of the country's Directors, as well as meet with staff from the U.S. Embassy and representatives of several NGOs that have worked with FWS or received grants through the African Elephant Conservation Act. The forum, itself, will provide Mr. Sheehan an opportunity to participate in discussions with all of the countries present the current status of lions and leopards in each of the countries during the forum sessions on Wednesday, November 14, and Thursday, November 15. As the Acting Director of FWS, it is important that Mr. Sheehan attend the forum to confirm FWS' commitment to supporting strong conservation efforts for trophy species, such as elephants, lions, leopards, and black rhinoceros.
>
> Tim
>
> On Mon, Oct 16, 2017 at 10:26 AM, Sellars, Roslyn <roslyn_sellars@fws.gov> wrote:
>
> > Tim
> > Just checking on the status of a justification and blurb on Greg's role at the meeting. I need to send this info to the DOI travel approvers this week.
> > Roslyn
> >
> > On Thu, Oct 12, 2017 at 2:52 PM, Sellars, Roslyn <roslyn_sellars@fws.gov> wrote:
> >
> > > Greg also mentioned that he would like meetings with Tanzanian government officials

and NGOs (e.g., Ministry of Natural Resources and SCI Foundation Africa) while in Tanzania. Is that possible?

We also need a detailed justification for Greg's attendance and his role at the meeting. Greg mentioned the justification should include details on meetings with the above listed government officials/NGOs.

Sorry for the multiple emails, but I am hoping to get a package together early next week for Greg's travel. I have flights for Greg. I will send the itinerary in a separate email.

Roslyn

On Thu, Oct 12, 2017 at 1:04 PM, Sellars, Roslyn <roslyn_sellars@fws.gov> wrote:

> Greg plans to attend for only 11/14 and 11/15. He also asks if meetings could be arranged concerning FWS projects during those 2 days. He needs to know which sessions he could miss in order to do these side meetings or he could do them in the evening.
>
> Roslyn
>
> ---------- Forwarded message ----------
> From: **Vannorman, Tim** <tim_vannorman@fws.gov>
> Date: Thu, Oct 12, 2017 at 12:38 PM
> Subject: Fwd: African Wildlife Consultative Forum
> To: "Sellars, Roslyn" <roslyn_sellars@fws.gov>
>
> in country contact for Tanzania.
>
> Tim
>
> ---------- Forwarded message ----------
> From: **Friberg, Samuel** <samuel_friberg@fws.gov>
> Date: Tue, Oct 3, 2017 at 12:25 PM
> Subject: Re: African Wildlife Consultative Forum
> To: "Vannorman, Tim" <tim_vannorman@fws.gov>
> Cc: "Sveom, Heather K (Dar es Salaam)" <SveomHK@state.gov>
>
> Thank you Tim,
>
> I currently have other obligations, but this could change. Please let me know what you need from the Embassy for assistance. I have included Heather Sveom, my counterpart who is also working on illegal wildlife trafficking issues.
>
> Please see her contact info below:
>
> Heather Sveom
> Environment, Science, Technology & Health Associate

Embassy of the United States of America
Dar es Salaam, Tanzania
SveomHK@state.gov<mailto:SveomHK@state.gov>
Office: +255 22 229 4292
Cell: +255 (0)68 567 7461

Sam Friberg

Senior Special Agent
Regional Wildlife Law Enforcement Attaché
United States Embassy -- Dar es Salaam, Tanzania
U.S. Fish and Wildlife Service, Office of Law Enforcement
Office: +255 22 229 4402
Mobile: +255 78 889 1570
USA Mobile: 703 209 9150
Email:
samuel_friberg@fws.gov
FribergSS@state.gov

On Mon, Oct 2, 2017 at 7:57 AM, Vannorman, Tim <tim_vannorman@fws.gov> wrote:

> Sam,
>
> I wanted to alert you to this meeting in mid-November, in case you have not heard about it yet. Every year (except last year), Safari Club International Foundation sponsors a meeting of Southern and Eastern African wildlife departments to get together. Ed Newcomer went to the meeting in South Africa in 2016.
>
> At this point, I will be attending for Division of Management Authority (I will probably go a few days earlier so that I can talk to the Tanzanians about lion and elephant hunting and the findings that my office needs to make). Greg Sheehan, Acting Director, FWS, may be going as well. Is this something you might attend? I have not brought it up with SCIF, but don't think there would be an issue.
>
> Let me know your thoughts and if there is a need for any coordination.
>
> Tim
>
> ---------- Forwarded message ----------
> From: **Goergen, Joseph** <jgoergen@safariclub.org>
> Date: Tue, Sep 19, 2017 at 1:34 PM
> Subject: Re: African Wildlife Consultative Forum
> To: "Vannorman, Tim" <tim_vannorman@fws.gov>
> Cc: "Lewis, Matthew" <mlewis@safariclub.org>
>
> Dear Tim,

I just wanted to follow up on Matt¹s email with the registration form and an updated draft agenda. We have officially invited the African governments and expect a good number in attendance.

The Government of Tanzania and Safari Club International (SCI) Foundation are pleased to officially invite you to the 15th African Wildlife Consultative Forum (AWCF) being held on 13-17 November 2017 at the Mt. Meru Hotel in Arusha, Tanzania. We hope that the USFWS will participate in this meeting to discuss the future of Africa¹s wildlife.

As you will see in the registration form, self-paid accommodation can be book through Mrs. Helen Angelides at helen@dmstz.com. Please let me know if you have any questions.

Please confirm the attendance of USFWS¹s delegation as soon as possible. Participants must RSVP to me with the completed registration form. Thank you.

First for Wildlife,
Joe

On 9/7/17, 1:23 PM, "Lewis, Matthew" <mlewis@safariclub.org> wrote:

>Hi Tim,
>
>We are happy to hear that Director Sheehan is considering attending. It
>would encourage African governments to send director-level delegates,
>which would make for a more productive meeting.
>
>We have worked up a draft agenda, but keep in mind that it is tentative
>and subject to change. The main items that will not change, however, are
>the focus on lion and leopard conservation, which we hope will result in
>a very productive dialogue about those species and their current status.
>
>I have attached an invitation letter for the Director as well as the
>draft agenda. Please let us know if there's anything else we can do that
>would help your approval process, as we would really like to see Director
>Sheehan in attendance, however we welcome any level of participation FWS
>is able to provide. We have tentative participation from CITES, UN
>Environment and IUCN as well, and are looking at inviting appropriate
>Tanzania-based NGO's. It is our hope that this will be the best-attended
>AWCF yet, and the most productive.
>
>Thanks for your interest in attending and we hope to see you soon.
>
>Best,
>Matthew
>
>

>_____
>From: Vannorman, Tim [tim_vannorman@fws.gov]
>Sent: Wednesday, September 06, 2017 3:29 PM
>To: Goergen, Joseph
>Cc: Lewis, Matthew
>Subject: Re: African Wildlife Consultative Forum
>
>Dear Matt and Joe,
>
>I have passed your e-mail up the chain and, to my understanding, Greg
>Sheehan is considering attending (but he has a lot of hurdles that would
>need to be cleared for him to attend).
>
>With the change in Administration, the review/approval process for
>foreign travel is more involved than the last time we traveled to AWCF.
>We would need to get our travel request into the Department of Interior
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>Best regards,
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>Matthew
>
>Matthew D. Lewis
>
>Director of Conservation
>Safari Club International Foundation
>501 2nd Street NE
>Washington, D.C. 20002
>202-543-8733 (tel)
>Email:
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>ub.org<mailto:mlewis@safariclub.org>>

>www.safariclubfoundation.org<http://www.safariclubfoundation.org><http://w
>ww.safariclubfoundation.org>
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>
>From: "Vannorman, Tim"
><tim_vannorman@fws.gov<mailto:tim_vannorman@fws.gov><mailto
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>lub.org>>>>, "Tacconelli, Michelle"
><mtacconelli@safariclub.org<mailto:mtacconelli@safariclub.org><mailto:mtac
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>Timothy J. Van Norman, Chief
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>[http://www.fws.gov/Chesapeakebay/Masrc/logos/usfws.gif][https://cites.org
>/eng/system/files/CoP17_Rhino_hp.jpg]

--
Timothy J. Van Norman, Chief
Branch of Permits
Division of Management Authority
U.S. Fish and Wildlife Service
(703) 358-2350

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From: Kessler Dan elle
To: Shire_Ga in
Cc: Tol efson_Chr s; Parramore_Laury; Vanessa Kauffman; Christina Meister; t m_vannorman@fws.gov
Subject: Re: Lion Info
Date: Monday August 14 2017 9:04:34 AM

Sorry, Chris! I was getting my lions and elephants crossed at a late hour on Friday. As Gavin mentioned, this is about lions. The findings will essentially be a continuation of the decisions that you wrote about for Huffington Post last year. Defer to Tim on status of reevaluating and sharing of a draft finding.

On Mon, Aug 14, 2017 at 8 55 AM, Shire, Gavin <gavin_shire@fws.gov> wrote

> The blog should be about lions, not elephants. The idea is that later, when we are being criticized about forthcoming decisions on elephants (and other lions), we can refer back to this lion decision and show that we make the decision that is appropriate for the science we have been provided. Where the info points to a negative finding, that's what we make, when it points to positive, that is what we make. Since this is the only (somewhat) negative finding we are likely to make for a while, we need to have something to show for it.
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> Gavin Shire
> Chief of Public Affairs
> U.S. Fish and Wildlife Service
> MS EA
> 5275 Leesburg Pike
> Falls Church, VA 22041-3803
> 703-358-2649 (o)
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> > > > > > > From **Meister, Christina** <christina_meister@fws.gov>
> > > > > > > Date Thu, Aug 10, 2017 at 3 08 PM
> > > > > > > Subject Lion Info
> > > > > > > To Laury Parramore <laury_parramore@fws.gov>
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- With South Africa are captive-bred lions shot as trophies prohibited from being imported into theUnited States?

Yes, at the present time. Based on current information, captive lions do not appear to contribute to theconservation of the species in the wild. Also, captive lion populations are known to be compromised by inbreeding. This could compromise genetic integrity and provenance and therefore make these lions unsuitable for reintroduction purposes. Further, based on the limited information currently available, there is no evidence to suggest that captive breeding operations are otherwise supporting or contributing to any in-situ conservation efforts for wild lions. Therefore, the Service has been unable to find enhancement as required under the Endangered Species Act for the import of captive lions taken as sport-hunted trophies in South Africa. Until such time as additional information becomes available that would affect this finding, the Service is unable to authorize the import of captive lion trophies from South Africa.

--
Christina M. Meister
Office of Public Affairs
U.S. Fish and Wildlife Service
5275 Leesburg Pike
Falls Church, VA 22041-3803

Office 703-358-2284
Cell 703-304-9535
christina_meister@fws.gov

--
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Chief, Office of Outreach & Communications
International Affairs Program
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From: Tollefson Chris
To: Shire, Gavin
Cc: Kessler, Danielle; Parramore, Laury; Vanessa Kauffman; Christina Meister; tim_vannorman@fws.gov
Subject: Re: Lion Info
Date: Monday, August 14, 2017 9:02:15 AM

Yeah, I've got that much, Gavin. Just wanted to have as much info as possible to update what I have from a year ago.

I'm still hoping to get a copy of the new finding itself...

Chris Tollefson - Press Secretary and Senior Communications Advisor
U.S. Fish & Wildlife Service - 5275 Leesburg Pike, MS: EA - Falls Church, VA 22041
703-358-2222 (W) 202-208-7317 (M) www.fws.gov

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Date Thu, Aug 10, 2017 at 3 08 PM
Subject Lion Info
To Laury Parramore <laury_parramore@fws.gov>

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To: Tollefson Chris
Cc: Kessler Danielle; Parramore La ry; Vanessa Ka ffman; Christina Meister; t m annorman@f s go
Subject: Re: Lion Info
Date: Monday August 14 2017 8:55:39 AM

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From: Tollefson Chr s
To: Vannorman Tim
Cc: Shire Gavin; Kessler Daniel e; Parramore Laury; Vanessa Kauffman; Chr stina Me ster
Subject: Re: Lion Info
Date: Monday August 14 2017 10:00:33 AM

Thanks, Tim!

Will update the blog and circulate for review shortly..

Chris

Chr s Tollefson - Press Secretary and Senior Communications Advisor
U.S. Fish & W ldlife Ser ice - 5275 Leesburg Pike MS EA - Falls Church VA 220 1
703-358-2222 (W) 202-2 7-7 17 (M) www.fws.go

On Mon, Aug 14, 2017 at 9 53 AM, Vannorman, Tim <tim_vannorman@fws gov> wrote

> Chris,
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> Attached is the draft 2017 findings for wild/wild managed lions taken in South Africa (positive finding) and for captive-bred lions (negative finding). If it helps to sit down and discuss further, I am around today.
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> > On Mon, Aug 14, 2017 at 8 55 AM, Shire, Gavin <gavin_shire@fws.gov> wrote
> >
> > > The blog should be about lions, not elephants. The idea is that later, when we are being criticized about forthcoming decisions on elephants (and other lions), we can refer back to this lion decision and show that we make the decision that is appropriate for the science we have been provided. Where the info points to a negative finding, that's what we make, when it points to positive, that is what we make. Since this is the only (somewhat) negative finding we are likely to make for a while, we need to have something to show for it.
> > >
> > > G
> > >
> > > Gavin Shire
> > > Chief of Public Affairs
> > > U.S. Fish and Wildlife Service
> > > MS EA
> > > 5275 Leesburg Pike
> > > Falls Church, VA 22041-3803
> > > 703-358-2649 (o)
> > > 703-346-9123 (c)
> > > gavin_shire@fws.gov
> > >
> > > On Mon, Aug 14, 2017 at 8 41 AM, Tollefson, Chris <chris_tollefson@fws.gov> wrote
> > >
> > > > Guys,
> > > >
> > > > I didn t get the chance to review these over the weekend - just realized this morning that they deal with elephant trophies from Zimbabwe and Tanzania.
> > > >
> > > > I was asked to write a blog about African lions from South Africa. Is there a fundamental misunderstanding here about what is being announced, or is this just the wrong attachment?
> > > >
> > > > Clarification would be much appreciated - as soon as possible would be great.
> > > >
> > > > Thanks,
> > > > Chris
> > > >
> > > > **Chris Tollefson - Press Secretary and Senior Communications Advisor**
> > > > U.S. F sh & Wildlife Ser ice - 5275 Leesburg Pike MS EA - Falls Church VA 220 1
> > > > 703-358-2222 (W) 202-2 7-7 17 (M) f g
> > > >
> > > > On Fri, Aug 11, 2017 at 4 15 PM, Kessler, Danielle <danielle_kessler@fws.gov> wrote
> > > >
> > > > > Hi Chris,
> > > > >
> > > > > Draft Q&As for the 2017 finding are attached. These have been reviewed by DMA and the Solicitor's office and should answer your questions. Thanks, Danielle
> > > > >
> > > > > On Fri, Aug 11, 2017 at 2 54 PM, Chris Tollefson <chris_tollefson@fws.gov> wrote
> > > > >
> > > > > > Tim,
> > > > > >
> > > > > > Can you send me the finding, and/or answer my questions below? Thanks!
> > > > > >
> > > > > > **Chris Tollefson - Press Secretary and Senior Communications Adv sor**
> > > > > > U.S. Fish & Wildlife Ser ice - 5275 Leesburg P ke MS EA - Falls Church VA 220 1
> > > > > > 703-358-2222 (W) 202-2 7-7 17 (M) www.fws.go
> > > > > >
> > > > > > On Aug 11, 2017, at 10 38 AM, Danielle Kessler <danielle_kessler@fws.gov> wrote
> > > > > >
> > > > > > > Hi, Chris. Looping in Tim as he and I were just chatting about this. I'm downtown for a meeting until this afternoon.
> > > > > > >
> > > > > > > Sent from my iPhone
> > > > > > >
> > > > > > > On Aug 11, 2017, at 10 16 AM, Tollefson, Chris <chris_tollefson@fws.gov> wrote
> > > > > > >
> > > > > > > > All,
> > > > > > > >
> > > > > > > > I've got plenty of material for a blog. But what I lack is a precise understanding of what we're announcing.
> > > > > > > >
> > > > > > > > Are we reaffirming our previous finding? Issuing a new finding? Will the prohibition last indefinitely, or do we plan to reassess at some point?
> > > > > > > >
> > > > > > > > Am I correct in understanding that this applies only to captive-bred lions from South Africa? Have we issued any new findings for wild lions there?
> > > > > > > >
> > > > > > > > Any clarity you could provide would be really helpful.
> > > > > > > >
> > > > > > > > Thanks!
> > > > > > > >
> > > > > > > > **Chris Tollefson - Press Secretary and Senior Communications Advisor**
> > > > > > > > U.S. Fish & Wildl fe Ser ice - 5275 Leesburg Pike MS EA - Falls Church VA 220 1
> > > > > > > > 703-358-2222 (W) 202-2 7-7 17 (M) www.fws.go
> > > > > > > >
> > > > > > > > On Thu, Aug 10, 2017 at 3 18 PM, Parramore, Laury <laury_parramore@fws.gov> wrote
> > > > > > > >
> > > > > > > > > Hi Chris,
> > > > > > > > > Per our chat, here is some info from various sources that should be helpful.
```
```

Thanks Christina and Vanessa for contributing. Danielle - would it be possible for Chris to see the draft finding?

This is pretty helpful: https://www.fws.gov/endangered/what-we-do/pdf/Lion_FL_FAQs_Final.pdf

Please note the attached TPs (when Dan appeared on the Diane Rehm show) are a year old but maybe there's some language in there that's worth re-purposing.

Hope this helps.

---------- Forwarded message ----------
From **Meister, Christina** <christina_meister@fws gov>
Date Thu, Aug 10, 2017 at 3 08 PM
Subject Lion Info
To Laury Parramore <laury_parramore@fws gov>

FYI - Vanessa asked me to send you the following info. This is from Tim V. in response to a July Reuters inquiry. The typos are from my computer, not the actual response.

So what I would like to know is what countries can hunters import lion trophies from into theUnited States? And do you have any data on such imports? Have they increased or decreased over thepast two years since Cecil the Lion saga? Or have they perhaps come to a complete standstill?

Currently, hunters can import lion trophies of wild and wild-managed lions (*P. l. melanochaita*) from South Africa taken during the 2016 hunting season. We are currently re-evaluating wild and wild-managed lions from South Africa taken in the 2017 hunting season, as well as evaluating the management programs oflions in Tanzania, Zambia, Zimbabwe, Mozambique, and Namibia to determine whether import of sport-hunted trophies contributes to the conservation of lions and meets the criteria of the Endangered Species Act.

With the listing in 2016, the number of lion trophies that have been imported did decrease. In 2013, 627 liontrophies were imported , of which 545 (predominately captive-bred) were from South Africa. Since the listing, the Service has issued import permits for only 9 trophies from South Africa taken after the listing date (however, permits would not be required to import trophies that were taken before the listing date and were imported with a CITES export permit; therefore the number that were imported would be higher than thenumber for which permits were issued).

- With South Africa are captive-bred lions shot as trophies prohibited from being imported into theUnited States?

Yes, at the present time. Based on current information, captive lions do not appear to contribute to theconservation of the species in the wild. Also, captive lion populations are known to be compromised by inbreeding. This could compromise genetic integrity and provenance and therefore make these lions unsuitable for reintroduction purposes. Further, based on the limited information currently available, there is no evidence to suggest that captive breeding operations are otherwise supporting or contributing to any in-situ conservation efforts for wild lions. Therefore, the Service has been unable to find enhancement as required under the Endangered Species Act for the import of captive lions taken as sport-hunted trophies in South Africa. Until such time as additional information becomes available that would affect this finding, the Service is unable to authorize the import of captive lion trophies from South Africa.

--
Christina M. Meister
Office of Public Affairs
U.S. Fish and Wildlife Service
5275 Leesburg Pike
Falls Church, VA 22041-3803

Office 703-358-2284
Cell 703-304-9535
christina_meister@fws.gov

--
Danielle Kessler
Chief, Office of Outreach & Communications
International Affairs Program
U.S. Fish & Wildlife Service
5275 Leesburg Pike
Falls Church, VA 22041-3803
703-358-2644
www.fws.gov/international

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--
Timothy J. Van Norman, Chief
Branch of Permits
Division of Management Authority
U.S. Fish and Wildlife Service
(703) 358-2350

***Sign up** for our e-newsletter to learn how we re working around the globe to protect species and their habitats!*



From:	Lisa Jones
To:	Cogliano, Mary
Cc:	Mike Moore; Tim Vannorman; Danielle Kessler
Subject:	Re: Questions on permits issued
Date:	Monday, November 20, 2017 12:27:44 PM

Thanks so much!

Lisa Hummon-Jones
Congressional and Legislative Affairs Specialist
U.S. Fish and Wildlife Service
703-358-2536 (o)
202-365-7255 (c)

Sent from my iPhone

On Nov 20, 2017, at 12:06 PM, Cogliano, Mary <mary_cogliano@fws.gov> wrote:

> Hi Lisa,
>
> The number of permits issued for import of hunted lions is as follows:
>
> - SOUTH AFRICA: 14 PERMITS ISSUED
> - ZAMBIA: 18 PERMITS ISSUED
> - ZIMBABWE: 19 PERMITS ISSUED
>
> Best,
>
> Mary
>
> ---------- Forwarded message ----------
> From: **Craig Hoover** <craig_hoover@fws.gov>
> Date: Mon, Nov 20, 2017 at 11:56 AM
> Subject: Re: Questions on permits issued
> To: "Jones, Lisa" <lisa_m_jones@fws.gov>
> Cc: Mike Moore <mike_moore@fws.gov>, Tim Vannorman <tim_vannorman@fws.gov>, "Kessler, Danielle" <danielle_kessler@fws.gov>, Mary Cogliano <mary_cogliano@fws.gov>
>
> Adding Mary who generated relevant data over the weekend.
>
> Sent from my iPhone
>
> > On Nov 20, 2017, at 11:54 AM, Jones, Lisa <lisa_m_jones@fws.gov> wrote:
> >
> > Hi Mike,
> >
> > We're getting some questions from the Hill about how many permits have been

issued for our recent lion findings, in addition to elephants. Danielle provided me with stats for elephants.
>
> Do you have stats handy on how many permits have been issued for lions for Zimbabwe, Zambia, and South Africa?
>
> Thanks so much!
>
> Lisa
>
> ----------
> Lisa Hummon-Jones
> Congressional and Legislative Affairs Specialist
> U.S. Fish and Wildlife Service
> 703-358-2536 (o)
> 202-365-7255 (c)
>

--
Mary Cogliano, Ph.D.
Supervisory Biologist & Policy Specialist
Division of Management Authority
U.S. Fish and Wildlife Service
5275 Leesburg Pike, MS: IA
Falls Church, VA 22041-3803
Phone: (703) 358-1991

From: Craig Hoover
To: Jones, Lisa
Cc: Mike Moore; Tim Vannorman; Kessler, Danielle; Mary Cogliano
Subject: Re: Questions on permits issued
Date: Monday, November 20, 2017 11:56:27 AM

Adding Mary who generated relevant data over the weekend.

Sent from my iPhone

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>
> ----------
> Lisa Hummon-Jones
> Congressional and Legislative Affairs Specialist
> U.S. Fish and Wildlife Service
> 703-358-2536 (o)
> 202-365-7255 (c)
>

From: Cogliano, Mary
To: Lisa Jones
Cc: Mike Moore; Tim Vannorman; Danielle Kessler
Subject: Re: Questions on permits issued
Date: Monday, November 20, 2017 12:32:08 PM

You're welcome!

Mary

On Mon, Nov 20, 2017 at 12:27 PM, Lisa Jones <lisa_m_jones@fws.gov> wrote:

> Thanks so much!
>
> ---
> Lisa Hummon-Jones
> Congressional and Legislative Affairs Specialist
> U.S. Fish and Wildlife Service
> 703-358-2536 (o)
> 202-365-7255 (c)
>
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> > Cc: Mike Moore <mike_moore@fws.gov>, Tim Vannorman <tim_vannorman@fws.gov>, "Kessler, Danielle" <danielle_kessler@fws.gov>, Mary Cogliano <mary_cogliano@fws.gov>
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>
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--
Mary Cogliano, Ph.D.
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--
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Division of Management Authority
U.S. Fish and Wildlife Service
5275 Leesburg Pike, MS: IA

Falls Church, VA 22041-3803
Phone: (703) 358-1991

From: Hoover, Craig
To: Trott, Matthew
Cc: London, Cade; Danielle Kessler; Gloria Bell; Tim Van Norman
Subject: Re: quick reply needed
Date: Tuesday, August 08, 2017 8:29:42 AM

Matt,

Please find below two paragraphs for the weekly report. Let us know if these are sufficient or should be revised in any way.

Best,

craig

Zimbabwe elephant - In 2014 and 2015, the Service was unable to determine that the hunting programs and subsequent imports of African elephant trophies from Zimbabwe met the criteria under the ESA regulations to authorize the issuance of import permits. After receiving information from Zimbabwe on a number of substantial improvements to their management program and elephant conservation efforts, the Service has determined that the killing of African elephant trophy animals in Zimbabwe on or after January 21, 2016 (the date that Zimbabwe's new management plan was officially adopted) through 2017 would enhance the survival of the African elephants and import permits could be issued for these trophies. The Service will publish a Federal Register notice announcing this change by the end of August.

Lions - In 2016, the Service listed the lion in Eastern and Southern Africa as threatened under the ESA. The Service has contacted each of the countries within this region that have conducted trophy lion hunts in the past few years to obtain information on the country's lion population, their lion management, and how sport-hunting was contributing the the survival of the species. The Service authorized the import of wild and wild managed lion sport-hunted trophies in 2016. After reviewing updated information from South Africa, the Service will again authorize imports of wild/wild-managed lions from South Africa taken during 2017-2019. The Service will announce this finding in mid-August.

On Tue, Aug 8, 2017 at 7:41 AM, Trott, Matthew <matthew_trott@fws.gov> wrote:

> Hi all, I'll let you all decide. I'm fine with Cade's explanation that we need to wait to add to weekly, so please send when we are ready to put in report
>
> Matt Trott
> U.S. FISH & WILDLIFE SERVICE
> EA-Division of Marketing Communications
> MS: EA
> 5275 Leesburg Pike
> Falls Church, VA 22041-3803
> 703-358-2512
> Email communication is easier and better for me.
>
> On Mon, Aug 7, 2017 at 5:33 PM, Craig Hoover <craig_hoover@fws.gov> wrote:
>
> > Matt,
> >
> > Sorry we missed your time window. We could get you something first thing tomorrow. These are really two separate issues, so I'd suggest two brief paragraphs. Tim can provide text for consideration tomorrow.

Best,

Craig

Sent from my iPhone

On Aug 7, 2017, at 4:31 PM, London, Cade <cade_london@fws.gov> wrote:

> Hi Matt,
>
> At present, we're still undergoing an internal review of the determinations. We still need to review the finding in-house before then sending it to the Solicitor's office for their consideration and additional review and then go to the Director's office for concurrence. Before then, it would not likely be appropriate to include in the weekly. Sorry that's not more helpful, but please let me know if I can be of any additional assistance!
>
> Cheers,
>
> Cade M. London
> Policy Advisor
> Assistant Director for International Affairs
> U.S. Fish and Wildlife Service
> 5275 Leesburg Pike, MS:IA
> Falls Church, VA 22041-3803
> (T): (703) 358-2584
> e-mail: cade_london@fws.gov
>
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>
> On Mon, Aug 7, 2017 at 4:18 PM, Trott, Matthew <matthew_trott@fws.gov> wrote:
>
> > i was told to add Zimbabwe elephant and lion determinations to weekly but Laury is not around and danielle is on a call. Can you give me a quick paragraph on it by 425?
> >
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--
Craig Hoover
Chief, Division of Management Authority
International Affairs
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5275 Leesburg Pike
Falls Church, VA 22041-3803
ph: 703-358-2162
www.fws.gov/international

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From: Vannorman, Tim
To: Craig Hoover
Cc: London, Cade; Danielle Kessler; Gloria Bell
Subject: Re: quick reply needed
Date: Tuesday, August 08, 2017 8:00:38 AM

Craig,

Here are two short paragraphs:

Zimbabwe elephant - In 2014 and 2015, the Service was unable to determine that the hunting programs and subsequent imports of African elephant trophies from Zimbabwe met the criteria under the ESA regulations to authorize the issuance of import permits. After receiving information from Zimbabwe on a number of substantial improvements to their management program and elephant conservation efforts, particularly the adoption of a new elephant management plan with clear goals and measurables, the Service has determined that the killing of African elephant trophy animals in Zimbabwe on or after January 21, 2016 (the date the new management plan was officially adopted) through to the end of 2017 would enhance the survival of the African elephants and import permits could be issued for these trophies.

Lions - In 2016, the Service listed the lion in Eastern and Southern Africa as threatened under the ESA. The Service has contacted each of the countries within this region that have conducted trophy lion hunts in the past few years to obtain information on the country's lion population, their lion management, and how sport-hunting was contributing the the survival of the species. After approving imports of wild/wild-managed lions taken in South Africa in 2016 and reviewing updated information from South Africa, the Service will again approve imports of wild/wild-managed lions from South Africa that are taken in 2017, 2018, and 2019. The Service is still reviewing information received from other countries regarding their lion programs, but have not finalized any import decisions. The Service anticipates making findings for Zimbabwe, Zambia, and Tanzania in August.

Your thoughts?

Tim

On Tue, Aug 8, 2017 at 7:41 AM, Trott, Matthew <matthew_trott@fws.gov> wrote:

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Craig

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--
Timothy J. Van Norman, Chief
Branch of Permits
Division of Management Authority
U.S. Fish and Wildlife Service
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From: Trott, Matthew
To: Hoover, Craig
Cc: London, Cade; Danielle Kessler; Gloria Bell; Tim Van Norman
Subject: Re: quick reply needed
Date: Tuesday, August 08, 2017 8:35:29 AM

---

thanks!

Matt Trott
U.S. FISH & WILDLIFE SERVICE
EA-Division of Marketing Communications
MS: EA
5275 Leesburg Pike
Falls Church, VA 22041-3803
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> Zimbabwe elephant - In 2014 and 2015, the Service was unable to determine that the hunting programs and subsequent imports of African elephant trophies from Zimbabwe met the criteria under the ESA regulations to authorize the issuance of import permits. After receiving information from Zimbabwe on a number of substantial improvements to their management program and elephant conservation efforts, the Service has determined that the killing of African elephant trophy animals in Zimbabwe on or after January 21, 2016 (the date that Zimbabwe's new management plan was officially adopted) through 2017 would enhance the survival of the African elephants and import permits could be issued for these trophies. The Service will publish a Federal Register notice announcing this change by the end of August.
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Falls Church, VA 22041-3803
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From:	Jimmiel Mandima
To:	Kessler, Danielle
Cc:	Gadd, Michelle; Craig Hoover; Tim Vannorman
Subject:	RE: Request for additional contextual information
Date:	Friday, November 17, 2017 5:52:31 PM

Thank you Daniella and most appreciated. We shall review the Zambia enhancement finding and also get in touch with both Craig and Tim next week if we find it necessary.

Have a great weekend.

Jimmiel

Jimmiel J. Mandima| Director, Program Design & Partner Relations
African Wildlife Foundation

From: Kessler, Danielle [mailto:danielle_kessler@fws.gov]
Sent: Friday, November 17, 2017 4:27 PM
To: Jimmiel Mandima <jmandima@awf.org>
Cc: Gadd, Michelle <michelle_gadd@fws.gov>; Craig Hoover <Craig_Hoover@fws.gov>; Tim Vannorman <tim_vannorman@fws.gov>
Subject: Re: Request for additional contextual information

Thanks, Jimmiel. The enhancement findings for Zimbabwe and Zambia are publicly available. If you need additional information, a Freedom of Information Act may be necessary, though I would defer to Craig Hoover and Tim VanNorman, who are copied on this message.

Best, Danielle

On Fri, Nov 17, 2017 at 1:25 PM, Jimmiel Mandima <jmandima@awf.org> wrote:

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> I am happy to call you now or after 3pm if your schedule permits.

Thank you for your consideration.

Regards,

Jimmiel

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Sent: Thursday, November 16, 2017 10:52 AM
To: Jimmiel Mandima <jmandima@awf.org>
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Subject: Re: Sport hunted trophies official statement?

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> Jimmiel
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> **Jimmiel J. Mandima**| Director, Program Design & Partner Relations
> **African Wildlife Foundation**
>
> **From:** Gadd, Michelle [mailto:michelle_gadd@fws.gov]
> **Sent:** Thursday, November 16, 2017 9:47 AM
> **To:** Danielle Kessler <danielle_kessler@fws.gov>; Jimmiel Mandima <jmandima@awf.org>
> **Subject:** Sport hunted trophies official statement?

> Hi Danielle,
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> --
> *Michelle Gadd, Ph.D.*
> *Program Officer, African Elephant and African Rhino Programs*
> *Division of International Conservation*
> *U.S. Fish and Wildlife Service*
> *5275 Leesburg Pike, MS: IA*
> *Falls Church, VA 22041-3803*
> *michelle_gadd@fws.gov*

--
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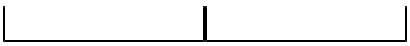



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From:	Jimmiel Mandima
To:	Kessler, Danielle
Cc:	Gadd, Michelle; Craig Hoover; Tim Vannorman
Subject:	RE: Request for additional contextual information
Date:	Monday, November 20, 2017 3:03:52 PM

Hey Danielle,

Perfect and thanks for sharing the additional info link on Zambia. FYI, we earlier today submitted a FOIA request and will await outcome. I will certainly reach out to all of you on this message for further guidance and clarification as needed.

Regards,

Jimmiel

Jimmiel J. Mandima| Director, Program Design & Partner Relations
African Wildlife Foundation

From: Kessler, Danielle [mailto:danielle_kessler@fws.gov]
Sent: Friday, November 17, 2017 4:27 PM
To: Jimmiel Mandima <jmandima@awf.org>
Cc: Gadd, Michelle <michelle_gadd@fws.gov>; Craig Hoover <Craig_Hoover@fws.gov>; Tim Vannorman <tim_vannorman@fws.gov>
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Program Officer, African Elephant and African Rhino Programs
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To: Jimmiel Mandima
Cc: Gadd, Michelle; Craig Hoover; Tim Vannorman
Subject: Re: Request for additional contextual information
Date: Friday, November 17, 2017 4:27:22 PM

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From: Richard Ruggiero
To: Jim Littig
Subject: Re: Trump admin. to reverse ban on elephant trophies from Africa
Date: Thursday, November 16, 2017 11:28:21 AM

I have reservations on this.

Sent from my iPhone

On Nov 16, 2017, at 11:15 AM, Jim Littig <jlittig@congressionalstrategies.com> wrote:

Richard: What do you think about this?

Trump admin. to reverse ban on elephant trophies from Africa

- By STEPHANIE EBBS

Nov 15, 2017, 6:33 PM ET

<image001.jpg>PlayTony Karumba/AFP/Getty Images

Coming up2nd US Doctor Accused of Illegal Lion Hunt

The Trump administration plans to allow hunters to import trophies of elephants they killed in Zimbabwe and Zambia back to the United States, reversing a ban put in place by the Obama administration in 2014, a U.S. Fish and Wildlife Service official confirmed to ABC News today.

Even though elephants are listed as endangered under the Endangered Species Act, a provision in the act allows the government to give permits to import these trophies if there is evidence that the hunting actually benefits conservation for that species. The official said they have new information from officials in Zimbabwe and Zambia to support reversing the ban to allow trophy hunting permits.

<image003.jpg>
De Agostini/Getty Images
An African bush elephant on Fothergill Island, lake Kariba, in Zimbabwe, March 3, 2014.

"Legal, well-regulated sport hunting as part of a sound management program can benefit the conservation of certain species by providing incentives to local communities to conserve the species and by putting much-needed revenue back into conservation," a Fish and Wildlife spokesperson said in a statement.
This change only applies to elephants in those two countries but questions

about using game hunting to generate money for conservation efforts also came up during the controversy after Cecil the lion was killed in Zimbabwe in 2015.

The government has not actually announced this policy change yet but it was reportedly announced at a wildlife forum in South Africa this week, according to Safari Club International, which filed a lawsuit to block the 2014 ban.

It's unclear how the current political situation in Zimbabwe could affect this decision, but a blog post from the president of the Humane Society of the United States points out that poaching has been a problem in Zimbabwe over the years and that the hunting industry there faces corruption issues.

A notice regarding this change will be posted in the Federal Register on Friday with more specifics on what new information justifies the changes.

The finding applies to elephants hunted in Zimbabwe on or after January 21, 2016, and on or before December 31, 2018, and elephants hunted in Zambia during 2016, 2017 and 2018 for applications that meet all other applicable permitting requirements, according to Fish and Wildlife spokesperson.

Savanna elephant populations declined by 30 percent across 18 countries in Africa from 2007 to 2014, according to the Great Elephant Census published last year, which put their remaining numbers at just over 350,000.

The elephant population declined 6 percent overall in Zimbabwe but dropped by 74 percent within one specific region. Elephants saw "substantial declines along the Zambezi River," in Zambia while other areas of that country were stable, according to the census.

<image005.jpg>
Tsvangirayi Mukwazhi/AP Photo
Zimbabwean President, Robert Mugabe, attends the burial of Major General Bandama who died after a short illness at the National Heroes acre in Harare, Zimbabwe, July, 17, 2014. more +

The Fish and Wildlife Service has been talking with wildlife officials in Zimbabwe since the ban was announced in 2014. Since then, Zimbabwe officials have stepped up efforts to combat poaching, established a system to report financial benefit from American hunters, and provided more information on how officials establish hunting quotas, according to the text of the federal register notice that will be posted Friday.

The census reported around 82,000 elephants in Zimbabwe. Wildlife officials set annual quotas limiting hunting there to 500 elephants in different areas.

Elephant hunting has been banned in Zambia several times over the years due to declining population size but was re-established in 2015 after surveys found a larger population in some areas. Zambia is home to some 22,000 elephants, according to the census.

Tourists can hunt elephants on private game ranches or specified areas in Zambia, many of which are on the outskirts of national parks. Zambian officials also carry out anti-poaching efforts and manage elephant hunting through permits and quotas, according to the Federal Register notice. In 2016, 30 elephants were allowed to be killed there as trophies but the government reported that only 12 males were killed, according to the notice.
Fees paid by hunters are also used to fund the country's conservation efforts.

M. James Littig
Principal
Congressional Strategies
703-623-1366

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INFORMATION/BRIEFING MEMORANDUM FOR THE SECRETARY

DATE: July 10, 2017

FROM: Greg Sheehan, Acting Director, U.S. Fish and Wildlife Service

SUBJECT: Lion and Elephant ESA listings and the permitting process

The purpose of this memorandum is to provide background on lion and elephant listings under the Endangered Species Act (ESA), the process for obtaining authorization under the ESA to import sport-hunted trophies, and the status of ESA findings for certain African countries.

BACKGROUND

In December 2015, The U.S. Fish and Wildlife Service (Service) listed the lion subspecies *Panthera leo leo*, located in India and west and central Africa, as endangered and listed *Panthera leo melanochaita*, located in eastern and southern Africa, as threatened. The Service also finalized a 4(d) rule for *Panthera leo melanochaita* that included the requirement that an import permit would need to be obtained prior to the import of any lion specimen.

The African elephant is listed as threatened (throughout its range) under the ESA and trade in African elephant specimens is regulated by a Section 4(d) rule of the Act (50 CFR 17.40(e)). On June 6, 2016, the Service published a final rule amending the Section 4(d) rule to, among other things, require the issuance of an ESA permit for all imports of African elephant trophies and ivory.

DISCUSSION

In accordance with Service regulations for the implementation of the ESA (50 CFR 17.33), in order to issue an import permit for a personally hunted lion trophy, the applicant must demonstrate that the import of a sport-hunted lion trophy would enhance the propagation or survival of the species in the wild. However, for most sport-hunted trophy imports, the hunter typically does not have access to all of the information the Service needs to make a positive "enhancement finding." To address this issue, the Service undertakes direct efforts to gather the information necessary to determine whether an "enhancement finding" can be made. To do so, the Service contacts the wildlife authority within the country where the trophy was taken to obtain information on the status of the species within the country, the management program for the species and how sport hunting is integrated into that management plan, how funds generated through hunting contribute to the conservation of the species, how local communities benefit from hunting operations, and other relevant information. Likewise, sport-hunted trophies of African elephants may only be authorized if the Service is able to find that the killing of the trophy animal will enhance the survival of the species, as called for in the 4(d) rule (50 CFR 17.40(e).

Historically, more than 90% of sport-hunted lion trophies (approximately 400 per year) have been imported to the United States from South Africa. Therefore, the Service prioritized making an enhancement determination for South Africa. In October 2016, we completed a positive enhancement finding for "wild" and "wild-managed" lions from South Africa and a negative finding for "captive" lions. To date, the Service has authorized the import of nine wild/wild-managed lion trophies from South Africa taken in 2016. We have also denied five applications for the importation of captive-bred lions taken in South Africa in 2016. (See attachment 2 and 3).

As of July 10, 2017, we have the following pending applications for lions:

Mozambique –	3 applications for lions taken in 2016 or 2017
Namibia –	2 applications for lion taken in 2016 and 2017
Tanzania –	17 applications for lions taken in 2016 or 2017
South Africa –	11 applications for wild/wild-managed or captive-bred lions taken in 2017
Zambia –	16 applications for lions taken in 2016 or 2017
Zimbabwe –	17 applications for lions taken in 2016 or 2017

As of July 10, 2017, we have the following pending applications for elephants:

Namibia –	6 applications for elephants taken in 2014 (2 renewals), 2016 and 2017
Tanzania –	2 applications for elephants taken in 2016
South Africa –	11 applications for elephants taken in 2016 and 2017
Zambia –	4 applications for elephants taken in 2017
Zimbabwe –	37 applications for elephants taken in 2014 (3), 2016 or 2017

With regard to sport-hunted elephants, we currently have positive findings for the import of trophies from South Africa and Namibia. In 2014 and 2015, we completed negative findings for Tanzania and Zimbabwe, countries for which we previously had positive findings. We have not authorized the import of sport-hunted elephant trophies for any other countries that currently allow sport hunting. We are currently under litigation for our negative findings for both Tanzania and Zimbabwe.

NEXT STEPS

Status of lion and elephant enhancement findings:

Mozambique – The Service has received information from Mozambique for both elephants and lions, and we are currently reviewing the material regarding the status of lions within the country and the management program that is currently in place for the species. Draft findings are underway.

Namibia – The Service has a positive finding for elephants. The Service has requested information regarding lions from Namibia on several occasions, but has not received any information regarding status of the lions in the country or the management regime for the species.

Tanzania – The Service has received information from Tanzania regarding the status of lions and elephants and their management programs. The material has been reviewed and we anticipate completing these findings by the end of July.

South Africa – The Service has a positive finding for elephants. Based on information received from South Africa and other sources, the Service made a positive finding for wild/wild-managed lions taken in 2016 and a negative finding for captive-bred lions taken in 2016. We are currently revising the finding for wild/wild-managed lions taken between 2017 and 2019 (South Africa's lion management plan for wild/wild-managed lions is valid until the end of 2019). We have received no new information for captive-bred lions that would change our current negative finding. The new finding will be completed by mid-July.

Zambia – The Service has received information from the Zambia Wildlife Authority on the status of lions in Zambia and their hunting programs for both lions and elephants. We have reviewed this information and have a draft finding that is currently being reviewed. We anticipate completing the finding by the end of July.

Zimbabwe – The Service has received and reviewed the information provided by Zimbabwe for both elephants and lions. We anticipate completing a new elephant finding in July, and a draft finding for lions is underway.

ATTACHMENTS

None

From:	Hoover, Craig
To:	Cogliano, Mary
Cc:	Tim Vannorman; Danielle Kessler
Subject:	Re: FW: The United States of America has lifted its ban on hunting trophies from Zimbabwe
Date:	Friday, July 07, 2017 3:59:48 PM
Attachments:	image003.png image002.png image005.png

Thanks Mary. We are working with External Affairs to do just that, hoping that they will retract the story.

On Fri, Jul 7, 2017 at 3:21 PM, Cogliano, Mary <mary_cogliano@fws.gov> wrote:

> Please see the below message. I'll respond appropriately but in light of this misinformation, I think we should reach out to the source to provide clarification.
>
> Mary
> ---------- Forwarded message ----------
> From: **Bob Jacobson** <bob@jandmsafaris.com>
> Date: Fri, Jul 7, 2017 at 2:55 PM
> Subject: FW: The United States of America has lifted its ban on hunting trophies from Zimbabwe
> To: "Cogliano, Mary" <mary_cogliano@fws.gov>
>
> Mary,
>
> I received this in as an email. Can you confirm or set this straight. I see no mention on any kind of a USFWS website.
>
> I have an application for Dan Boldt from Texas for Elephant in SAVE for this October. He is mailing next week.
>
> Bob
>
> J and M Safaris
>
> Bob Jacobson, *CEO*
>
> bob@jandmsafaris.com
>
> P: (507) 209-1929 | F: (507) 645-7010
>
> Step Into Adventure!
>
> ---
>
> **From:** Bernice [mailto:africa@desfountainandjones.com]
> **Sent:** Friday, July 7, 2017 6:22 AM
> **To:** Bob <bob@jandmsafaris.com>
> **Subject:** Fwd: The United States of America has lifted its ban on hunting trophies from Zimbabwe
>
> Begin forwarded message:

From: "SOAZ1" <soaz1@mweb.co.zw>
Date: July 7, 2017 at 12:16:41 PM GMT+2
To: "ZPHGA Admin" (b) (6) >
Subject: The United States of America has lifted its ban on hunting trophies from Zimbabwe

US lifts ban on hunting trophies from Zimbabwe



The United States of America has lifted its ban on hunting trophies from Zimbabwe, allowing the country to resume exports later this year, the environment minister said today.

On April 4, 2014, the US Fish and Wildlife Service announced an interim suspension of imports of sport-hunted African elephant trophies hunted in Zimbabwe, which it later extended to 2015 and "indefinitely into the future," because the government's measures to protect the animals did not enhance the survival of the species.

The decision was challenged by the US Safari Club and the powerful National Rifle Association but a US District Court upheld the ban.

Environment, Water and Climate Minister Oppah Muchinguri- Kashiri said that according to the provisions of the waiver, Zimbabwe would start exporting the outstanding trophies in the second quarter of 2017.

"All the trophies which were being held in the country will be exported this year but under strict conditions. We have been given an opportunity to export again into the US," she said.

The US ban preceded the controversial killing of the hugely popular Cecil, a 13-year-old male lion which lived in Zimbabwe's Hwange National Park, by Walter Palmer, a US trophy hunter in July, 2015.

The killing led to calls for tighter controls on hunting trophy imports by mainly western countries.

Zimbabwe hosts hunters from various countries including Russia, the United States, Hungary, Spain and Germany who pay to shoot animals such as lions, elephants and leopards, earning the country millions in revenue.

United States provide the bulk of the hunters and the existence of the ban has had negative effects on hunting revenue.

Bookings for the 2017 hunting season, which runs between April and November each year, are up 20 percent from the previous year's $70 million, despite the embargo by the US.

The 2016 hunting season was depressed as most hunters stayed away due to uncertainty over proposals by some Western countries to impose stricter hunting controls on elephants and lions by mostly African countries.- **The Source**

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INFORMATION MEMORANDUM FOR THE DIRECTOR

FROM: Craig Hoover, Chief, Division of Management Authority

SUBJECT: Sport-Hunted Trophy issues Raised by Safari Club and others during a meeting with Secretary Zinke

I. SUMMARY

On July 11, 2017, Secretary Zinke hosted a meeting with several hunting advocacy groups, including Safari Club International, Dallas Safari Club, the Congressional Sportsmen's Foundation, and others, to discuss foreign species hunting trophies and how the U.S. Fish and Wildlife Service is implementing the Endangered Species Act and other legal requirements. These groups presented Secretary Zinke with a list of "International Hunting Priorities and Recommended Actions." On July 10, 2017, the Office of the Executive Secretariat received a letter from American tourist hunting community organizations, including Conservation Force, Dallas Safari Club, Houston Safari Club, and others, which also provided a list of recommended actions relating to foreign species hunting trophies and how the U.S. Fish and Wildlife Service is implementing the Endangered Species Act and other legal requirements. This information memo summarizes the recommended actions and how the Service might respond to them.

II. DISCUSSION

Removal of barriers to the importation of legally hunted African lions that enhance the survival of the species:

1. The hunting groups identified what they believe is a barrier to the importation of sport-hunted lion trophies and requested that the Service make the required findings under the Endangered Species Act (ESA) and grant permit applications to allow the import of lion trophies taken in southern and eastern Africa since the listing of the species in January 2016.

In accordance with Service regulations for implementation of the ESA (50 CFR 17.32; 17.40(r)), to issue an import permit for a personally hunted lion trophy, the applicant must demonstrate that the import of the trophy would enhance the propagation or survival of the species in the wild. However, for most sport-hunted trophy imports, the hunter typically does not have access to all of the information the Service needs to make a positive "enhancement finding." To address this issue, the Service has contacted the wildlife authority within the country where the trophies have been or likely will be taken to obtain information on the status of the species within the country, the management program for the species, how sport hunting is integrated into that management plan, how funds generated through hunting contribute to the conservation of the species, how local communities benefit from hunting operations, and other relevant information.

In 2016, the Service made an enhancement finding for sport-hunted wild/wild-managed lions taken in South Africa in 2016. On August 31, 2017, we announced a positive finding for wild/wild-managed lions taken in South Africa in 2017, 2018, and 2019, based on their current management plan that covers this period. We are working to finalize our findings for lions taken in Tanzania, Zimbabwe, and Zambia at this time. We are reviewing material received from the Government of Mozambique and Namibia. As soon as the Service has made a finding on whether the import of a sport-hunted lion trophy meets the enhancement criteria under our regulations, we will authorize the import and notify each applicant of the decision. We anticipate making findings for each of these countries in the next several weeks.

One way that these groups can assist in this process is to encourage countries to provide information so that we can make the necessary findings. This was demonstrated in the provision of information from Namibia shortly after our meeting, after we indicated that Namibia had not yet responded to several inquiries.

2. The hunting groups noted that the Section 4(d) rule that was published at the time the lion was listed under the ESA requires that a permit must be issued prior to the import of a lion trophy. The groups do not believe that import permits should be required and has asked the Service to conduct a formal rulemaking process to remove the permitting requirement from the Section 4(d) rule.

Section 9(c)(2) of the ESA and our ESA implementing regulations at 50 CFR 17.8 provide a limited exemption for the import of some Threatened, CITES Appendix-II specimens, which can be used by hunters to import sport-hunted trophies without an ESA threatened species import permit. Import of threatened species that are also listed in CITES Appendix II is presumed not to be in violation of the ESA if the import is not made in the course of a commercial activity, all CITES requirements have been met, and all general wildlife import requirements under 50 CFR part 14 have been met. However, when the Service promulgates a Section 4(d) rule for a threatened species, the presumption that otherwise would result from the operation of Section 9(c)(2) of the ESA is rebutted on the basis of the rulemaking record for the Section 4(d) rule. When the lion was listed as threatened, a Section 4(d) rule was established that rebutted this provision and established the requirement for an ESA import permit for the import of all lion specimens into the United States, including the requirement that the Service find that the import of a sport-hunted trophy enhances the propagation or survival of the species in the wild. The current Section 4(d) rule was completed through the ordinary notice and comment rulemaking process and was deemed "necessary and advisable for the conservation of the species."

Removal of the import permit requirement for sport-hunted trophies of African lions of the threatened subspecies *P. l. melanochaita* (Southern Africa, Eastern Africa; commonly called the "African lion") would require a revision of the 4(d) rule at 50 C.F.R. § 17.40(r). Removal of the requirement for the endangered subspecies *P. l. leo* (India, Western Africa, Central Africa; commonly referred to as the "Northern African or Asian lion") cannot be accomplished through

a 4(d) rule; an endangered species import permit is required under Section 10 of the ESA. Endangered species are not subject to the rebuttable presumption of Section 9(c)(2). To revise the 4(d) rule for *P. l. melanochaita*, the Service would need to follow the ordinary notice and comment rulemaking process under the Administrative Procedure Act (APA), undertake all required determinations such as NEPA and Section 7 of the ESA, and must make a determination under Section 4(d) that the amendment is "necessary and advisable for the conservation of the species" based on the best available information.

3. The groups encourage the Service to work with the South African hunting community to develop and demonstrate the connection between hunting captive-bred lions and conservation of the species in the wild.

The Service has been communicating with the South African Predator Association (SAPA), which represents a number of farms in South Africa that are raising captive-bred lions. Under the ESA, the enhancement requirements are the same for captive-bred animals as for wild animals. Therefore, in order for the Service to authorize the import of a captive-bred lion trophy, the Service must determine that the import of the trophy would enhance the propagation or survival of the species *in the wild*. While SAPA has discussed certain approaches to meet this enhancement requirement, to date they have not developed a program for their members to contribute either as an organization or as individuals to the conservation of wild lions in South Africa or within the lion's natural range. SAPA has requested an opportunity to meet with the Service to discuss the permitting process and the legal requirements for authorizing import of sport-hunted trophies. The Service will continue to work with SAPA to provide guidance on the permitting process and how SAPA or their members could meet the enhancement requirements.

Removal of barriers to the importation of legally hunted African elephants from Zimbabwe:

The hunting groups identified what they believe is a barrier to the import of sport-hunted elephant trophies from Zimbabwe and requested that the Service make the required findings under the ESA to allow the import of elephant trophies from Zimbabwe legally hunted on or after May 12, 2014, when the Service determined and announced in the Federal Register that import of elephant trophies from Zimbabwe did not meet the enhancement criteria under the ESA.

In April 2014, the Service made an interim determination that the information available to us was not sufficient to make an enhancement finding under the ESA for the import of elephant trophies from Zimbabwe, and announced the resulting suspension of imports until such time as we had sufficient information to make a positive finding. In July 2014, after reviewing information presented by the Zimbabwe Parks and Wildlife Management Authority, the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE), professional hunter

association, non-governmental organizations and others, we determined that based on the available information, we were unable to make a positive enhancement finding for elephant trophies taken in Zimbabwe after April 4, 2014 (as a result of litigation over this decision, the Court ruled that the effective date of the suspension should be May 12, 2014, since this was the date the Federal Register notice announcing the decision was published). On March 26, 2015, after reviewing additional information received since the 2014 findings, we announced that we would extend the suspension on elephant trophy imports through 2015 and future hunting seasons until such time as we had sufficient information to make a positive finding. Again, this decision was based on the available information on what was occurring in Zimbabwe at that time. Since these findings, while we have received additional information, we have not received any additional information that demonstrates that the management activities or the status of elephants in Zimbabwe in 2014 and 2015 was substantially different than what was identified in our 2014 and 2015 findings. Therefore, we do not believe there is a basis to amend these findings to allow trophies taken in much of 2014 or 2015 to be imported. These findings have been litigated and upheld on the merits at the District Court level and defense of the findings on appeal has been fully briefed and is currently in front of the Appellate Court with oral argument scheduled for October 13, 2017.

Since the 2015 finding, the Service has received new information on Zimbabwe's elephant management program, the status of elephants in Zimbabwe, and the contribution by U.S. hunters toward elephant conservation. We are able to determine that trophies taken after January 21, 2016, until December 31, 2017, would meet the enhancement criteria and, providing individual applicants are eligible for a permit under the Service general permitting regulations, we would authorize the import of such trophies. The decision to authorize imports of elephants taken on or after January 21, 2016, is tied to this being the date that Zimbabwe's revised elephant management plan was officially adopted and implemented by the Zimbabwe Government. As a result, we are able to make a causal connection between the conservation contribution of U.S. hunters seeking to legally hunt and import elephant trophies from Zimbabwe and enhancement of the elephant's survival in Zimbabwe such that the regulatory standard is satisfied for trophies taken during 2016 and 2017, on or after January 21, 2016. Once we announce this decision (the Federal Register notice is currently in the surname process and awaiting clearance from the Department), we will send the Zimbabwe Government a letter informing them of the decision to authorize trophies taken in 2016 and 2017 and request additional information on several issues in order to make a finding for the 2018 hunting season.

Removal of barriers to the importation of legally hunted African elephants from Tanzania:

The hunting groups identified what they believe is a barrier to the import of sport-hunted elephant trophies from Tanzania and requested that the Service make the required findings under the ESA and CITES to allow the import of elephant trophies from Tanzania since April

2014, when the Service announced that it was unable to determine that import of elephant trophies from Tanzania meet the permit issuance criteria under the ESA and CITES. The groups ask the Service to reinstate a 1997 enhancement finding for the import of Tanzanian sport-hunted elephant trophies and to re-evaluate how the Service makes CITES non-detriment findings.

In April 2014, the Service announced that we were not authorizing the import of sport-hunted elephant trophies taken in Tanzania in 2014 due to the inability to make a positive enhancement finding under the ESA and a non-detriment finding under CITES, both requirements to authorize imports. The Service had reviewed all of the available information that was presented by the Tanzanian Government, non-governmental organizations and others when making its enhancement and non-detriment findings for trophies taken in 2014 and were unable to make the required findings. In 2015, after reviewing the available information, the Service announced that we were still unable to make a positive enhancement or non-detriment finding. We therefore denied all permit applications requesting authorization to import sport-hunted elephant trophies for those years. Since these findings, we have not received any additional information that demonstrates that the management activities or the status of elephants in Tanzania in 2014 and 2015 was different than what was identified in our 2014 and 2015 findings. Therefore, we do not believe there is a basis to amend these findings to allow trophies taken in 2014 or 2015 to be imported. Safari Club and National Rifle Association filed suit against the Service over the merits of our 2014 decisions. The District Court initially found that the plaintiffs did not state a claim upon which relief can be granted because no member of either organization applied for a permit and dismissed the case. Subsequently, the plaintiffs appealed the decision to the Appellate Court, which overturned the lower court decision and remanded the case back to the District Court. The case has now been fully briefed on the merits and is still pending before the District Court.

Since the 2015 findings, the Service has received some information on Tanzania's elephant management program, the status of elephants in Tanzania, and the contribution by U.S. hunters toward elephant conservation. We are evaluating this information now to make a determination of whether elephant trophies taken during the 2016 and 2017 hunting seasons would meet the issuance criteria under the ESA and CITES regulations. There are still outstanding concerns with the status and management of elephants in Tanzania. We are drafting a briefing document to present to the Director in the near future to discuss this further.

In 1997, the Service made a determination, based on the information available at that time, that imports of sport-hunted elephant trophies from Tanzania met the enhancement criteria under the ESA. In 2014, after evaluating the information available at that time on the status and management of African elephants in Tanzania in 2014, the Service issued an updated enhancement finding, determining that imports did not meet the enhancement criteria. Because we had new information that led to our 2014 finding, we are unable to reinstate the 1997 finding.

When the Service makes its non-detriment findings, it uses the best available science, trade data, and other relevant information. This has been the standard used since the United States became a member to CITES and is also provided in our CITES implementing regulations at 50 C.F.R. 23.61. The Service also follows the guidance provided in Resolution Conf. 16.7 (Rev. CoP17). This guidance was developed by the Parties to CITES through an in-depth and exhaustive process and adopted by the Parties at the 16th Meeting of the Conference of Parties in 2013.

Reevaluation of the standard for enhancement of survival:

The hunting groups have requested that the Service review its current practices in developing enhancement of survival findings under the ESA to make the basis of the finding whether the hunting program simply benefits the survival of the species.

The hunting groups believe that the Service is using a different and heightened enhancement standard than was previously used by the Service prior to the 2014 Zimbabwe and Tanzania elephant trophy findings. In contrast with findings made in 1997, they believe that the 2014 and 2015 findings discounted the benefits of sport hunting and required that sport hunting actually ensure rather than merely enhance elephant survival. The Service relied on the same set of factors to make enhancement findings in 1997, 2014, and 2015. Each finding considered current population data, Zimbabwe's elephant management plan and implementation of that plan, enforcement of existing regulations, and whether Zimbabwe demonstrated a sustainable sport-hunting offtake quota. The Service's move to a negative enhancement finding, which the hunting groups refer to as evidence of a heightened standard, merely reflects the different facts that formed the basis of enhancement findings made more than fifteen years apart. The Service did not discount sport hunting's contribution to community-based conservation. Rather, it considered that revenue in proper context. In 2014 and 2015, the Service applied the same standard and, based on substantial but different evidence, made negative enhancement findings. The Service does not expect that a country resolve every outstanding issue facing an ESA-listed trophy species prior to the Service authorizing imports. The enhancement standard under the ESA provides that otherwise prohibited activities may be approved if the activities being carried out enhance the propagation or survival of the species. Such direct or indirect activities need to provide a clear and documentable benefit to the species. The Service recognizes that well-managed, scientifically based wildlife management regimes are adaptive in nature, addressing issues and concerns as they arise.

Removal of the permit requirement for African elephants:

The hunting groups request that the Service withdraw the regulations that require the issuance of import permits for trophies for Appendix-II African elephant populations. The hunting groups

expressed that since neither the ESA nor the African Elephant Conservation Act require the issuance of permits, there should not be such a requirement under the ESA regulation.

The hunting groups are correct that prior to the 2016 revision to the 4(d) rule for African elephants, there was no requirement for the prior issuance of an import permit for elephant trophies from Appendix-II populations. There was, however, a requirement that "[A] determination is made that the killing of the animal whose trophy is intended for import would enhance survival of the species…" The enhancement-finding requirement was established in 1992. The requirement to issue a threatened species permit for import of all African elephant sport-hunted trophies (instead of only those from Appendix-I populations) was promulgated to allow us to more carefully evaluate trophy imports in accordance with legal standards and the conservation needs of the species. The permitting process also establishes a direct avenue of communication with individual hunters to receive information from and provide notification of any changes to our determination.

Removal of the individual import permit requirement for African elephants would require revision of the 4(d) rule for African elephants to delete the language "and the trophy is accompanied by a threatened species permit issued under §17.32" from 50 C.F.R. § 17.40(e)(6)(i)(B). To do so, the Service would need to follow the ordinary notice and comment rulemaking process under the APA, undertake all required determinations such as NEPA and ESA Section 7, and must make a determination under Section 4(d) that the amendment is "necessary and advisable for the conservation of the species" based on the best available information.

Removal of the individual permitting requirement may also complicate enforcement of the two per hunter per year limitation on the number of sport-hunted African elephant trophies that may be imported into the United States. We placed a limit on the number of trophies that can be imported per hunter per year to increase control of the U.S. domestic ivory market and to ensure that we are not allowing the import of commercial quantities of ivory as sport-hunted trophies, as happened in a small number (fewer than 10 per year) of circumstances in the recent past.

Use best available science in the Service's decision whether to uplist African leopards:

The hunting groups request that the Service use the best available scientific data when considering a petition submitted to the Service to uplist the African leopard from threatened to endangered under the ESA. If such information is not currently available, the hunting groups request that the Service work with the leopard range countries to obtain the data. The groups also request that the Service consult with range states prior to enacting stricter domestic measures for foreign species.

As established in the ESA § 4(b)(1)(A), the basis for making a listing decision is that "[t]he Secretary shall make determinations required by subsection (a)(1) solely on the basis of the best scientific and commercial data available to him after conducting a review of the status of the species and after taking into account those efforts, if any, being made by any State or foreign nation, or any political subdivision of a State or foreign nation, to protect such species, whether by predator control, protection of habitat and food supply, or other conservation practices, within any area under its jurisdiction, or on the high seas."

During our status review of the leopard, we will thoroughly evaluate the best scientific and commercial information available on the species, including all potential threats to the species and the extent to which any protections or other conservation efforts have reduced those threats. To that end, following publication of our 90-day finding that reclassifying the leopard as endangered may be warranted, we contacted, or attempted to contact, all but five countries identified by the International Union for the Conservation of Nature as those in which the species is currently "native" or "possibly extinct" (we did not attempt to contact Iran, Bhutan, South Sudan, Turkmenistan, or North Korea because the United States does not have diplomatic relations with these countries or these countries are not signatories to CITES). We notified these countries that we were initiating a status review of the leopard and requested information from them on the status of the species. We will continue to reach out to range countries and will contact other interested parties during the review process. If a listing action is proposed we will also comply with our duty under § 4(b)(5)(B) to "insofar as practical, and in cooperation with the Secretary of State, give notice of the proposed regulation to each foreign nation in which the species is believed to occur or whose citizens harvest the species on the high seas, and invite the comment of such nation thereon" which provides further opportunity to consult with and seek information from range states.

Relief from FOIA-related attacks on importers and exporters:

The hunting groups request that the Service deny Freedom of Information Act (FOIA) requests for personal information about the identity of importers and exporters of wildlife. They believe the Service has taken an inconsistent approach about whether to release the identities of wildlife importers and exporters to FOIA requesters that could be used to attack members of the hunting community.

The Service receives over 1,000 FOIA requests each year. Requests for information on importers and exporters are generally phrased as requests for all information contained in the Law Enforcement Management Information System (LEMIS) database for certain species and time periods (e.g., "information relating to imports of pangolins for all years 2012 to present"). LEMIS tracks information submitted by both commercial and individual importers and exporters.

The names of individual importers and exporters are withheld under FOIA Exemptions 6 and 7(C). Exemption 6 allows an agency to withhold "personnel and medical files and similar files

the disclosure of which would constitute a clearly unwarranted invasion of personal privacy." 5 U.S.C. § 552(b)(6). Exemption 7(C) protects "records or information compiled for law enforcement purposes, but only to the extent that the production of such law enforcement records or information […] could reasonably be expected to constitute an unwarranted invasion of personal privacy." 5 U.S.C. § 552(b)(7). The Service consistently applies Exemptions 6 and 7(C) to withhold the names of individual importers and exporters appearing in LEMIS.

For commercial importers, the Service is required by Subpart F of the Departmental FOIA Regulations (43 CFR §§2.26 to 2.36) to notify submitters of possibly confidential commercial information whenever a FOIA request for that information has been received. Submitters are notified when the requested information appears to be potentially confidential commercial information and are afforded an opportunity to submit objections to the release of that information. In cases where there are so many submitters that individual notifications are not practical, which is sometimes the case when multiple years of LEMIS information are requested, the Service may publish notice in the Federal Register. 43 C.F.R. § 2.27(b).

Notification via the Federal Register is done infrequently, but has been done twice recently due to litigated FOIA requests for entire years' worth of information from LEMIS. This may have contributed to a perception that more requests were being made for information on individuals contained in LEMIS, but in fact the requests are for all information contained in LEMIS.

Individuals are not notified when a FOIA request is received for information about that individual, because the Service does not provide information regarding the existence of records in the case of third-party requests for information on specific individuals. If a generalized request were received, then submitters of possibly confidential commercial information would be notified of the opportunity to submit their Exemption 4 arguments. Individuals, however, need not make an Exemption 4 argument to enjoy the protection of Exemptions 6 and 7(C).

The Service will continue to withhold the names of individual importers and exporters appearing in LEMIS under FOIA Exemptions 6 and 7(C).

Revert to past practices regarding seizure and forfeiture:

The hunting groups believe that seizure and forfeiture practices changed in the last Administration and that FWS should return to previous Service Manual provisions. For example, they believe that FWS should "reincorporate" the thirty-day grace period for non-commercial importers to correct harmless errors, revise the definition of "contraband" that includes lawful property, and remove the requirement for hunters to file claims in federal courts for the port of entry.

FWS seizure and forfeiture practices are consistent with applicable law, including the Civil Asset Forfeiture Reform Act of 2000 (CAFRA) and the Convention on International Trade in

Endangered Species of Wild Fauna and Flora (CITES). A proposed rule was published on June 17, 2016, to update the FWS regulations in part 12 of Title 50 of the Code of Federal Regulations, 50 CFR part 12, in part, to reflect the procedural changes required by CAFRA. 81 FR 39847. The "contraband" definition in the proposed rule reflects the contraband exemptions listed in CAFRA and the current case law. *See* 18 U.S.C. 983(a)(1)(F), 983(d), and 983(f); *see also Conservation Force v. Salazar*, 677 F. Supp. 2d 1203, 1208 (N.D. Cal. 2009).

Adoption of a 30-day grace period for non-compliance with wildlife laws to correct certain permitting errors is not available. While it is not illegal to import many types of wildlife into the United States, a failure to present required permits will transform the wildlife into contraband. Under some circumstances, though not routine, remission is available based upon the petitioner's representations of innocence or lack of knowledge of the underlying unlawful conduct.

The proposed rule does not require anyone to file claims in federal courts, but rather provides the option of either filing a petition for remission with the Office of the Solicitor or filing a claim in federal district court for the return of seized property. As reflected in current case law, the two options are alternative rather than sequential options. *See Conservation Force v. Salazar*, 646 F.3d 1240,1242*; Malladi Drugs & Pharmaceuticals, Ltd. v. Tandy*, 552 F.3d 885, 890 (D.C. Cir. 2009). This is a change from the old practice of allowing petitioners to file claims after their petition for remission was denied.

During the comment period for the proposed rule, we received and are considering a comment from one of the hunting groups regarding the potential burden on non-commercial importers posed by the provision of the proposed rule referring to the filing of a Rule 41(g) motion under certain circumstances for the return of seized property in the district where the property was seized after the filing of a claim. *See* 81 Fed. Reg. 39862. This provision is being considered for revision in or removal from the final rule.

Conservation Strategy and Action Plan for the Lion (*Panthera Leo*) in Zimbabwe



Zimbabwe Parks and Wildlife Management Authority
Ministry of Environment and Tourism

Acronyms used

AA	Appropriate Authority
AWCF	African Wildlife Consultative Forum
CAMPFIRE	Community Areas Management Programme for Indigenous Resources
CRG	Carnivore Research Group
CITES	Convention on International Trade in Endangered Species of Flora and Fauna
HACSIS	Human Animal Conflict Scheme for Insurance
IUCN	International Union for the Conservation of Nature
MOMS	Management Oriented Monitoring System
NGO	Non Government Organisation
NP	National Park
PAC	Problem Animal Control
PWMA	Parks & Wildlife Management Authority
RDC	Rural District Council
SASUSG	Southern Africa Sustainable Use Specialist Group
SOAZ	Safari Operators Association of Zimbabwe
TFCA	Transfrontier Conservation Area
THT	Tiki Hywood Trust
WWF	World Wide Fund for Nature
ZATSO	Zimbabwe Association of Tour and Safari Operators
ZNSPCA	Zimbabwe National Society for the Prevention of Cruelty to Animals
ZPH&GA	Zimbabwe Professional Hunters & Guides Association
ZPWMA	Zimbabwe Parks and Wildlife Management Authority

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FOREWORD

Zimbabwe is one of the few lion range states in Africa, where large areas of land which have been set aside as protected areas, still have viable lion populations. In some parts of Africa, lions have been completely wiped out through uncontrolled hunting, revenge killings, habitat loss and other factors with the only record to indicate their existence in the past now left as anecdotal evidence. The lion is a powerful African symbol, it is a flagship species and yet its future is under threat. The conflict with local communities and the threat to livestock and human lives in many parts of the world including Zimbabwe is well documented. While its attraction in ecotourism as one of the most beautiful and graceful cats, and as a trophy animal in sport hunting, its economic benefits are huge. Its social and cultural values are an integral part of the Zimbabwean lifestyle, therefore efforts to ensure lion conservation need to be strengthened.

The Zimbabwe Conservation Strategy and Action Plan for the Lion will guide the conservation and management of this important top predator. The strategy and action plan is the outcome from a workshop in which stakeholders representing the wildlife industry, technocrats, inter and non-governmental organizations, wildlife producers etc, actively participated. Hence the strategy and action plan addresses the needs of this country. It, at the same time responds to regional and international standards set by Treaties such as CITES and CBD etc.

Collaborative work on Research and Monitoring on lion needs to be strengthened to ensure that adaptive management is practiced and is also based on sound scientific data. The strategy and action plan also sets the stage for the sharing of experiences between stakeholders and therefore creates a conducive environment for researchers, protected area managers, policy makers and local communities to map the way forward for lion management. We need to mindful of the need to put communities who bear the largest cost of living with the lion at the centre of all conservation efforts.

1. INTRODUCTION

The lion *Panthera leo is* a powerful cultural symbol of Africa and an important indicator of an area's wilderness qualities where it occurs. It is also a key species for tourism, research and trophy hunting, the last embedded in mythology and reflecting the pinnacle of success in a classical African hunting safari.

Increasingly threatened, with much of its former range now lost, the lion is a major predator of domestic livestock, presenting challenges and hardship to those who live amongst lions. Whilst an economic and dangerous liability, the lion is also a major source of economic benefit being one of Africa's most important tourism attractions.

In Zimbabwe, the lion population is estimated to be between 1,000-1,700 animals (Chardonnet 2002, Bauer and Van Der Merwe 2004,) with a current range of c. 60,000-90,000 km' compared to their distribution over approximately 250,000 km' in the early 60s (Child and Savory 1964, Smithers 1983). Occasional records indicate the presence of lions from time to time in a number of unexpected localities, e.g. lions are presently stock raiding around Nyanga NP in Zimbabwe's Eastern Highlands. The present range is less than one quarter than 50 years ago and probably no more than 20% of the country's total land area.

Information on population status, current distribution and trends (as opposed to range) still remains lacking for most major wildlife areas although there are estimates of numbers for some areas. Lion specific surveys and research has been limited to areas of the Parks & Wildlife Estates, namely Hwange NP and Matetsi SA in northwest Matabeleland, and Mana Pools and Matusadona NPs in the Zambezi Valley (Loveridge 2002, Purchase 2002, Monks 2005), and the Save Valley Conservancy.

2. BACKGROUND

At the 13th Conference of the Parties to the Convention on International Trade in Endangered Species of Flora and Fauna (CITES), which took place in Bangkok, Thailand in October 2004, Kenya submitted a proposal on the African lion calling for the transfer of the lion population from Appendix 11 to Appendix I, for consideration by the Parties. In response, Parties recommended a detailed examination of the issues surrounding the conservation of the African lion, through a series of regional workshops.

IUCN together with other key stakeholders, organized two sub-regional workshops on the conservation of the African lion. The first workshop brought together 14 West and Central African lion range states to a workshop in Douala, Cameroon in October 2005. The second workshop brought together 15 lion range states from Eastern and Southern African to a workshop that took place in Johannesburg, South Africa in early January 2006 (Bauer, Chardonnet and Nowell 2005). Participants at each workshop included Directors of Wildlife Conservation Departments and their technical advisors, safari operators, community leaders, non-governmental organisations involved in conservation, as well as researchers on the African lion.

The workshops came up with a number of recommendations which included:

- The need for African lion range States to follow up the workshops by developing and implementing national lion management plans.
- The need for a Pan African Conservation strategy to form the basis of a region wide collaboration in the conservation of the lion and which would also form the basis for the management of other wildlife species on regional scale.

In the spirit of following up the first recommendation, the Zimbabwe Parks and Wildlife Management Authority (PWMA), together with IUCN, convened a workshop to develop a national lion conservation strategy and action plan for the African lion in Zimbabwe. It is intended that this strategy and plan will motivate for increased lion conservation activity. Attended by conservation NGOs, the private sector, and Rural District Councils (RDCs), as well as PWMA and IUCN, the workshop was held in late October-early November 2006.

3. ISSUES RELATING TO LION CONSERVATION IN ZIMBABWE

3.1 Management & research

Management decisions, including technical advice, policy formulation and management interventions, need to be based on sound scientific information, with research programmes addressing specific problems encountered by conservation managers (Funston 2006, Loveridge 2006). Some key issues that need attention include:

- The need to develop and decide upon standardized lion census methods for application.
- The need to initiate standardized surveys in areas within Zimbabwe where the status of lion is unknown.
- Improved understanding of the ecology and biology of the lion, including its habitat and prey. These may be changing under human influences, or in the longer term, as a result of climate change.
- Changes in lion population trends and range as a result of habitat change, hunting, and increased informal killing to protect livestock and people.
- Determination of morphological or other features that facilitate the rapid identification of adult male trophy animals in the field.
- Protocols and data base requirements for monitoring population status, trophy hunting and PAC off takes, and the use of this data for future management and development of best hunting practices.
- The socio-economic impacts of lion conservation and the need for stakeholder inclusion in decision making.
- The need to continuously review the legal and institutional frameworks that provide incentives for the expansion of wildlife as form of land use.
- The need to clarify policy in the context of banning the use of female lions as trophy animals.

3.2 Capacity needs

Capacity requirements reflect the adequacy of human, financial and material resources. Under-resourced wildlife agencies are a major constraint to performance and the realisation of the potential of wildlife as a serious economic sector activity (Child 2004). Pertinent issues include:

- Capacity for management, monitoring and scientific research.
- Appropriate PWMA and other Government staff training programmes at different levels and for other key stakeholders, such as CAMPFIRE Association, RDCs, SOAZ and relevant NGOs.
- The need to identify appropriate training programs and institutions. This should include in-house training.
- The need for capacity to manage problem animals including discretionary control work, data collection, analysis, synthesis and feedback.
- The need for capacity to administer and manage CITES requirements.

Given that most State wildlife agencies never have adequate human, financial and material resources, there is the need to focus on innovative and accountable ways of fund raising.

3.3 Mitigation

Lions kill livestock and occasionally humans, and vengeful killings are frequent. This is a fundamental reason for the decline in lion populations in many African countries (Woodroffe et al. 2006). Being highly emotive, the issue has potential to undermine lion conservation efforts if not addressed properly. The objective is to minimise and where possible to eliminate human-lion related conflicts. Some issues for consideration include:

- A framework for rapid PAC response. Parks needs to work closely with RDCs on this matter.
- Setting up databases for monitoring human-lion conflict.
- Participatory planning to minimize human-lion conflict.
- Designing mechanisms (including traditional ones) to reduce livestock predation.
- The need to create awareness and education on lion conservation issues.
- The possible translocation and reintroductions of problem animals in areas far removed from human habitation.

3.4 Socio-economic

Linked very closely to mitigation of lion problems and lion-human interactions are the associated costs and benefits of long-term lion conservation. Costs need to be minimised and benefits maximised within equitable arrangements. This is especially important amongst rural communities who bear the cost of living with wildlife. CAMPFIRE has made considerable progress in this regard and any lion strategy needs to build on such progress. For example, the benefits of lion conservation need to be more explicitly recognised in the distribution of revenues from safari hunting and ecotourism activities in CAMPFIRE and other areas. Moreover, further devolution of revenues earned from CAMPFIRE, to below that of RDC is needed. In this regard a promising start has been made in some districts with Appropriate Authority 'status whereby wildlife producer communities are now being paid hunting revenues directly (Taylor 2006, Taylor and Murphree 2007).

3.5 Communication and information dissemination

Information is key to decision making. Information is required at different levels and the type of information may vary with the level of the stakeholder.

- Policy makers and resource managers require information to establish effective management systems.
- Parks managers need information to ensure lions are sustainably managed in their areas of jurisdiction.
- Parliamentarians need information to assist them to understand the ecological, socioeconomic and cultural issues relating to lion conservation to enable them to debate these issues with understanding.
- Communities need to know how to mitigate the effects of lions on their livestock.
- Trophy hunters need information to help them maximize their hunting opportunities.

3.6 Framework for captive breeding

In recent years there has been an increase in the number of captive lion breeders in the country. The issues here include the following:

- Critical analysis of the value of captive lion breeding to conservation efforts.
- Examination and critical analysis (costs/benefits) of the introduction of captive bred lions to the wild.
- Examination and critical analysis of market opportunities and threats for captive bred lions, e.g. canned lion hunting.
- The need and requirements for the regulation of captive lion breeding in the country.

3.7 Trade and regulation

In southern Africa, illegal trade in lion and lion products is not yet a major problem. However the situation may change in time. Consideration may need to be given to the following issues:

- The need to ensure non-detriment findings related to lion trophy export quotas under CITES.
- The need to train and coordinate law enforcement officers (Immigration, Customs, Police) to identify lion products.
- The need to review national legislation and policies.
- The need to set up systems to share information with other States.

3.8 Regional collaboration

Collaboration across national borders is an important step in building up-bilateral and regional lion conservation strategies. During the eastern and southern African lion workshop, the pooling of knowledge from surrounding African states on the distribution of lions clearly showed that lions in and around the various countries adjacent to Zimbabwe are a shared resource. It is appropriate in such cases to develop shared systems for lion conservation. This includes some of the following:

- Collaborative and standardized conservation approaches.
- Shared systems for data collection.
- Similar or comparable management systems.

- Communication and sharing of information.

4. STRATEGY FOR THE CONSERVATION OF THE LION IN ZIMBABWE

Analysis of the above set of issues led to the formulation of a conservation strategy for lions in Zimbabwe, together with an accompanying logical framework and action plan. Targets and their indicators were established at the Goal and Output levels.

4.1 **Vision** (Long term objective)

Lions conserved and managed sustainably for their aesthetic, cultural and ecological values, and the socio-economic development of Zimbabwe.

4.2 **Goal** (Immediate objective or purpose)

To secure and where possible, restore as many viable lion populations as possible in Zimbabwe whilst mitigating their negative impacts and enhancing their value for the benefit of people through sustainable use.

4.3 Goal Targets

4.3.1 Target 1

Ensure the persistence of key lion populations and other important populations including those of doubtful viability

4.3.2 Target 2

Human and livestock loss reduced

4.3.3 Target 3

Optimize wildlife conservation-related net benefits to local communities

4.4 **Outputs** (Results and outcomes)

4.4.1 Lion Management

Output 1. Lion populations, their habitats and wild prey effectively conserved and managed in collaboration with local stakeholders

Target 1.1:

Establish a baseline survey and monitoring programme for identified lion populations and their range inside and outside the Parks & Wildlife Estate

Activities

1) Undertake baseline surveys, and where necessary, identify populations outside Parks & Wildlife Estate
2) Design, develop and set up simple but robust monitoring protocols for key variables (populations, habitats, prey)
3) Set up systems for carrying out collaborative surveys and monitoring across boundaries with shared lion populations (National Park, Safari Area, Forest Area, Communal Land, Large/Small Scale Commercial Farming and/or International)

Target 1.2:

Maintain and strengthen capacity for lion conservation, management, monitoring and research within PWMA and amongst other key stakeholders

Activities

1) Undertake training needs assessment
2) Identify and secure funding resources
3) Provide training and capacity strengthening within PWMA and amongst other key stakeholders e.g. RDCs
4) Train personnel in data capture, management and analysis

Target 1.3:

Identify and implement best management standards and practice for all trophy hunted lion populations, ensuring their viability and sustainable, equitable and adaptively managed trophy quotas

Activities

1) Implement Quota Setting Methodology rigorously and consistently across all hunting areas
2) Review and analyse annual quotas and offtakes to ensure these are adaptive and responsive to population changes, trophy quality and levels of PAC over time
3) Allocate quotas at a scale reflective of lion ecological and biological functionality which invariably differs across different land unit sizes or land uses
4) Refine and update the hunt return form [TR2] and the trophy hunting database and review annually thereafter
5) Ensure centralised database and cost-effective system for data collection from hunting areas and subsequent collation, entry, analysis, reporting and feedback to key stakeholders in the wildlife industry (PWMA, RDCs, SOAZ, conservation NGOs, Researchers etc)
6) Replicate Matetsi Safari Area hunt data collection system in all Parks and non-Parks hunting areas and train PWMA, RDC and other relevant field staff to gather and collate hunting data as per the Matetsi system
7) Train PWMA, RDC and other relevant field staff in the Quota Setting Methodology
8) Review system of fixed and optional quotas (and auctioned hunts) to improve incentives to hunt trophy male lion only, including quota-based incentives/disincentives
9) Review trophy fees to maximise benefit and generate additional revenue
10) Review and put in place criteria for age-based identification of male trophy animals

Target 1.4:

Develop and implement a national lion captive breeding management policy[1]

Activities

1) Identify captive breeding enterprises and establish purpose
2) Consult with stakeholders including breeders, ZNSPCA, IUCN Captive Breeding Specialist Group, and others e.g. Tikki Hywood Trust (THT)
3) Establish destination and role of captive bred lions upon reaching maturity
4) Relate captive bred lions to existing captive breeding policies for crocodiles, ostriches and operations for other captive bred wild species, e.g. Lion & Cheetah Park, Chipangali
5) Review existing policies and/or guidelines
6) Appoint Working Group to develop captive lion breeding policy as appropriate or necessary e.g. WWF-SARPO, NSPCA, THT, Captive Breeders, Wildlife Veterinary Unit.

[1] There was no representative of the captive lion breeders present at the Workshop

Target 1.5:

Develop and implement co-management frameworks for wildlife management

Activities

1) Develop a national lion action plan that articulates collaborative co-management of lion populations amongst different land categories and users in the four major wildlife areas of the country: NW

Matabeleland, Sebungwe Region, Zambezi Valley and SE Lowveld
2) Ensure adoption and implementation of co-managements plans by stakeholders including conservancies
3) Develop and implement participatory monitoring of implementation of plans

Target 1.6:

The geographic distribution range of the lion population expanded

Activities

1) Conservancies and neighbouring communities to work together and incorporate neighbouring communal lands into conservancies where possible.
2) TFCAs to develop programmes to increase jointly managed lion populations

4.4.2 Lion Research

Output 2:

Information for effective and adaptive lion conservation management generated

Target 2.1:

Initiate targeted research on lion ecology, management and mitigation of conflict

Activities

1) Identify gaps in knowledge of lion ecology and biology that require research
2) Identify areas where collaborative (including cross boundary/border) research is required
3) Standardise methodology where collaborative research is required
4) Develop cost-effective age determination methods for lions
5) Identify population ecology research questions in key lion populations
6) Explore predator-prey relationships
7) Identify socio-ecological research needs.
8) Assess the impact of key threats to lion populations in Zimbabwe at present, with particular focus on human-lion conflict, snaring (both direct mortality of lions in snares and depletion of prey populations), and the sustainability of hunting quotas

4.4.3 Mitigation

Output 3:

Human-lion related conflicts minimized and, where possible, eliminated

Target 3.1:

Develop and establish databases on lion/human conflict

Activities

1) Collect PAC (Problem Animal Control) reports on lion related problems
2) Analyse reports & produce evaluation matrix
3) Produce report with recommendations on appropriate PAC monitoring system, e.g. MOMS Oriented Monitoring Systems)
4) Undertake community training on MOMS

Target 3.2:

Identify and implement methods to reduce and mitigate livestock losses and lion attacks on humans

Activities

1) Undertake participatory planning on how to mitigate livestock losses and lion attacks on humans
2) Undertake field work to identify weakness in livestock husbandry in relation to mitigation
3) Review literature, capitalise on experiences and lessons learned elsewhere, e.g. Namibia, and undertake community leadership exchange visits
4) Examine and design appropriate farmer-based compensation schemes, e.g. HACSIS, Namibia
5) Provide training on lion mitigation methods
6) Implement mitigation methods as appropriate at selected sites

Target 3.3:

Trained and properly staffed PAC Units established to conduct rapid response, restrained and precisely targeted problem animal control

Activities

1) Undertake needs assessment and capacity for managing PAC Units at PWMA field station and/or RDC levels
2) Define the role and responsibility of Units
3) Train and equip Units
4) Training and capacity building for PAC to be delegated to the responsible appropriate authority (RDC) and sub-district levels
5) Collaborative and effective PAC techniques developed and implemented within 5 years

Target 3.4:

Incidents of human-lion conflict reduced by at least 30% in 5 years while also reducing retaliatory killing

Activities

1) Specific awareness and education package on lion conservation and management developed and implemented within 5 years
2) Mechanisms developed with the livestock sector to reduce livestock predation by lions by at least 35% from the current level within 5 years

Target 3.5:

Number of lions killed through indiscriminate killings reduced by at least 30% in 5 years after baseline established.

Activities

1) Country specific awareness and education package on lion conservation and management developed and implemented within 5 years
2) Develop incentives for communities to use legal PAC in identified 3 hotspots within 5 years.

Target 3.6:

Incidences of lion attacks on humans reduced by at least 30% from the current levels in 5 years

Activities

1) Develop and implement collaborative and effective PAC techniques
2) Develop appropriate educational and awareness programmes to promote avoidance of potentially lethal encounters between humans and lions

4.4.4 Socio-economic

Output 4:

The costs and benefits of long-term lion management equitably distributed

Target 4.1:

Complete an inventory of stakeholders directly affected by lion conservation

Activities

1) Identify stakeholder groups (e.g. local communities, CAMPFIRE RDC representatives, commercial safari hunting operators (SOAZ, ZPH&GA), tourism operators ZATSO) at the appropriate scale
2) Identify the financial impacts of lion conservation on each stakeholder group
3) Determine extent and magnitude of socio-economic impacts on each stakeholder group
4) Prioritise groups for intervention based on extent and magnitude of socio-economic impacts

Target 4.2:

Deliver appropriate training and capacity building to prioritised stakeholders

Activities

1. Identify representative stakeholders groups per wildlife region
2. Identify training needs in consultation with identified stakeholders
3. Develop training materials and implement training programmes
4. Review effectiveness of training material and programme in consultation with identified stakeholders
5. Implement adaptive programme across 4 wildlife regions

Target 4.3:

Agree and implement collaboratively developed area-specific lion management plans with identified stakeholder groups in each wildlife region within 5 years-.

Activities

1) Consult identified stakeholders
2) Determine the scope and scale of the key activities of the management plan
3) Identify and integrate 'best practices', making provisions for:

    - Ownership issues
    - Zoning for wildlife
    - Mutually binding agreement
    - Verifiable compliance
    - Suitable wildlife utilization plan (e.g. tourism, trophy hunting)
    - Income flows and cost distribution (including rainy-day funds to anticipate uncertainties in tourist revenues)
    - Appropriate husbandry techniques
    - Conflict-mitigation measures
    - Regulation of human immigration
    - Adequate wildlife and conflict monitoring
    - Annual environmental audits

4) Implement management plan
5) Review plan annually and amend where necessary

Target 4.4:

Implement transparent mechanisms to equitably distribute lion-related/generated income to identified stakeholders (groups and/or communities)

Activities

1) Identify income generated from lion conservation (see CAMPFIRE generated revenues)
2) Ensure that benefits of protecting lion populations reach local stakeholders
3) Distribute generated income according to intensity of lion impact (Apply CAMPFIRE Producer Community/Ward principles)
4) Provide appropriate incentives, e.g. implementation of mitigation measures and/or local re-location of people in high-conflict areas to low-conflict areas
5) Provide appropriate incentives e.g. participatory land use planning, to discourage immigration into lion and other wildlife range

4.4.5 Regulation

Output 5:

Effective regulation of consumptive lion utilisation ensured

Target 5.1:

Implement approved policy and practice at national and local levels regarding problem animal control (PAC) of lions within 2 years

Activities

1) Review, and revise where necessary, current policy and practice at national and local levels regarding problem animal control of lions (PAC)
2) Identify key responsibilities of the Appropriate Authority (AA), i.e. the land occupier in respect of problem animal control of lions, given the vulnerable status of lions and recent changes in land tenure
3) Incorporate PAC offtakes with trophy hunting quota offtake to ensure that the overall offtake (i.e. total quota) is sustainable.
4) Determine need for regulation of PAC, including the provision of incentives/disincentives
5) Establish database for lion PAC (see Targets 1.5 & 3.1 above)
6) Ensure PAC policy and practice conforms to the appropriate scale of lion ecological functionality, temporally and spatially, and that this is recognised as an AA responsibility with respect to hunting and PAC offtakes

4.4.6 Communication, Awareness and Information Dissemination

Output 6:

Promote awareness in lion conservation and management

Target 6.1:

To carry out awareness programmes in 50% of the districts in Zimbabwe within the next three 3 years

Activities

1) Identify target groups that need awareness
2) Identify awareness needs for different target groups e.g. hunters, politicians. farmers
3) Develop and package awareness materials for different target groups, e.g. multi-media tools, TV, internet, radio
4) Implement awareness programmes

5) Create feedback mechanisms for target groups
6) Provide extension, information and interpretative services to surrounding communities

Target 6.2:

Create lion conservation and management information units within one year

Activities

1) Facilitate flow of information from various sources
2) Document and process information from various sources
3) Create information database
4) Use Mushandike Natural Resources College as a training centre
5) Define personnel needs and resource requirements
6) Training, M&E, Research

4.4.7 Regional and Trans-boundary Collaboration

Output 7:

Regional conservation and management of trans-boundary lion populations achieved through effective collaboration

Target 7.1:

Undertake an inventory of national strategies for lion management

Activities

1) Make a presentation at the AWCF Meeting in November 2006
2) Develop a budgeted proposal seeking funds to undertake the inventory
3) Appoint 1/. a consultant or 2/. design questionnaire or 3/. use TFCA Conservation Committee or a combination of 2 & 3

Target 7.2:

Encourage the development of national lion conservation strategies where these are missing &/ or incomplete

Activities

1) Seek consensus from the AWCF for the development & implementation of national lion conservation strategies
2) Contact counterparts before the AWCF Meeting
3) Present national lion strategies where applicable and/or available
4) Obtain support from neighbouring countries for the development of national lion conservation strategies
5) Persuade neighbours to develop national lion conservation strategies

Target 7.3:

Develop an integrated and harmonised lion management strategy for Transfrontier Conservation Areas (TFCAs)

Activities

1) Within 2-3 years (medium term) develop the SADC strategy for lion conservation and management
2) Develop appropriate framework:

    - Develop National strategies

- Seek consensus through AWCF
  Incorporate into TFCA Treaties
- Develop SADC strategy

Target 7.4:

Implement lion conservation strategy and management plan

Activities

1) Incorporate strategy into TFCA Conservation Committee workplans [& other stakeholder workplans]
2) Seek funding as required
3) Carry out half-yearly compliance reviews
4) Report back annually to all stakeholders especially those not involved in implementation

5. ROLES & RESPONSIBILITIES

5.1 PWMA- Lion Coordinator

- Put in place management protocols for lion populations requiring special protection.
- Coordinate all national activities on the lion conservation, research and management including (i) census surveys, (ii) setting up monitoring needs, (iii) coordinating data collection including on human-lion conflicts.
- Make submission of trophy data by safari operators mandatory.
- Identify key areas for data collection, e.g. ecological & biological; trade; hunting; socio-economic data.
- Together with Utilisation Unit and Carnivore Research Group, design and develop database systems for data capture, collation, analysis, feedback and dissemination.

5.2 PWMA: Utilisation Unit

- Ensure compliance with hunting regulations and submission of Hunt Return Forms and TR2 Forms.
- Maintain databases for safari hunting and PAC & mitigation measures

5.3 PWMA Field Stations: Ecologists, Wardens

- Procure and make available needed resources for anti-poaching and law enforcement activities (staff, vehicles, fuel, camping equipment etc) .
- Collate and ensure submission of Hunt Return Forms and TR2 Forms.
- Enforce compliance with hunting regulations.
- Liaise with Utilisation Unit and Coordinator .

5.4 CAMPFIRE Association and RDCs with AA status

- Ensure compliance with hunting regulations and submission of Hunt Return Forms and TR2 Forms.
- Facilitate PAC data collection on a regular basis according to PAC monitoring protocols; other data as requested from time to time.
- Facilitate training and capacity building.

5.5 Carnivore Research Group (CRG)

- Explore more comprehensive set of measures of trophies shot (photos, blood for genetic/ disease screening, other skull and tooth measures) (ecologists on field stations, Co-ordinating committee, carnivore researchers).

5.6 Lion conservation & management co-ordinating committee (LCMCC)

- To be chaired by PWMA/Lion Coordinator and to include representation of all parties involved in lion

conservation and management.

- All parties, including PWMA, Carnivore Research Group and conservation NGOs through Coordinating Committee to contribute to the LCMCC Fund.

5.7 SOAZ

- Safari Operators and PHs to ensure compliance with hunting regulations and submission of Hunt Return Forms and TR2 Forms. Training as required.
- SOAZ to facilitate appropriate training of members.

5.8 Lion Captive Breeders Association

- To be reflected in Lion Captive Breeding Policy

6 IMMEDIATE ACTIONS

Immediate actions which need to be taken are:

- Overall: Appoint a Lion Coordinator for PWMA, to be followed up by the establishment of A Lion Conservation & Management Co-ordinating Committee.
- Establish baseline data as soon as possible and build databases.
- Specific outputs to include:

1. Management: Develop Lion Captive Breeding Policy
2. Research: Constitute the Carnivore Research Group
3. Mitigation: Review and undertake needs assessment for PAC Units
4. Socio-economic: Pursue CAMPFIRE fiscal devolution aggressively
5. Apply regulations as required, e.g. mandatory trophy measurements
6. Disseminate and publicise the development and implementation of this Strategy
7. Inform regional partners, i.e. range states.

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Fwd: African Lion - 2015 Zimbabwe NDF (sent on behalf of John Jackson)

1 message

Vannorman, Tim <tim_vannorman@fws.gov> Mon, Jan 11, 2016 at 1:26 PM
To: Anna Barry <anna_barry@fws.gov>
Cc: Lisa Lierheimer <lisa_lierheimer@fws.gov>

Anna,

As discussed at last Thursday BOP meeting, the evaluation of lion trophy imports has been divided up between the biologists and senior biologists. You were selected to analyze Zimbabwe's lion trophy program.

While there is a draft letter saved on the R drive (R:/dma/bop/lions/zimbabwe), I am not sure we need to send it yet. Attached is Zimbabwe's non-detriment finding which may cover much of what we need to make our enhancement finding (either pro or con). Please review the non-detriment finding with an eye towards enhancement. We can then talk about whether we need additional information or not. Remember I have been working on Zimbabwe elephant program, so have a lot of additional background information that will help in your evaluation.

Thanks,

Tim

---------- Forwarded message ----------
From: **Regina A. Lennox** <regina.lennox@conservationforce.org>
Date: Mon, Jan 11, 2016 at 1:20 PM
Subject: Re: African Lion - 2015 Zimbabwe NDF (sent on behalf of John Jackson)
To: "Vannorman, Tim" <tim_vannorman@fws.gov>

Hi Tim,
Great. Do you have Zimbabwe's aging guidelines for 2014 and forward? I attach that too, just in case. It is available on ZimParks' website, but I am not sure it ever made it to you. It explains some of the decisions in the NDF.
Cheers,
Regina

On Mon, Jan 11, 2016 at 11:57 AM, Vannorman, Tim <tim_vannorman@fws.gov> wrote:

> Regina,
>
> Thank you for the e-mail. I was about to send a letter to Olivia with a series of questions regarding lions - your e-mail may make that letter unnecessary at this time.
>
> I will have one of my staff review the non-detriment finding to see if it answers all of our questions regarding whether the lion hunting program is enhancing the survival of the species (the requirement under the Endangered Species Act). If we have additional questions, we will contact Olivia directly.
>
> Sincerely,
>
> Tim
>
> On Mon, Jan 11, 2016 at 12:44 PM, Regina A. Lennox <regina.lennox@conservationforce.org> wrote:
>
> > Dear Tim,
> >
> > Attached please find Zimbabwe's 2015 Non-Detriment Finding for African Lion. It is being submitted to assist FWS in making its enhancement finding for import of lion hunting trophies from Zimbabwe. We hope to be able to provide other relevant documents as they become available.

> We intend to refer to these documents in permit applications in lieu of attaching them to each individual application unless you would prefer they be attached to each.
>
> We note that the current population estimates have increased since those in the attached document. Example: Bubye Valley Conservancy is reported to now have 510 lion.
>
> Most sincerely,
>
> John J. Jackson, III
>
> --
> **Conservation Force**
> 3240 S I-10 Service Road W, Suite 200
> Metairie, Louisiana 70001 USA
> 504-837-1233 (office)
> www.conservationforce.org

--
Timothy J. Van Norman, Chief
Branch of Permits
Division of Management Authority
U.S. Fish and Wildlife Service
(703) 358-2350

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--
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Lion trophy age restrictions Zimbabwe 2014.pdf
500K

BUBYE VALLEY CONSERVANCY LION RESEARCH REPORT

Dr Byron du Preez [Oxford]
2016-01-12

INTRODUCTION

The United States Fish and Wildlife Service (USFWS) have recently evaluated the conservation status of the lion *Panthera leo* with particular regard to sport-hunting (http://www.fws.gov/endangered/what-we-do/lion.html – accessed 2015-01-08). The results of this evaluation have led to the formal protection of two subspecies under the Endangered Species Act, classifying *P. l. leo* as endangered and *P. l. melanochaita* as threatened. Together these subspecies apparently represent all of the lions in Africa (Barnett et al. 2014).

Sport-hunting is a legal activity that is both sanctioned and carefully controlled by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The USFWS found that the sport-hunting of *P. l. melanochaita* "if well managed, may provide a benefit to the subspecies" (http://www.fws.gov/endangered/what-we-do/lion.html – accessed 2015-01-08). Here we aim to explore this statement further and present data from a long-term *in situ* lion research project.

Please note that this is a preliminary report that just focuses on the Bubye Valley Conservancy in Zimbabwe. A more comprehensive report regarding the status of Zimbabwe's lion populations is currently being produced in collaboration with Dr Andrew Loveridge of Hwange National Park, Dr Rosemary Groom of the Save Valley Conservancy, Dr Peter Lindsey of Panthera, and Roseline Mandisodza-Chikerema of the Zimbabwe Parks and Wildlife Management Authority (ZPWMA), and of course Dr Byron du Preez of the Bubye Valley Conservancy.

LIONS *PANTHERA LEO* AND SPORT-HUNTING

The IUCN Red List have recently reclassified lions as Vulnerable (remaining as such since 1996; IUCN 2015), estimating that there are between 20,000 and 30,000 free-ranging lions left (Bauer et al. 2015) in less than 25% of their historic range (IUCN 2006). However, this generalised classification does not take into account an apparent conservation dichotomy: sample subpopulations of lions in Botswana, Namibia, South Africa and Zimbabwe have in fact increased overall (Bauer et al. 2015). Lions were historically present throughout Africa, some of Europe, the Middle East and Asia (Bauer and Van Der Merwe 2004), but current conservation strongholds remain only in parts of eastern and southern Africa (Brassine and Parker 2012; Nowell and Jackson 1996).

Lions are uniquely social felids, forming coalitions of up to nine males associated with female prides that may consist of 20 individuals or more (Macdonald et al. 2010; Schaller 1972). In the 1990's, lions were successfully (in terms of high reproductive and survival rates) reintroduced into private areas in parts of their former range (Miller and Funston

2014). However, this population growth rate inevitably led to the potential problem of overabundance (Funston 2008) and low genetic diversity (Trinkel et al. 2010), with both of these issues requiring active and intensive management (Hunter et al. 2007), and ultimately reducing the conservation value of these lion populations (Miller and Funston 2014). The ability to translocate lions originally facilitated the relief of overpopulation, but as the available areas for relocations were used up, sport-hunting and euthanasia have subsequently become the main methods of lion population control (Miller and Funston 2014).

The lion is the apex predator wherever it occurs (Macdonald et al. 2010), and is an ideal conservation umbrella; being large, charismatic and easily observable (e.g. Williams et al. 2000). The lion is important to commercial wildlife ventures, which risk losing significant market share where they cannot offer them to clients (Lindsey et al. 2007). The lion is thus prioritised in conservation, and their charisma exploited to attract tourists and raise the funds required in ensuring that wildlife areas remain viable (Lindsey et al. 2007). Lions are also a particularly valuable species in the sport-hunting industry, rivalled only in demand by buffalo *Syncerus caffer* and leopard *Panthera pardus* (Creel and Creel 1997). Lions are therefore prevalent in private wildlife areas (Packer et al. 2013), where their populations can achieve exponential growth rates given the protection and resources afforded by well-managed operations (Miller and Funston 2014).

There is more land area in Africa conserved for hunting than there is in all of Africa's formally protected areas combined: approximately 1.4 million km^2, which exceeds the total area covered by national parks by 22% (Lindsey et al. 2007). For wildlife conservation to be successful outside of national parks, these areas must be self-sufficient and able to generate sufficient revenue to cover the considerable costs of protecting the habitat and wildlife therein (Lindsey et al. 2006).

Hunting quotas are sanctioned by CITES on the basis that sport-hunting does not endanger the ultimate survival of the population. The positive aspects of sport-hunting as a conservation tool include a focus on males and a low percentage off-take; neither of which generally jeopardise populations, and also suggest that hunting could play a role in endangered species conservation (Leader-Williams et al. 2005).

An adaptive quota management system for lion hunting based on the ages of lions hunted was agreed on in July 2013 in Harare, Zimbabwe, during a meeting hosted by the Zimbabwe Parks and Wildlife Management Authority (ZPWMA) and the independent non-governmental conservation organisation Panthera. The points system is summarised in Table 1.

Table 1. Points allocated to hunting blocks arising from the harvest of lions of different ages under different quota regimes

	≥6 years	No trophy	5 years old	4 years old	<4 years	Failure to submit hunt

						return/incomplete hunt returns
For quotas of 3/more	4	3	3	2	-3	0
For quotas of 2	4	3	3	2	0	0
For quotas of 1	6	3	3	2	0	0
Quota setting process	These points are added up and divided by 3 to yield the quota for next year					

During 2013, operators were requested to submit hunt returns and photos as a trial run to get the system up and running. In 2014 operators were requested to do the same but were informed that the age of the lions hunted in 2014 would determine their lion quotas in 2015. The 2015 lion hunt results would thus also determine the 2016 quota.

THE BUBYE VALLEY CONSERVANCY

After originally being eradicated by cattle ranchers in the area, 13 lions were reintroduced to the Bubye Valley Conservancy in 1999, and four young males broke into the Conservancy that same year. From the original 17 animals present in 1999, the Bubye Valley Conservancy lion population was estimated at approximately 280 individuals in 2009 when robust population surveys were initiated by a team from the University of Oxford Wildlife Conservation Research Unit (WildCRU), and this population has continued to grow. Today it is estimated that there are over 500 lions on the Bubye Valley Conservancy.

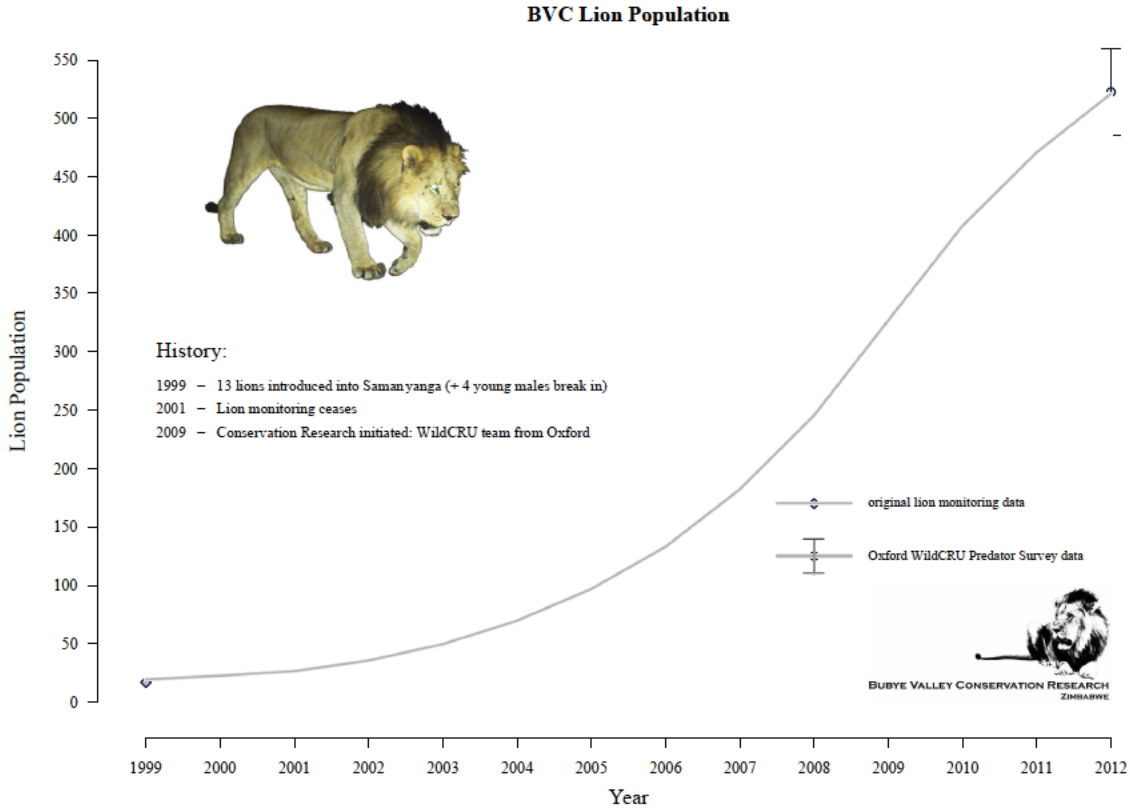

Figure 1: The Bubye Valley Conservancy lion population has increased exponentially since the original reintroduction of the species to the conservancy in 1999.

The exponentially increasing Bubye Valley Conservancy lion population currently exists at one of the highest densities in Africa (~0.190 lions km^{-2}: du Preez et al. 2015), greater than that of the Serengeti, Tanzania (0.100 lions km^{-2}: Pusey and Packer 1987; Spong 2002), Selous, Tanzania (0.080 – 0.130 lions km^{-2}: Creel and Creel 1996, 1997), Kruger National Park, South Africa (0.096 – 0.112 lions km^{-2}: Mills 1995), and Hwange National Park, Zimbabwe (0.027 lions km^{-2}: Loveridge et al. 2007). This equates to the largest contiguous lion population in Zimbabwe.

The Bubye Valley Conservancy offsets the cost of lion predation on its wildlife via sport-hunting of the species. In 2014, the lion hunting quota allocated to the Bubye Valley Conservancy by ZPWMA was 10 individuals. Based the fact that the entire quota was harvested and maximum points were scored for each individual trophy (more than six years in age), the allocated quota was raised to 13 lions for 2015. Only 12/13 lions were hunted in 2015 due to a late cancellation; nevertheless eight lions over six years old and four lions of five years old were harvested and the resultant points justifying a quota of 15 lions for 2016. Note that while the lion hunting quota for Zimbabwe has been voluntarily reduced by a national steering committee, the Bubye Valley Conservancy lion hunting quota has been successively raised twice based on hunt success and age of lions hunted under the *national adaptive quota management system*.

DISCUSSION

The saturation of lions in wildlife areas on both state and private land is positive for their future conservation security; but it is also critical to that of incidentally conserved endangered species, such as both species of rhinoceros (*Diceros bicornis* [black] and *Ceratotherium simum* [white]) on private wildlife conservancies in Zimbabwe (Lindsey et al. 2009; Suzuki 2001), which benefit from the same resources and protection that are incentivised and provided by the revenue generated from sport-hunting. The Bubye Valley Conservancy now boasts the world's third largest black rhinoceros population (N. Anderson [Lowveld Rhino Trust], pers. comm.). This remarkable achievement is an incidental conservation benefit derived entirely from trophy hunting activities – there are no photographic tourists visiting the Bubye Valley Conservancy, and these rhinos are not hunted. Having rhinos on the land therefore generates no revenue – and in fact there is a significant cost associated with protecting these animals. This expense is covered by the revenue generated by sport-hunting, with additional donations from the clients, and the habitat for the rhino is also preserved by maintaining the land as a conservation area, as opposed to converting it into agricultural or grazing land for example. The Bubye Valley Conservancy lion population has increased from an original 17 individuals in 1999 to over 500 in 2015 – not despite hunting, but because of the incentive provided by sport-hunting for their protection.

However, the high densities of lion populations achieved within commercial wildlife areas have the potential for intense intraguild persecution. Lions are aggressively competitive, and have been linked to reductions in cheetah (e.g. Durant 1998, 2000; Laurenson 1995) and wild dog (e.g. Creel 2001; Creel and Creel 1996; Vucetich and Creel 1999) densities, both of which face local extinction where lion abundance, and the respective level of persecution, is high. Excessive lion density may also result in population declines of ungulate prey (e.g. Wegge et al. 2009). It is vital to holistic conservation that wildlife managers can understand and deal with the level of impact that lions exert on other species; particularly those that are elusive difficult to observe, and which face decline if not carefully monitored. To this end, a conservation research initiative in partnership with WildCRU was established on the Bubye Valley Conservancy in 1999.

Based on the number of kills made (du Preez et al. *in prep*.) and the current value of the meat (K. Leathem, *pers. comm*.), the Bubye Valley Conservancy lion population consumes hundreds of thousands of dollars worth of prey each year. These lions are mainly tolerated because of their ability to generate the revenue that helps to offset this expense – although it is estimated that economically it is still not worth keeping the lions whose cost outweighs their value (Funston et al. 2013). If lion hunting were to be banned, based on the economics involved it would become unviable to continue managing the Bubye Valley Conservancy as a wildlife area in its current form, and lions would either have to be re-exterminated (or at least severely reduced via culling), or what is the largest privately owned wildlife area in the world would be converted back into a cattle ranching area (K. Leathem, *pers. comm*.). This is the reality of any business, in that it needs to cover costs and pay staff and cannot run at a loss for luxury of conservation. Childs (1993) states “A refusal to treat wildlife in the same way as other resources and maintenance of centralised protectionist management

prejudices its survival. Only by raising its commercial value will wildlife be able to compete for space on the scarce African landscape. Trade bans which detract from wildlife's commercial value prejudice its chances of survival in the long term."

The USFWS state "Well-managed conservation programs use trophy hunting revenues to sustain lion conservation, research and anti-poaching activities" (http://www.fws.gov/endangered/what-we-do/lion.html – accessed 2015-01-08). The Bubye Valley Conservancy meets each one of these points: clearly contributing to lion conservation with Zimbabwe's largest contiguous population; a long-term conservation research partnership with WildCRU; and with a self-funded anti-poaching unit that protects the world's third largest rhino population (the largest on private land).

The success of the Bubye Valley Conservancy, in terms of both its hunted lion and non-hunted rhino populations, provides the incentive for other areas in the country to sustainably manage their wildlife resource. Although the USFWS understandably categorises lion conservation by country rather than individual properties, the Bubye Valley Conservancy currently and deservedly hunts nearly a third of the total Zimbabwean lion quota. This sport-hunting does not negatively affect the lion population, which remains in positive growth despite the off-take.

RIFA SAFARI AREA – PRO SAFARIS AFRICA

Lion - *Panthera Leo*

Louis Muller

25th January 2016

Rifa Safari Area

Rifa forms part of the Hurungwe Safaris area in the north east of Zimbabwe in the upper Zambezi Valley. The escarpment is the southern boundary and therefore is in the Zambezi valley. Rifa is 615 km2 (Dunham & Mackie 2015)

Rifa boundaries Makuti Safari area to its South, Zambia to its West and North. Nyakasanga Safarir area is located between Mana Pools National Park and Rifa and is Rifa's Eastern Boundary.

Adaptive Lion Quota

Rifa has good prey base for Lion with the following population estimates:

2015	Ground Estimates
Buffalo	646
Lion	68
Hippo	300
Kudu	346
Eland	81
Impala	1829
Bushbuck	139
Hyena	285
Warthog	169
Waterbuck	41
Zebra	68
Sable	0

Population estimates are done with daily game sighting reports done by Professional Hunters and Game scouts.

Lion population is estimated at 68 as of August 2015. This is done with camera traps and spoor count done during the season.

Rifa Safari Area quota has been as follows since Pro Safaris has been the Lease holder

Lion Quota

	2008	2009	2010	2011	2012	2013	2014	2015
Approved Quota	2	2	2	2	2	2	2	2
Quota Taken	2	2	2	2	2	2	0	2

The aged based program was introduced 1st January 2014, where Lions of 5 years or older are to be harvested. In 2014 season the Professional hunters did not feel that they had any Lion males on bait that they could comfortably call 5 years or older. The decision was made by the operator to not take the risk in fear of losing on tag for the following season.

In 2015 both Lions on quota were harvested as PH's became better in ageing and more importantly, Lions matured and numbers increased. The Lions were aged at the annual Lion ageing workshop conducted by ZPWMA and Panthera represented by Dr. P. Lindsey. Both Lions were aged at 5 years old, however Dr. Lindsey indicated that one was on the cusp of 5-6 years. The quota will remain at 2 for 2016.

Human-Lion Conflict

Rifa safari area is surrounded by safari areas and the Zambezi River. Lion – Human conflict is limited to the Border town of Chirundu. The only incident was in 2012 when a woman was killed by a Lioness. The lioness was killed.

Hunting as conservation and Lion contribution

	% of Turnover	
	2014	2015
Turnover	100%	
Elephant contribution	21%	
Lion contribution	12%	
Salaries	19%	
ZPWMA	39%	
Anti-poaching	6%	
Conservation	6%	
Cost Of Sales	6%	
Operating Costs	15%	
Meat	2%	

ZPWMA receive 39% of gross. From this they fund ZPWMA but also their own anti-poaching teams.

6% of gross is spent on anti-poaching funded by the operator to have his own anti-poaching unit, over above the ZPWMA anti-poaching teams. All efforts are co-ordinated by our team. Since there are no communities surrounding Rifa, there is minimal meat poaching. However due to a 48Km Zambezi River border with Zambia, Elephant poaching is rampant. This is due to ease of crossing back across and international border with little persecution. Meat poaching from Zambians is however simply not worth the risk vs the reward. Ivory, however is.

The conservation programs listed at 6% of gross are, water points installation, pipeline maintenance, water pumping, de-silting of water pans and donations in equipment to ZPWMA anti-poaching units.

Wages are at 19% and we employ 14 staff, 10 anti-poaching scouts, 3 Professional hunters, 6 trackers with an average of 5 dependants to each person. Total of 165 dependants. We also have a training program of training 2 staff members each year for a PH license.

Further meat in a Safari area belongs to the operator since there is no community. The meat is used as ration for staff and anti-poaching patrols including ZPWMA Rangers. Each person gets allocated 2kg meat every 6 days. Apart from our staff there will be a minimum of 2 sticks (3 Rangers) in Rifa at

any given time. Totalling to about : 4137kg Meat. Further we donate meat for state functions in order to prevent ZPWMA shooting animals for these functions. This meat comes to about 1000kg p. annum. Lastly all left over meat is donated to the Children's Home (Orphanage) in Karoi. This amounts to about 1000kg p. annum. The total value of meat not sold but rather donated comes to about US$12,250. This would amount to 2% of gross income.

Lion hunts contribute about 12% of total Gross. They are sold on 18 -28 day safaris. Due to not contributing a significant amount of days to the hunting calendar, the loss of Lion hunting will not really have an impact on our Cost of sales. Further operating costs are fixed and so are wages. The loss of Lion hunting would therefore have a 12% loss in gross, however it would leave the operator the choice to lose the existing 9% profit margin, or cut the existing 12% spending on conservation.

Either way, the outcome would have a detrimental effect to the conservation of Rifa Safari area.

USA vs Other markets

Since Pro Safaris has secured the lease in 2008, 12 Lions have been harvested. 9 have been sold to USA hunters vs 3 from other countries. This is 75% of our Lion hunting market. USA hunters is therefore a significant contributor and therefore creates demand far outweighing supply. We estimate we would have to drop our price by a minimum of 30%. This would mean Lion contribution to gross would drop to 8.4%.

This means conservation funding would be cut by 36%.

Rifa Safari area has a small quota on all species. Lion therefore is a major contributor to the conservation of Elephant and the habitat to all species. Even if we have to find other markets, the Loss of the US Hunters will have a major negative impact on the survival of the viability of this area as a wildlife area.

Sport-Hunting and Lion *Panthera leo* Conservation in Zimbabwe

Dr Byron du Preez[†1], Dr Rosemary Groom[‡2], Olivia Mufute[§3] and Roseline Mandisodza-Chikerema[¶3]

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January 31, 2016







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Summary of Steps Taken by Zimbabwe to Improve the Management of Lion Sport-Hunting

i – Banning of all lioness hunting in Zimbabwe
ii – Hunting moratoria around the Gonarezhou and Hwange National Parks
iii – Removal of fixed hunting quotas
iv – Age restrictions on sport-hunted lions
v – Scientifically-based adaptive quota management system

Summary of Lion Sport-Hunting's Contribution to Conservation

i – Lion sport-hunting contributes 33.9% to 42.4% of total revenue on private land
ii – Lion sport-hunting generates up to US$ 557 km^{-2}
iii – Anti-poaching (in particular that of rhinoceroses) costs ∼US$ 216 km^{-2}

Introduction

The United States Fish and Wildlife Service (USFWS) have recently evaluated the conservation status of the lion *Panthera leo* with particular regard to sport-hunting (http://www.fws.gov/endangered/what-we-do/lion.html [accessed 2015-01-19]). The results of this evaluation have led to the formal protection of two subspecies under the Endangered Species Act, classifying *P. l. leo* as endangered and *P. l. melanochaita* as threatened. Together these subspecies apparently represent all of the lions in Africa (Barnett et al. 2014).

Sport-hunting is a legal activity in which the international import/export of trophies is both sanctioned and carefully controlled by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The USFWS found that the sport-hunting of *P. l. melanochaita* "*if well managed, may provide a benefit to the subspecies*" (http://www.fws.gov/endangered/what-we-do/lion.html [accessed 2015-01-19]). Here we explore this statement further, and present data from three long-term *in situ* lion research projects; the Bubye Valley Conservation Research Initiative, Savé Val-

ley Conservancy Research, and the Hwange Lion Research Project.

The data presented in this report clearly illustrates the positive conservation benefit that well-managed trophy hunting of lions can have for the species, as well as the importance of hunting in maintaining the wildlife in an area; addressing Point 5 on page 3 of the Federal Fish and Wildlife Permit Application Form (Form 3-200-20) [i.e. "*Please be aware that the U.S. Fish and Wildlife Service must make a finding that your activities will enhance or benefit wild populations of the species involved. If you have any information that could support this finding (e.g., population status or trend data; how the funds from license/trophy fees will be spent; what portion of the hunting fee will support conservation), please submit such information on a separate page with your application*"].



Figure 1: The lions pictured here, known as Winston (*standing*) and Geronimo (*lying*), were both collared in March 2012 when they were the dominant males in the Matombosa area and have been continuously monitored ever since as part of the on-going long-term WildCRU Bubye Valley Conservation Research Initiative. In November 2015 Geronimo, who was approximately 9 years old, died after succumbing to injuries sustained from fighting with another male. Winston, also 9 years old, has since lost his dominant status, lost his territory to two 4.5 year old males, become nomadic and avoids contact with other males. As of this report being written, the recent litter of cubs that both Winston and Geronimo sired are still alive.

Most importantly, since July 2013 there has been a continuous self-imposed internal reform of the lion hunting industry in Zimbabwe that is actively participated in and supported by all of the relevant stakeholders, including; the Zimbabwe Parks and Wildlife Management Authority (ZPWMA), non-governmental organisations, professional hunters, safari operators, scientists and researchers.

Here we discuss the results of this process in terms of robust evidence regarding the sustainability and self-regulation of lion hunting in Zimbabwe.



Figure 2: Winston and Geronimo's cubs.

Lions – *Panthera leo*

The IUCN Red List have recently reclassified lions as Vulnerable (remaining as such since 1996; IUCN 2015), estimating that there are between 20,000 and 30,000 free-ranging lions left (Bauer et al. 2015a) in less than 25% of their historic range (IUCN 2006). However, this generalised classification does not take into account an apparent conservation dichotomy: sample subpopulations of lions in Botswana, Namibia, South Africa and Zimbabwe have in fact increased overall (Bauer et al. 2015a). Lions were historically present throughout Africa, some of Europe, the Middle East and Asia (Bauer and Van Der Merwe 2004), but current conservation strongholds remain only in parts of eastern

and southern Africa (Brassine and Parker 2012; Nowell and Jackson 1996). The current lion population estimate for Zimbabwe's major lion areas is approximately 2,600 individuals [Hwange-Matetsi Complex: 750, South Eastern Lowveld: 350, Gonarezhou National Park: 60, Malilangwe: 37, Savé Valley Conservancy: 284, Bubye Valley Conservancy: 500, Mid-Zambezi Valley Complex: 600], though the actual number would be larger if there were data available for the countries minor lion areas that are yet to be surveyed] (ZPWMA 2015).

The lion is a uniquely social felid, forming coalitions of up to nine males associated with one or more female prides that may consist of more than 20 individuals (Macdonald et al. 2010; Schaller 1972). Lions are infamously infanticidal (Schaller 1972), where males will kill unrelated cubs so as to bring the female into oestrus and present an opportunity to sire their own litter, which is often used as an argument against sport-hunting of the species (e.g. Packer et al. 2010), where it is feared that the removal of dominant males causes cub mortality that eventually results in lowered population recruitment and survival (Packer et al. 2009). Infanticide, however, does not result from sport-hunting when age-appropriate males, past their prime and no longer territorial or with dependent cubs, are harvested (Whitman et al. 2004). Moreover, the fission-fusion nature of lion society (Mosser and Packer 2009; Pusey and Packer 1987) means that infanticide may still occur when the dominant males are simply not present there and then to defend their cubs (B. du Preez, pers. obs.).

In the 1990's, lions were successfully reintroduced into private areas in parts of their former range, where they achieved high reproductive and survival rates (Miller and Funston 2014). However, the resultant population growth inevitably led to the potential problem of overabundance (Funston 2008) and low genetic diversity (Trinkel et al. 2010), with both of these issues requiring active and intensive management (Hunter et al. 2007) and ultimately reducing the conservation value of these lion populations (Miller and Funston 2014). The ability to translocate lions originally facilitated the relief of overpopulation, but as the available areas for relocations were used up, sport-hunting and euthanasia have subsequently become the main methods of lion population control (Miller and Funston 2014).

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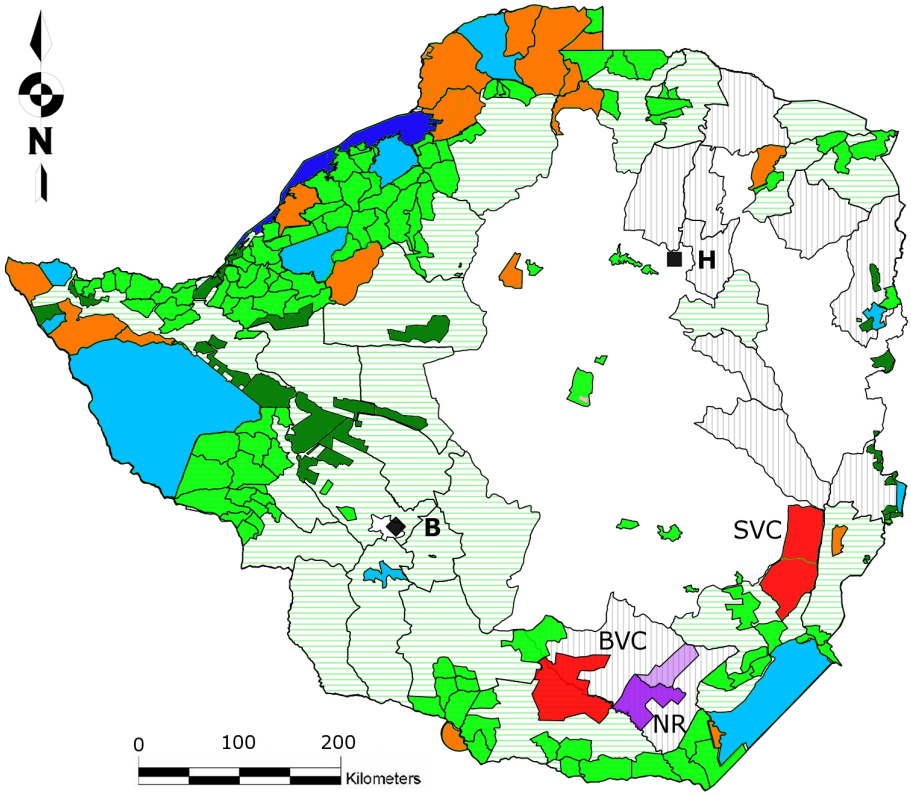

Figure 3: Map of Zimbabwe's main wildlife areas: [*i*] National Parks are represented in light blue; [*ii*] Safari areas are represented in orange; [*iii*] Forestry areas are represented in dark green; [*iv*] Community and Private wildlife areas are represented in light green; [*v*] Communal Land (CAMPFIRE Areas) in which sport-hunting may occur is represented by light green horizontal stripes; [*vi*] Communal Land in which sport-hunting does not occur is represented by grey vertical stripes. [*vii*] The Bubye Valley [BVC] and Savé Valley [SVC] Conservancies are represented in red. [*viii*]The Nuanetsi Ranch [NR] on which sport-hunting takes place is represented in dark purple (light purple represents the Nuanetsi Ranch cattle area); [*ix*] Lake Kariba is represented in dark blue. Harare (the capital city) is represented by a black square and letter '**H**'. Bulawayo is represented by a black diamond and letter '**B**'. Sport-hunting may occur in areas: *ii*, *iii*, *iv*, *v*, *vii* & *viii*

The ability of lions to rapidly increase in abundance is an aspect of their ecology that is often overlooked. Lion populations can achieve exponential growth rates (Miller and Funston 2015; Groom and Watermeyer 2015; du Preez et al. in prep.), and the problems associated with high lion densities fast present themselves and require significant investment in their solution (Hunter et al. 2007; Kettles and Slotow 2009; Loveridge et al. 2007; Packer et al. 2013; Smuts 1978). Whilst unregulated sport-hunting of lions (in particular that of dominant males and pride females) may result in population declines (e.g. Packer et al. 2010; Packer et al. 2009), restricting offtake to only males over

a certain age (i.e. have already bred and/or are no longer dominant) has no impact on lion population persistence, irrespective of quota size (Whitman et al. 2004). Such is the situation currently facing both the Bubye Valley and Savé Valley Conservancies, where the lion populations continue to grow despite sport-hunting and increasing quotas. Whilst sport-hunting may not alleviate over-population in these areas, it does somewhat offset the cost of keeping lions. Culling of lions may be the only realistic option for controlling numbers in larger areas, as the use of contraceptives is likely to be inefficient and expensive. Because of fears about public sentiment associated with sport-hunting, it has now become common practice for managers to cull excess lions in more than 45 wildlife areas in South Africa to which lions have been introduced, and which resulted in the wasteful destruction of about 200 lions in 2012 (Miller and Funston 2014).

Conservation and Sport-Hunting

There is more land area in Africa conserved for hunting than there is in all of Africa's formally protected areas combined: approximately 1.4 million km^2, which exceeds the total area covered by national parks by 22% (Lindsey et al. 2007). For wildlife conservation to be successful outside of national parks, these areas must be self-sufficient and able to generate sufficient revenue to cover the considerable costs of protecting the habitat and wildlife therein (Lindsey et al. 2006). Indeed, conservation would benefit from an incentive to utilise land for wildlife rather than the alternatives of livestock grazing, agriculture, and deforestation.

The international trade of lions, including trophies, is controlled by a strict CITES licensing system on the basis that this trade does not endanger the ultimate survival of the population (https://www.cites.org/eng/disc/how.php [accessed 2015-01-19]). The positive aspects of sport-hunting as a conservation tool include a focus on males and a low percentage off-take; neither of which generally jeopardise populations, and also suggest that hunting could play a role in population recovery (Leader-Williams et al. 2005).

The recommendation of setting uniform harvest limits, e.g. 1 lion 2,000 km^{-2} (Lindsey et al. 2012; Packer et al. 2010), may be overly simplistic, affect the economics of wildlife based landscape use, and disincentivise investment in conservation (Lindsey et al. 2007). A more practical approach to sustainably setting realistic lion sport-hunting quotas could involve using a positive/negative feedback method that calculates a fluid quota per area based on the previous season's performance. Such an adaptive quota management system has already been implemented in Zimbabwe.

Zimbabwe's Adaptive Lion Quota Management System

An adaptive quota management system for lion hunting based on the ages of lions hunted was agreed on in July 2013 in Harare, Zimbabwe, during a meeting hosted by the Zimbabwe Parks and Wildlife Management Authority (ZPWMA) and an independent non-governmental conservation organisation. The points system is summarised in Table 1.

Table 1: *Points allocated to hunting blocks arising from the harvest of lions of different ages*

	≥ 6 years	No trophy	5 years old	4 years old	< 4 years	Failure to submit return, or incomplete return
For quotas of ≥3	4	3	3	2	-3	0
For quotas of 2	4	3	3	2	0	0
For quotas of 1	6	3	3	2	0	0
Resultant quota	*These points are added up and divided by 3 to yield the quota for next year*					

During 2013, operators were requested to submit hunt returns and photos as a trial run to get the system up and running. In 2014 operators were requested to do the same but were informed that the age of the lions hunted in 2014 would determine their lion quotas in 2015. The 2015 lion hunt results would thus also determine the 2016 quota.

Results of the Adaptive Lion Quota Management System

In 2015 there was a marked increase in the age of lions hunted in Zimbabwe as a whole. Notably, only one lion of <4 years of age was hunted and the large majority of lions were 5 years or older (Figure 4). In 2013, only 28% of the lions hunted were 5 years or older, in 2014 that figure had risen to 49% and in 2015 to 77.3% (Figure 5). The proportion of lions hunted that were less that 5 years of age dropped overall between 2013 and 2015 (Figure 6). For this achievement, credit is due to the hunting community for showing greater selectivity of harvest. A word of caution however, is that the majority of lions hunted were on the cusp of 5 - 6 years of age and were not older than six years. Restricting hunting to individuals that are at least six (and preferably older) is desirable from a biological perspective due to the reduced risk of the loss of pride males and infanticide of cubs associated with the harvest of such individuals (Whitman et al. 2004).

In 2015 the Zimbabwe national lion hunting quota was set at 85 lions. Of this 85, only 39 were hunted in 2015, and based on the resultant score from aging the trophies, and the fact that operators chose not to hunt lions of inadequate age (see Figures 4, 5 & 6), the recommended quota for 2016 was set at 75 [Harare 2015-11-11]. (The Rural District Council areas in which lions occur are currently exempted from the age restrictions, as was agreed upon at the 2013 lion management meeting in Harare, as a means of ensuring that impoverished communities obtain the opportunity to benefit from the presence of lions, recognising the potential negative impacts the species has on the livelihoods of livestock farmers).

Using these figures and estimating the average value of a lion safari at approximately US$ 80,000 then a 50% offtake (35 lions) would generate US$ 2,800,000 annually. If management costs are approximately \$150 km^{-2} (V. Booth, pers. comm.), then the lion safaris alone can support 18,600 km^{-2} of wildlife habitat in Zimbabwe.

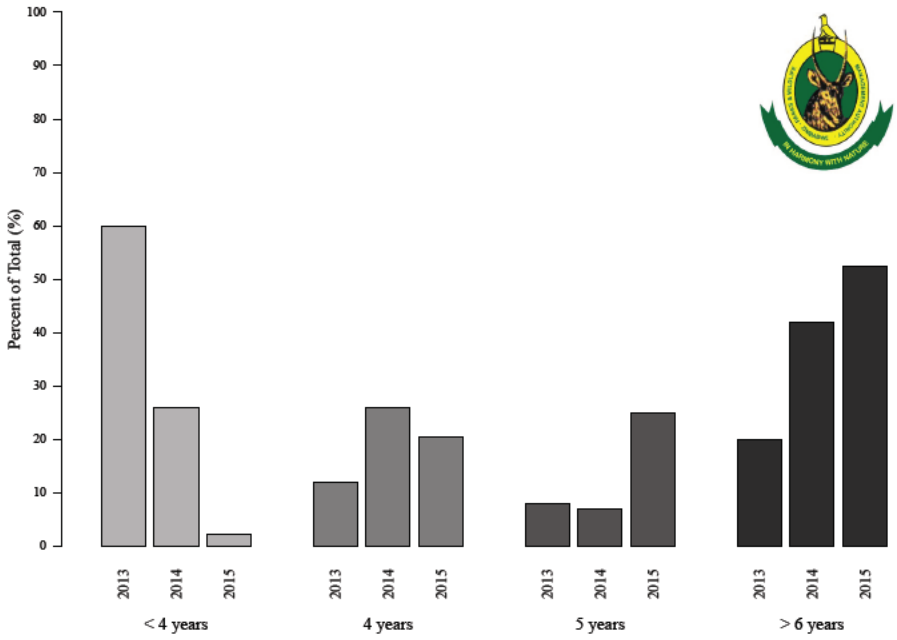

Figure 4: The percentage of lions hunted in each age class in 2013, 2014 and 2015 in Zimbabwe.

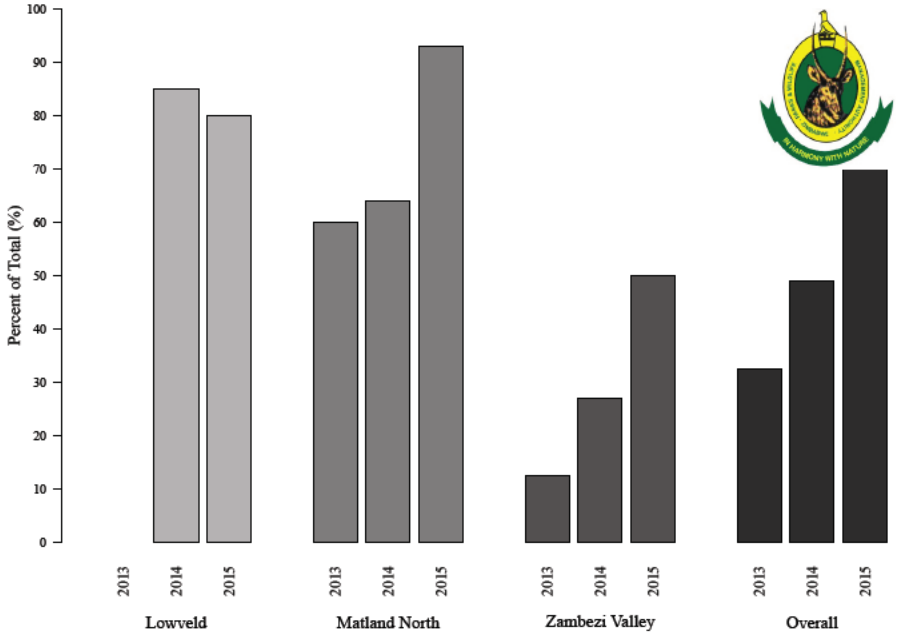

Figure 5: The proportion of lions hunted that were 5 years or older in the three main lion-hunting areas of Zimbabwe.

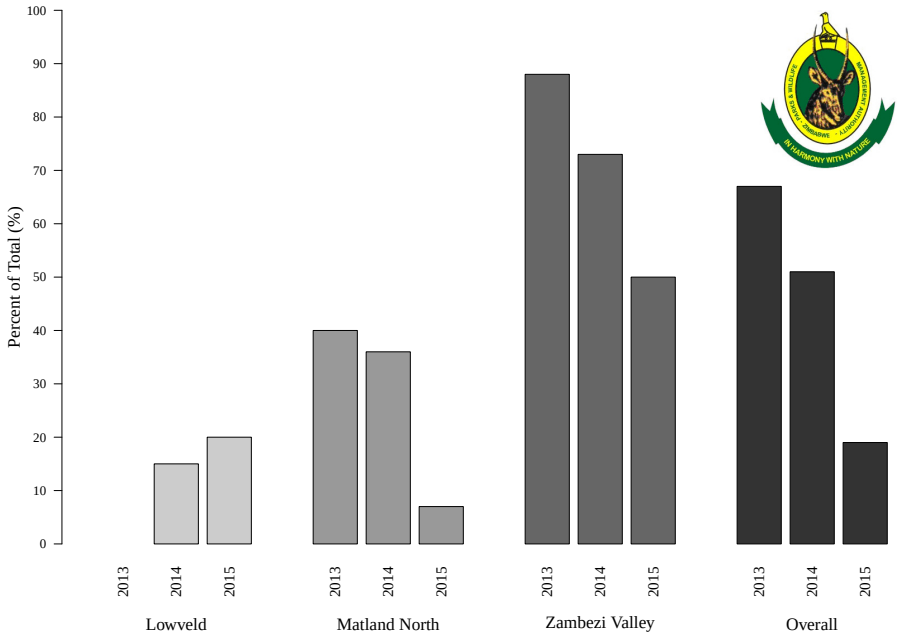

Figure 6: The proportion of lions hunted that were less than 5 years of age in the three main lion-hunting areas of Zimbabwe.

Table 2: *Human and Lion Conflict (2009 - 2011) in Zimbabwe, including human mortality caused by lion (CAMPFIRE Association, 2012)*

District	Total incidents	Livestock killed	*People Injured*	*People Killed*
Hurungwe	5	1	*2*	*2*
Chiredzi	25	136	*0*	*0*
Mbire	5	7	*0*	*5*
Binga	9	39	*0*	*0*
Total	**44**	**183**	***2***	***7***

Human-Lion Conflict

The lion is a flagship species and powerful symbol of Africa; yet living with lions poses hardships for many communities (e.g. Table 2). In some areas, the lion is a major predator on domestic livestock, inevitably leading to conflicts with local herders. Both sides suffer in this situation.

Outside of protected areas, the lion's prey base is much reduced, which results in relatively greater chance of encountering livestock. Co-existence of lions with people may be enhanced by giving value to lions through tourism and hunting promoted in communal lands under the Communal Area Management Programme for Indigenous Resources (CAMPFIRE). This hunting contributes to the conservation of lions via the financial revenue generated, which is ploughed back into conservation of the resource and empowers local communities to invest in their own rural development programs.

The Bubye Valley Conservancy

History of the Bubye Valley Conservancy

Towards the end of the nineteenth century, the Liebig's Extract of Meat Company (LEMCO) founded an extensive cattle ranch in the Zimbabwean lowveld, to the detriment of the indigenous wildlife that was initially eliminated because of competition for grazing with the livestock, as well as a risk of disease transmission from buffalo and wildebeest *Connochaetes taurinus*. As their natural prey base became depleted, the predators were subsequently persecuted when they began to prey on the livestock. Some wildlife persisted in small pockets of remote habitat, however lion, elephant *Loxodonta africana*, buffalo and rhinoceros *Diceros bicornis* [black] & *Ceratotherium simum* [white] were all completely eradicated. A monoculture of cattle dominated the landscape and impacted on the environment for the better part of a century.

Then, in 1992, Zimbabwe suffered one of the worst droughts on record, a relatively short time after the devastating one of 1983 that LEMCO was still trying to recover from. The frequency and severity of the droughts effectively reduced confidence in the economic viability of cattle ranching in the area, and the Bubye Valley Conservancy was subsequently founded in 1994 with the realisation that endemic wildlife, which are better adapted than livestock to cope with the local climate, could be successfully commercialised (Child 1988; Bond 1993).

The conversion from cattle ranching back to a wildlife area was neither straightforward nor cheap, requiring a significant initial investment and annual running costs. In just 20 years of operation the Bubye Valley Conservancy now protects the world's third largest black rhinoceros population, one of Zimbabwe's largest lion populations, a large and increasing elephant population, and abundant game.

Sport-hunting is an essential step in converting areas that were previously dedicated to livestock farming into non-consumptive tourism areas (Child 1993), and was fundamental to the formation of Bubye Valley Conservancy and allowing the wildlife populations to recover. The Samanyanga area of the Bubye Valley Conservancy, probably the most scenic section, was originally set aside for non-consumptive photographic tourism, but made an annual loss for several years, before, largely due to Zimbabwe's land reform program and resultant instability in the country, it was reverted back to sport-hunting as the only practical and economically viable option (K. Leathem, pers. comm.). Sustainable sport-hunting provides the sole economic incentive to continue operating the Bubye Valley Conservancy as a wildlife conservation area.

Bubye Valley Conservancy Community Support

The Bubye Valley Conservancy donates over 45 tonnes of meat from sport-hunting to the local communities each year. This meat donation is worth over US$ 100,000 per year, and the communities are free to decide how they use it. In addition to this, the Conservancy also supports several schools, clinics, and community projects in the three surrounding districts of Mwenezi, Maranda and Jopempe. The local community thus

sees a direct benefit from the wildlife on the Bubye Valley Conservancy, but is also empowered by job opportunities created both with these special projects, as well as on the Conservancy. A summary of the Bubye Valley Conservancy community support effort between 2011 and 2015 is provided in Table 4.

Bubye Valley Conservancy Lion Monitoring and Management

After originally being eradicated by cattle ranchers in the area, 13 lions were reintroduced to the Bubye Valley Conservancy in 1999, and four young males broke into the Conservancy that same year. From the original 17 animals present in 1999, the Bubye Valley Conservancy lion population was estimated at approximately 280 individuals in 2009 when robust population surveys were initiated by a research team from the University of Oxford Wildlife Conservation Research Unit (WildCRU), and this population has continued to grow. Today it is estimated that there are over 500 lions on the Bubye Valley Conservancy (du Preez et al. 2015). The exponentially increasing Bubye Valley Conservancy lion population currently exists at one of the highest densities in Africa (∼0.187 lions km^{-2}: du Preez et al. 2015; Figure 7), greater than that of the Serengeti, Tanzania (0.100 lions km^{-2}: Pusey and Packer 1987; Spong 2002), Selous, Tanzania (0.080 - 0.130 lions km^{-2}: Creel and Creel 1996, 1997), Kruger National Park, South Africa (0.096 - 0.112 lions km^{-2}: Mills 1995), and Hwange National Park, Zimbabwe (0.027 lions km^{-2}: Loveridge et al. 2007). This equates to one of the largest contiguous lion populations in Zimbabwe.

Bubye Valley Conservancy Lion Hunting

The Bubye Valley Conservancy offsets the cost of lion predation on its wildlife via sport-hunting of the species, and which began in 2002. In 2014, the lion hunting quota allocated to the Bubye Valley Conservancy by ZPWMA was 10 individuals. Based on the fact that the entire quota was harvested and that maximum points were scored for each individual trophy (more than six years in age), the allocated quota was raised to 13 lions for 2015. Only 12 out of 13 lions were hunted in 2015 due to a late cancellation; nevertheless eight lions over six years old and four lions of five years old were harvested and the resultant points justifying a quota of 15 lions for 2016.

Table 3: *The Bubye Valley Conservancy annual lion hunting quota and offtake from 2002 to 2015.*

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Approved quota	1	2	3	2	2	2	3	3	5	8	12	10	10	13
Quota taken	1	2	3	2	2	2	2	3	5	8	12	10	10	12
Percentage success	100	100	100	100	100	100	67	100	100	100	100	100	100	92

Note that while the lion hunting quota for Zimbabwe has been voluntarily reduced by the national steering committee, the Bubye Valley Conservancy lion hunting quota has been successively raised twice based on both hunt success and age of lions hunted and the resultant points scored under the national adaptive quota management system (Table 3).

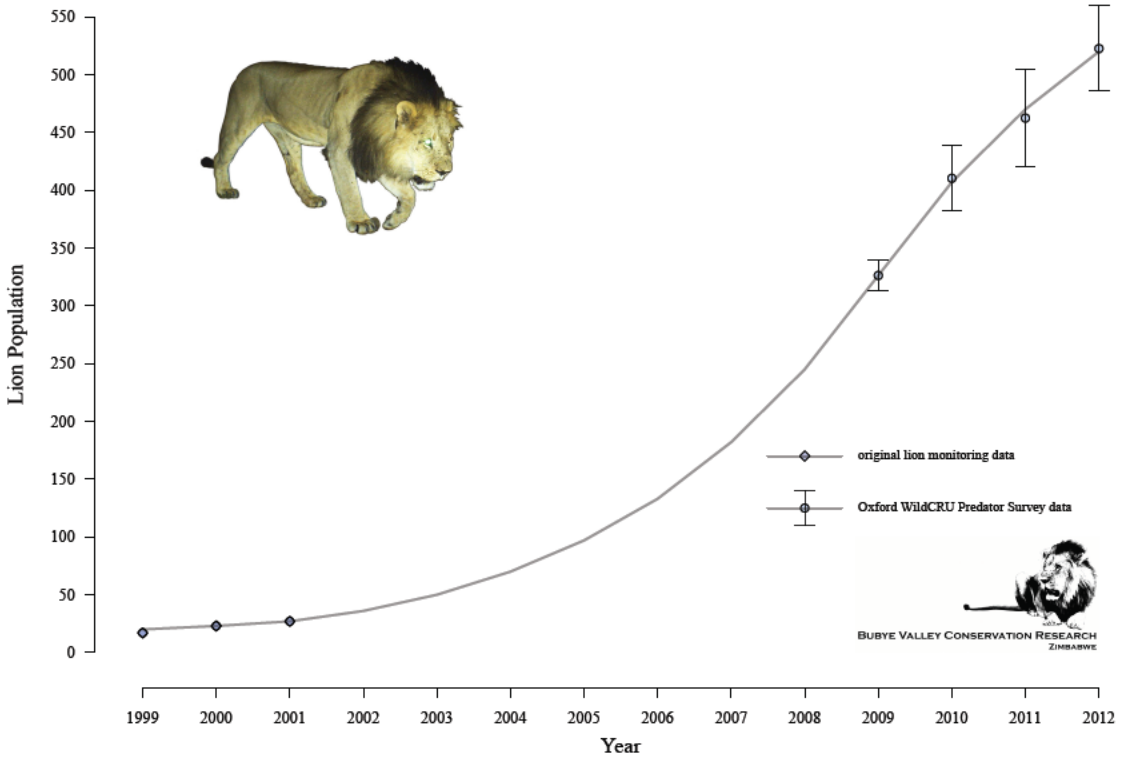

Figure 7: The Bubye Valley Conservancy lion population has grown exponentially since the reintroduction of lions in 1999. Diamonds represent the known lion abundance from monitoring of the original individuals introduced; Points indicate lion abundance calculated from spoor transect analyses; error bars represent the standard error of the mean.

Table 4: *Summary of the Bubye Valley Conservancy support to the surrounding local communities (2011 - 2015)*

Boreholes:	- 1 x Jompembi Village 2 - 1 x Penemene - 1 x Jompembi Village 4 - 1 x Nyimani village (Mwenezi) - 1 x Driehoek School - 1 x Mgaladhivha School - 2 x Mtetengwe to supply water to the clinic site - 2 new bush pumps (complete) purchased and installed at Village 2 & Village 3 and troughs built at both sites *Drinking trough for cattle built at Village 2 borehole* *All boreholes equiped with new bushpumps, piping and cylinders* *Boreholes at Village 3, Mtetengwe, Mdzwiti, Vumani and Penemene and Makado Police post repaired and maintained* *All new piping and pumps etc. are supplied by BVC*
Buildings:	- Mtetengwe Clinic's main building built - 3 x F13 staff houses built *Clinic and House fenced - everything funded and built by BVC* *The clinic is a standard large Government clinic - male & female wards + maternity ward and outpatients* *Storerooms, offices etc. also built* *All houses and buildings are electrified, painted and supplied with running water* - Mtetengwe School school office block and staff room built and painted *All classroom windows repaired and the schools second borehole repaired.* - Secure engine house was built at the second borehole site - Borehole equipped with BH15S mono pump unit driven by a rebuilt Lister LT 1 engine - 5000 litre header tank and stand errected - new 5000 litre header tank purchased and fitted - pipeline laid to connect the borehole to the clinic - another pipeline connected to the same borehole to supply the Mtetengwe school with fresh water - New coldroom and refrigeration unit purchased and fitted at the Lutumba butchery *Part of aid program to get the Beit Bridge RDC self funding projects up and running* - New coldroom and refrigeration unit was purchased and fitted at the Rutenga butchery *Part of aid program to get the Mwenezi RDC self funding projects up and running*
Meat Donations:	- BVC donates meat on a regularly basis to the Mwenezi Orphange - Numerous donations of meat were made to support school sports days & speech nights/prize giving events *Both Beit Bridge & Mwenezi districts* - 1600 kgs of meat has been donated each month since July 2011 to a Maranda trust *Administered by Chiefs andlocal headmen* *Excess meat sold and funds used for community projects* *Classroom roof replaced at Vhongwe school* *4 new classroom blocks constructed at other schools using funds from these monthly allocations* - 1000 kgs of meat per month is been donated to Beit Bridge communities since April 2014 - 1000 kgs of meat per month is been donated to Mwenezi communities since August 2013
Miscellaneous:	- Sports uniforms for the Penemene school team purchased ($2600) *Sports uniforms required for inter-schools sports* - Transport the soccor teams representing Mgaladivha, Jompembi and Tongwe *To Lutumba for the inter-school competitions* - 2 sets of soccer goal posts & 2 sets of Netball poles were made for Mgaladivha School *New soccer field graded by BVC* - 2m security fencing supplied to Penemene School - Second hand door and window frames donated to Mapiri school (ex Mazunga School) - 1 new 3 1/2 " rod pump cylinder was purchased and fitted to the Vumhani borehole *All repairs to b/holes in the Vumhani area are done by BVC* - 26 bags of cement were donated to Mgaladivha School - Fencing donated to the Mgaladivha School - Supplied 10 x 5/8" mono shafts for the Botalele Clinic (Maranda) borehole - Water supply to Mlelezi Clinic - 400 m pipeline laid to supply the Nyimani Villarge's cattle with water *3.5 m drinking trough build for this same project* - 60 bags cement donated to the Welkom for repairs to a dam wall - 6 loads of riversand and 20 cement donated to Vumani Preschool - Various school renovations in both the Beit Bridge and Maranda areas
Current Projects:	- Construction of a School admin block at Mgaladhivha School - Supply of 24 loads of riversand to Mdzwiti School (value $1200) - All roofing materials supplied to Mdzwiti School - Supply roofing materials, cement, all window and door frames for Vumani Preschool

The Savé Valley Conservancy

History of the Savé Valley Conservancy

The Savé Valley was a wildlife-rich wilderness until the early 1900's, when the first cattle ranching initiatives started in the area. The establishment of Devuli Ranch and Angus Ranch in 1920 paved the way for seven decades of commercial cattle ranching in the area we know today as the Savé Valley Conservancy. Roads were cut, fences erected and an everlasting 'battle' ensued against the wildlife, especially against all predators.

The large predators, especially lions, were virtually eradicated (Pole 1999). However, by the late 1980's, declining range productivity, depressions and droughts forced the landowners to consider alternative options. Around that time, empirical evidence of the competitive advantage of wildlife over livestock began to emerge (Child 1988; Bond 1993), especially in arid areas (Jansen et al 1992; Cumming 1993), and wildlife was finally given serious consideration as a viable land use option.

In 1989, a proposal was drawn up (du Toit 1989) to turn what was then the Sabi Valley Intensive Conservation Area into a wildlife conservancy. The plan was to create a single large wildlife area, especially for the re-establishment of endangered species and overexploited species, with cattle remaining the primary income generator. The Savé Valley Conservancy was constitutionally inaugurated in June 1991, and following the severe 1991/1992 drought, wildlife ranching became the primary land-use. At the time this was the largest private wildlife conservancy in the world (3,410 km^2).

The conservancy members then restocked the wildlife, removed all internal fencing, erected a common perimeter fence and developed effective security systems. A double, electrified, veterinary-approved fence was completed in 1995, and the following decade saw a massive investment in wildlife re-stocking and security systems.

Sport-hunting was essential for the successful transition of the conservancy from cattle to wildlife. During the early years, wildlife densities were low, resulting in poor potential for ecotourism, and hunting generated the income needed to erect the fence, re-stock game, and improve security, especially because of the significant numbers of black rhinoceros now found there. Gradually, some of the ranchers shifted more into ecotourism. One property, Senuko Ranch, completed a 16 bed up-market lodge with a view of marketing non-consumptive safaris, offering game drives and bush walks and specializing in rhino walks and African wild dog *Lycaon pictus* den visits. Lodge occupancy rose from 0% in 1996 to 62% by the end of 1999.

However, the Zimbabwean land reform program, which was initiated in February 2000, soon made a strong negative impression in the international community, and resulted in travel bans and warning from most of Zimbabwe's source markets. This, together with the political instability meant that the wildlife industry and ecotourism industry collapsed over-night: sport-hunting became the only economically viable land use option, and has remained the only tangible source of income to the landowners of the Savé Valley Conservancy. In the case of the Senuko Lodge, for example, the land reform program resulted in a 98% cancellation of

the confirmed bookings. After four years of seeking alternative markets, the lodge could achieve no higher than 17% occupancy, and in 2005 moved back into a hunting-based operation.

A more direct impact of the land reform program for the Savé Valley Conservancy was the loss of 33% of the area of the conservancy to invading subsistence farmers (Lindsey et al 2008). The loss of land was catastrophic and the related pressure from wire snare poaching was extreme. In the following eight years (2001 to 2009), 10,520 illegal hunting incidences were recorded, 84,396 wire snares were removed and at least 6,454 wild animals killed (Lindsey et al. 2011).

Savé Valley Conservancy Community Support and Anti-Poaching

In 2012, conservancy members provided over US$ 100,000 worth of support to adjacent villages or farmers in the resettled areas. Assistance included drilling boreholes, maintaining boreholes, dredging of dams, assisting with building projects in clinics and schools, assisting with repairs, maintenance and materials at schools, education initiatives, school field trips, provision of computer equipment in schools, craft programs and regular donations of meat.

Moreover, the conservancy recently entered into a mutually dependent agreement with the Chiefs representing the communities surrounding the Savé Valley Conservancy. The agreement links the communities to the Natural Resource Utilisation that occurs through the business operation of the conservancy and opens up opportunities for the local indigenous populations to share in any wealth creation. This agreement strengthens relations between the conservancy and the surrounding local communities and creates an environment that helps to protect, conserve and sustain the natural assets of the area. The hunting tourism of the conservancy is currently the only form of income by which the surrounding communities can benefit. Revenues from trophy lion hunting constitute a significant portion of inflow and thus an important part of the community benefits. Any reduction would seriously jeopardise the growth of this infant positive relationship and community empowerment initiative.

The Savé Valley Conservancy is thus pioneering private-community partnerships in Zimbabwe, and trade restrictions on lion trophies will indirectly adversely affect these already seriously impoverished communities through a reduction in available income to share with communities. This is very likely to have a knock on impact on the lions themselves with a significantly reduced tolerance and an increase in retaliatory poisoning of lions for livestock predation. Without a demonstration of income from lions, the political pressure from the surrounding communities to remove them from the conservancy altogether will be a challenge to resist.

Savé Valley Conservancy Lion Monitoring and Management

After the Conservancy was formed, and persecution stopped, lions, mainly males, recolonized the area and their numbers started to increase in the late 1990's / early 2000's. Few lionesses were observed until 2003, when small family groups and male-female pairs were seen, and by 2004 - 2005 there were some reports of cubs. During this period 13

lions were also reintroduced into the Savé Valley Conservancy. After an initial lag phase the lion population on the Savé Valley Conservancy has increased dramatically and at present is growing exponentially (Figure 8; Groom and Watermeyer 2015).

Monitoring of the lion population began in 1999 (Pole 1999) with track index or call-up surveys being conducted sporadically until 2006. From 2007 to present, annual conservancy-wide track index surveys have been conducted using a standardized methodology (Groom and Watermeyer 2015). The resulting population estimates were verified in 2011 by a baited lion call-up survey and a collation of managers' estimates, all of which provided similar results.

Prey availability models (Hayward et al. 2007) suggest that the carrying capacity for the lion population in the Savé Valley Conservancy is approximately 271 lions. The population estimate for 2015 was 284 lions, suggesting lions have reached their ecological carrying capacity, even whilst being responsibly hunted.

A professional lion management plan was commissioned by the conservancy in 2011 (Funston 2011), to provide the Savé Valley Conservancy members with a science-based plan to help them ethically and sustainably manage their lion population. This plan specifically advocates the use of hunting as a conservation management tool. It also demonstrates willingness by the conservancy to guide their lion management based on science and advice from professionals.

Savé Valley Conservancy Lion Hunting

Lions have been hunted in the Savé Valley Conservancy since 2002, although that was largely for removal of problem animals. Hunting began properly in 2005 with quotas increasing annually to a maximum of seven per year from 2009 onwards (Table 5), with the quota being raised to ten for 2016 based on trophy ages.

Despite offtakes of lions through sport-hunting, the lion population has continued to increase in the Conservancy. The revenue generated from hunting lions has enabled landowners to invest in proper land management, anti-poaching, water provision and fence maintenance, all of which benefit the lion population (especially as lions seem to be vulnerable to being caught in wire snares; Becker et al 2013; R. Groom, pers. obs.).

Table 5: *The Savé Valley Conservancy annual lion hunting quota and offtake from 2002 to 2015.*

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Approved quota	5	5	1	3	3	4	6	7	7	7	4	2	3	5
Quota taken	1	0	1	3	3	3	3	6	5	3	4	1	3	5
Percentage success	20	0	100	100	100	75	50	86	71	43	100	50	100	100

Sport-hunting of lions brings considerable revenue to the Conservancy, revenue that is vital for the continued functioning of the area for wildlife conservation. Without the costs of lions being offset by the income from sport-hunting, landowners cannot reasonably be expected to tolerate such high lion densities, and their numbers would have to be reduced significantly.

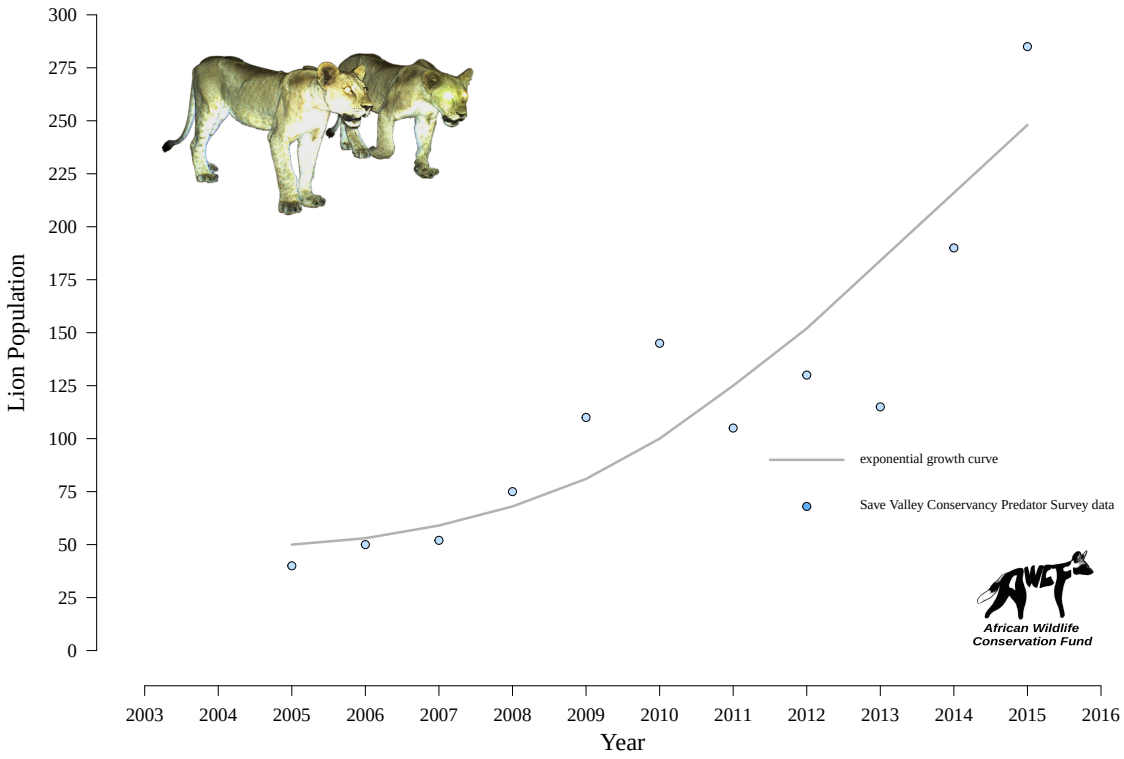

Figure 8: The Savé Valley Conservancy lion population, like that of the Bubye Valley Conservancy, has grown exponentially. Points indicate estimated lion abundance calculated from field surveys; the line represents the exponential growth curve.

The Pros and Cons of Conserving Lions

The saturation of lions in wildlife areas on both state and private land is positive for their future conservation security; but it is also critical to that of incidentally conserved endangered species, such as both species of rhinoceros on private wildlife conservancies in Zimbabwe (Lindsey et al. 2009; Suzuki 2001), which benefit from the same resources and protection that are incentivised and provided by the revenue generated from sport-hunting. The Bubye Valley Conservancy now boasts the world's third largest black rhinoceros population (N. Anderson [Lowveld Rhino Trust], pers. comm.), which is classified as Key 1 by the African Rhino Specialist Group and means that this population is considered key to the overall survival of the species. The Savé Valley Conservancy has the second largest black rhinoceros population in Zimbabwe after Bubye. These are not coincidences. These rhinoceros (and other endangered species, such as wild dog) strongholds are the result of the incidental conservation benefits derived entirely from sport-hunting activities - there are no photographic tourists visiting either the Bubye Valley or Savé Valley Conservancies, and the rhinoceros are not hunted. Having rhinoceros on the land therefore generates no revenue - and in fact there is a significant cost associated with protecting these animals; US$ 590,000 (not including incentive and reward bonuses donated for these purposes) was spent on anti-poaching by the Bubye Valley Conservancy during 2015 (K. Leathem, pers. comm.), and US$ 546,000 is spent annually on anti-poaching by the Savé Valley Conservancy (Lindsey et al. 2012). This expense is covered mainly by the revenue generated by sport-hunting with additional donations from the clients; and most importantly, the habitat for the rhinoceros is preserved by maintaining the land as a conservation area, as opposed to converting it into agricultural or grazing land for example.

However, the high densities of lion populations achieved within commercial wildlife areas have the potential for intense intraguild persecution. Lions are aggressively competitive, and research on the relationship between lions and leopards has shown that high densities of lions can negatively affect leopard population density, demographic structure, cub survival, and spatial ecology down to even the step-wise decisions that leopards make regarding habitat use and behaviour based on both the actual and potential risk of encountering lions (du Preez 2014; du Preez 2015). Leopards are a generalist species that are able to cope with persecution by adapting their behaviour and ecological niche, and even they suffer under a burgeoning lion population; ecological specialists and endangered species, such as cheetah *Acinonyx jubatus* and wild dog, do not fare nearly as well under such intense competitive pressure. In fact, competition with lions has been directly linked to reductions in cheetah (e.g. Durant 1998, 2000; Laurenson 1995) and wild dog (e.g. Creel 2001; Creel and Creel 1996; Vucetich and Creel 1999) densities, both of which face local extinction where lion abundance, and the respective level of persecution, is high. Excessive lion densities may also result in population declines of ungulate prey (e.g. Wegge et al. 2009). It is vital to holistic conservation that wildlife managers can understand and deal with the level of impact that lions exert on other species; particularly those that

are elusive difficult to observe, and which face decline if not carefully monitored. To this end, a conservation research initiative in partnership with WildCRU was established on the Bubye Valley Conservancy in 2009, and research conducted on the Savé Valley Conservancy since 2007.

Based on the number of kills made (du Preez et al. in prep.) and the current value of the meat (K. Leathem, pers. comm.), the Bubye Valley Conservancy lion population consumes hundreds of thousands of dollars worth of prey each year. These lions are mainly tolerated because of their ability to generate the revenue that helps to offset this expense - although it is estimated that economically it is still not worth keeping the lions whose cost outweighs their value (Funston et al. 2013).

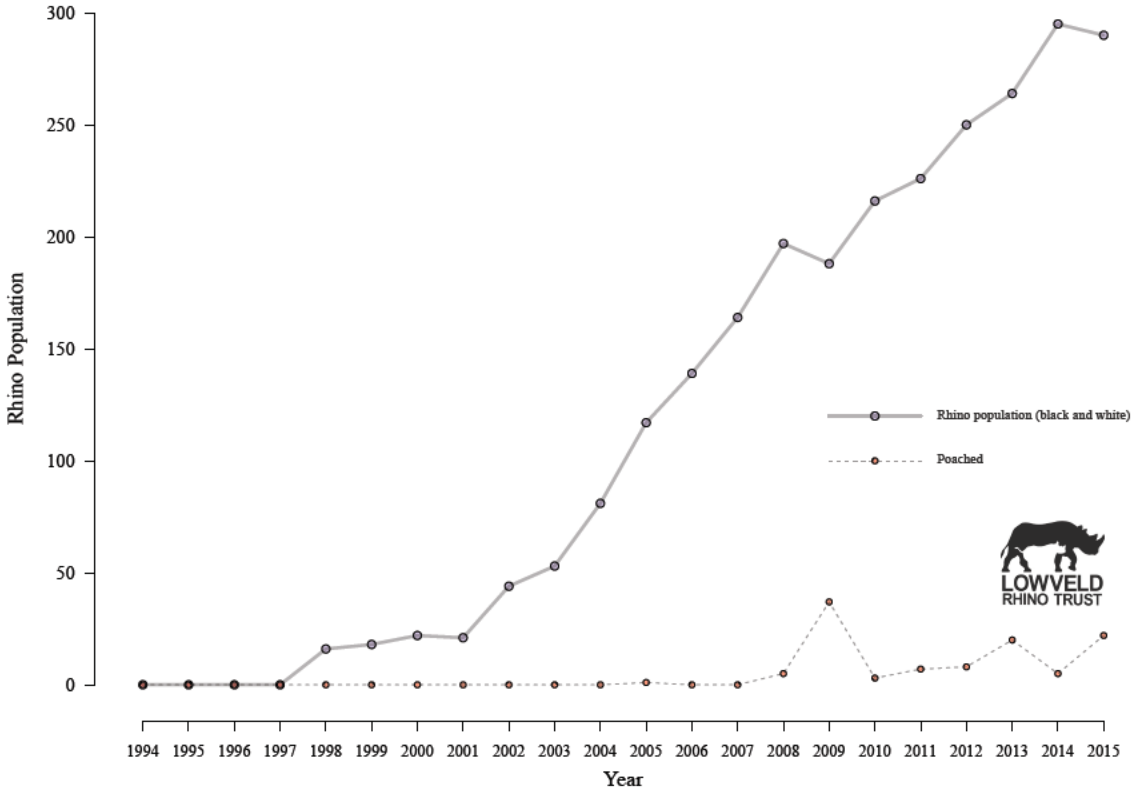

Figure 9: The Bubye Valley Conservancy black rhino population is rated as Key 1 by the African Rhino Specialist Group which means that the population is considered key to the overall survival of the species.

Where the Money Goes: The Finances of Lion Sport-Hunting and Reinvestment in their Conservation

Break-down of the finances involved in a typical lion hunt on the Bubye Valley Conservancy:

Lion Trophy fee: US$ 42,000
Lion Hunt Daily rate: US$ 2,950 day^{-1}
(Minimum lion hunt duration: 18 days [*total daily rate of US$ 53,100 lion hunt^{-1}*])

Additional costs include:
ZPWMA scout
Observers
Bait used
Other trophy species taken during the lion hunt, etc.
[*These additional costs average approximately US$ 6,500 lion hunt^{-1}*]

Bubye Valley Conservancy - Lion Sport-Hunting Revenue Generated (2015):

((18 days × 2,950 day^{-1}) + 42,000 trophy fee + 6,500 additional costs) × 12 lions
= **US$ 1,219,200**

Lion sport-hunting therefore represents approximately 33.9% of the Bubye Valley Conservancy's total annual revenue generation (which includes post-hunt meat and hide sales).

All of the revenue generated from lion sport-hunting on the Bubye Valley Conservancy has gone back into the running costs of the Conservancy, which is all part of conservation, and which includes: anti-poaching and fence monitoring and maintenance (approximately US$ 506,000 year^{-1}), research (approximately US$ 34,700 year^{-1} not including client and sponsor donations), and community support assistance (approximately US$ 210,000 year^{-1}).

[*No profit after costs has been declared, nor dividends taken by shareholders, since the Bubye Valley Conservancy was formed in 1994. All revenue generated to date has been spent on running costs, improvements and restocking.*]

Discussion

Here we have shown that since their reintroduction after historical eradication, both the Bubye Valley and Savé Valley Conservancies' lion populations have increased exponentially - not despite sport-hunting, but because of sport-hunting and the incentive it provides for protection.

The success of the Bubye Valley and Savé Valley Conservancies, in terms of both of their hunted lion and non-hunted rhinoceros populations, may also provide the motivation for other areas in the country to sustainably manage their wildlife resource. A case in point is the Nuanetsi Ranch, a wildlife area that is also a legacy of failed cattle ranching, located almost directly between the Bubye Valley and Savé Valley Conservancies in Zimbabwe (Figure 3). At present there is a single lion on the Nuanetsi Ranch but management is not able to justify introducing more due to the current uncertainty over the future of lion hunting (B. Lees-May [Nuanetsi Ranch Conservator], pers. comm.). The Nuanetsi Ranch is a wildlife area of 1,489 km^2, and could conceivably sustainably hold between 201 and 278 lions (based on the most recently estimated lion densities of the Savé Valley [0.135 lions km^{-2}; Groom and Watermeyer 2015]; and Bubye Valley [0.187 lions km^{-2}; du Preez et al. 2015] Conservancies respectively). However, the Nuanetsi Ranch has invested in building up an abundant wildlife population, which is sport-hunted, and the management will not risk losing a significant amount of valuable game, that could otherwise be sold as trophies or meat, to a species from which it can not recuperate lost revenue, and instead that requires further investment in control measures (B. Lees-May [Nuanetsi Ranch Conservator], pers. comm.).

Between 2005 and 2015 the United States market has represented 70.4% of the total Zimbabwean lion sport-hunting industry (http://trade.cites.org/en/cites_trade/ [accessed 2015-01-19]), though in reality it constituted over 90% for both the Bubye Valley and Savé Valley Conservancies. If this market was effectively lost due an inability of prospective clients to import their trophies, based on the economics involved it would become unviable to continue managing the Bubye Valley Conservancy as a wildlife area in its current form, and lions would either have to be re-exterminated, or at least severely reduced via culling; or else what is the largest privately owned wildlife area in the world would be converted back into a cattle ranching area (K. Leathem, pers. comm.). This is the reality of any business, in that it needs to cover costs and pay staff and cannot run at a loss for luxury of conservation. Child (1993) states "*A refusal to treat wildlife in the same way as other resources and maintenance of centralised protectionist management prejudices its survival. Only by raising its commercial value will wildlife be able to compete for space on the scarce African landscape. Trade bans which detract from wildlife's commercial value prejudice its chances of survival in the long term*".

Although the USFWS understandably categorises lion conservation by country for simplicity, rather than individual properties, the Bubye Valley and Savé Valley Conservancies currently and deservedly hunt more than a third of the total Zimbabwean lion quota between them. Here we have shown that this sport-hunting does not negatively affect the lion population, which remains in positive growth despite off-take. In addition

to this, other areas, such as the Nuanetsi Ranch, could be incentivised to invest in lion conservation if the ability to sustainably utilise the lions as a resource was guaranteed.

The USFWS identified five primary factors that threaten lion survival in the wild, namely: habitat loss; loss of prey; retaliatory killing due to increased human-lion conflicts; inadequate regulatory mechanisms; and weak management of protected areas (http://www.fws.gov/endangered/what-we-do/lion.html [accessed 2015-01-19]). Each and every point on this list, which notably does not include sport-hunting, supports the fact that incentivising tolerance for lions through sustainable use would enhance the species' overall survival.

As responsible conservationists, we are not arguing against tight regulation of sport-hunting, especially with regard to sensitive species such as lions, and we support the need for transparency and accountability within the industry. However, this reform is a process being driven from within, as any indiscretion is an affront on all stakeholders. For example, long-term lion monitoring by WildCRU in Hwange National Park (HNP), Matabeleland North, Zimbabwe, documented a 'vacuum effect' and reduction in male lion density in the Park as a result of sport-hunting in the surrounding areas (Loveridge et al. 2007). A result of this research was the recommendation that ZPWMA implement a hunting moratorium in western Zimbabwe, which was accepted and enforced from 2005 to 2008 (Davidson 2009). Subsequent monitoring of the HNP lion population showed that the perturbation effects caused by sport-hunting were reversed during the moratorium, and sport-hunting was reinstated at a reduced, more sustainable quota (Davidson 2009). This example demonstrates both the relationship between independent researchers and ZP-WMA, and that the research assists ZP-WMA in robust decision making. This study has also shown that the lion population was able to recover quickly, and that a blanket-ban would have been as unnecessary as it would have been detrimental to overall lion conservation in the country.

In addition to the self-imposed hunting moratorium in the Matabeleland North district, Zimbabwe has voluntarily stopped sport-hunting of any lioness. The fixed-quota concept, in which hunting quotas had to be paid for upfront before the hunting season even began, and which was resultantly attributed to poor quality trophies and young animals being hunted, has also been abandoned. The adaptive quota management system for lion hunting based on the ages of lions hunted has been accepted and embraced by all stakeholders. This adaptive quota management system has not only led to a reduced national lion hunting quota, but has also resulted in a significant increase in the age of harvested lions to a level that is considered to have minimal ecological impact, being old individuals that are no longer contributing to the gene pool nor protecting cubs.

The IUCN Red List lion conservation status has remained unchanged for 20 years even in the face of Africa's ever-changing landscape. Despite fears that lion abundance is decreasing overall, in southern Africa it is in fact increasing (Bauer et al. 2015b).

Conclusion

Given the evidence presented, the arguments against sport-hunting would appear to be based more in emotion than logic and reality (e.g. Lindsey et al. 2015). Conservation, however, is not about individuals within populations, but the overall populations themselves. Sustainable sport-hunting of lions is just that: *sustainable* - and ironically, without it, the lions themselves become unsustainable. Conservation objectives need to be balanced with both social and economic factors if they are to be achieved.

The USFWS states "Well-managed conservation programs use trophy hunting revenues to sustain lion conservation, research and anti-poaching activitie" (http://www.fws.gov/endangered/what-we-do/lion.html [accessed 2015-01-19]). The Bubye Valley and Savé Valley Conservancies both fully meet each one of these conditions: clearly contributing to lion conservation in Zimbabwe; having long-term conservation research programs; and self-funded anti-poaching units.

The histories regarding the formation of both the Bubye Valley and Savé Valley Conservancies were both presented in this report, despite being remarkably similar; the point being that lion conservation in both areas, and many others, has the same fate either way. The Bubye Valley and Savé Valley Conservancies are both excellent examples of focussed and determined efforts to make wildlife based land use viable in an otherwise cattle dominated landscape. However, the fact remains that the cost of having lions, both ecologically and financially, is high. Simply increasing the abundance of one species at the expense of another cannot be considered a conservation success.

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Barry, Anna <anna_barry@fws.gov>

Fwd: Supplement to info submitted re: applicants Chancellor, Greenawalt, Horrocks (PRT MA86474B), Smithers (PRT MA86472B)

3 messages

Vannorman, Tim <tim_vannorman@fws.gov> Mon, Feb 1, 2016 at 12:58 PM
To: Anna Barry <anna_barry@fws.gov>

Anna,

You are down for doing the leg work for Zimbabwe lions. Are you still good with this or are you swamped with other permitting actions?

Tim

---------- Forwarded message ----------
From: **Regina A. Lennox** <regina.lennox@conservationforce.org>
Date: Mon, Feb 1, 2016 at 12:44 PM
Subject: Supplement to info submitted re: applicants Chancellor, Greenawalt, Horrocks (PRT MA86474B), Smithers (PRT MA86472B)
To: "Vannorman, Tim" <tim_vannorman@fws.gov>
Cc: bryan_arroyo@fws.gov, dan_ashe@fws.gov, "John J. Jackson, III" <jjw-no2@att.net>

Dear Tim,
Attached please find additional information on lion management in Zimbabwe. This supplements the information already submitted in support of the permit applications for Chancellor, Greenawalt, Horrocks (PRT MA86474B), and Smithers (PRT MA86472B).
The attached report includes an updated wildlife map of Zimbabwe and additional information on Save Valley Conservancy's lion population, Bubye Valley Conservancy's community assistance program, and the financial breakdown of lion hunting and investment in conservation.
Please let us know if you have any questions about this document.
Kind regards,

--
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--
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ZIMBABWE LION HUNTING & RESEARCH REPORT USFWS BdP 20160131.pdf
6441K

Sport-Hunting and Lion *Panthera leo* Conservation in Zimbabwe

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January 31, 2016







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Summary of Steps Taken by Zimbabwe to Improve the Management of Lion Sport-Hunting

i – Banning of all lioness hunting in Zimbabwe
ii – Hunting moratoria around the Gonarezhou and Hwange National Parks
iii – Removal of fixed hunting quotas
iv – Age restrictions on sport-hunted lions
v – Scientifically-based adaptive quota management system

Summary of Lion Sport-Hunting's Contribution to Conservation

i – Lion sport-hunting contributes 33.9% to 42.4% of total revenue on private land
ii – Lion sport-hunting generates up to US$ 557 km^{-2}
iii – Anti-poaching (in particular that of rhinoceroses) costs ∼US$ 216 km^{-2}

Introduction

The United States Fish and Wildlife Service (USFWS) have recently evaluated the conservation status of the lion *Panthera leo* with particular regard to sport-hunting (http://www.fws.gov/endangered/what-we-do/lion.html [accessed 2015-01-19]). The results of this evaluation have led to the formal protection of two subspecies under the Endangered Species Act, classifying *P. l. leo* as endangered and *P. l. melanochaita* as threatened. Together these subspecies apparently represent all of the lions in Africa (Barnett et al. 2014).

Sport-hunting is a legal activity in which the international import/export of trophies is both sanctioned and carefully controlled by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The USFWS found that the sport-hunting of *P. l. melanochaita* "*if well managed, may provide a benefit to the subspecies*" (http://www.fws.gov/endangered/what-we-do/lion.html [accessed 2015-01-19]). Here we explore this statement further, and present data from three long-term *in situ* lion research projects; the Bubye Valley Conservation Research Initiative, Savé Val-

ley Conservancy Research, and the Hwange Lion Research Project.

The data presented in this report clearly illustrates the positive conservation benefit that well-managed trophy hunting of lions can have for the species, as well as the importance of hunting in maintaining the wildlife in an area; addressing Point 5 on page 3 of the Federal Fish and Wildlife Permit Application Form (Form 3-200-20) [i.e. "*Please be aware that the U.S. Fish and Wildlife Service must make a finding that your activities will enhance or benefit wild populations of the species involved. If you have any information that could support this finding (e.g., population status or trend data; how the funds from license/trophy fees will be spent; what portion of the hunting fee will support conservation), please submit such information on a separate page with your application*"].



Figure 1: The lions pictured here, known as Winston (*standing*) and Geronimo (*lying*), were both collared in March 2012 when they were the dominant males in the Matombosa area and have been continuously monitored ever since as part of the on-going long-term WildCRU Bubye Valley Conservation Research Initiative. In November 2015 Geronimo, who was approximately 9 years old, died after succumbing to injuries sustained from fighting with another male. Winston, also 9 years old, has since lost his dominant status, lost his territory to two 4.5 year old males, become nomadic and avoids contact with other males. As of this report being written, the recent litter of cubs that both Winston and Geronimo sired are still alive.

Most importantly, since July 2013 there has been a continuous self-imposed internal reform of the lion hunting industry in Zimbabwe that is actively participated in and supported by all of the relevant stakeholders, including; the Zimbabwe Parks and Wildlife Management Authority (ZPWMA), non-governmental organisations, professional hunters, safari operators, scientists and researchers.

Here we discuss the results of this process in terms of robust evidence regarding the sustainability and self-regulation of lion hunting in Zimbabwe.



Figure 2: Winston and Geronimo's cubs.

Lions – *Panthera leo*

The IUCN Red List have recently reclassified lions as Vulnerable (remaining as such since 1996; IUCN 2015), estimating that there are between 20,000 and 30,000 free-ranging lions left (Bauer et al. 2015a) in less than 25% of their historic range (IUCN 2006). However, this generalised classification does not take into account an apparent conservation dichotomy: sample subpopulations of lions in Botswana, Namibia, South Africa and Zimbabwe have in fact increased overall (Bauer et al. 2015a). Lions were historically present throughout Africa, some of Europe, the Middle East and Asia (Bauer and Van Der Merwe 2004), but current conservation strongholds remain only in parts of eastern

and southern Africa (Brassine and Parker 2012; Nowell and Jackson 1996). The current lion population estimate for Zimbabwe's major lion areas is approximately 2,600 individuals [Hwange-Matetsi Complex: 750, South Eastern Lowveld: 350, Gonarezhou National Park: 60, Malilangwe: 37, Savé Valley Conservancy: 284, Bubye Valley Conservancy: 500, Mid-Zambezi Valley Complex: 600], though the actual number would be larger if there were data available for the countries minor lion areas that are yet to be surveyed] (ZPWMA 2015).

The lion is a uniquely social felid, forming coalitions of up to nine males associated with one or more female prides that may consist of more than 20 individuals (Macdonald et al. 2010; Schaller 1972). Lions are infamously infanticidal (Schaller 1972), where males will kill unrelated cubs so as to bring the female into oestrus and present an opportunity to sire their own litter, which is often used as an argument against sport-hunting of the species (e.g. Packer et al. 2010), where it is feared that the removal of dominant males causes cub mortality that eventually results in lowered population recruitment and survival (Packer et al. 2009). Infanticide, however, does not result from sport-hunting when age-appropriate males, past their prime and no longer territorial or with dependent cubs, are harvested (Whitman et al. 2004). Moreover, the fission-fusion nature of lion society (Mosser and Packer 2009; Pusey and Packer 1987) means that infanticide may still occur when the dominant males are simply not present there and then to defend their cubs (B. du Preez, pers. obs.).

In the 1990's, lions were successfully reintroduced into private areas in parts of their former range, where they achieved high reproductive and survival rates (Miller and Funston 2014). However, the resultant population growth inevitably led to the potential problem of overabundance (Funston 2008) and low genetic diversity (Trinkel et al. 2010), with both of these issues requiring active and intensive management (Hunter et al. 2007) and ultimately reducing the conservation value of these lion populations (Miller and Funston 2014). The ability to translocate lions originally facilitated the relief of overpopulation, but as the available areas for relocations were used up, sport-hunting and euthanasia have subsequently become the main methods of lion population control (Miller and Funston 2014).

The lion is the apex predator wherever it occurs (Macdonald et al. 2010), and is an ideal conservation umbrella; being large, charismatic and easily observable (e.g. Williams et al. 2000). Lions are important to commercial wildlife ventures, which risk losing significant market share where they cannot offer them to clients (Lindsey et al. 2007), and are thus prioritised in conservation; exploiting their charisma to attract tourists and raise the funds required in ensuring that wildlife areas remain viable. The lion is also a particularly valuable species in the sport-hunting industry, rivalled only in demand by buffalo *Syncerus caffer* and leopard *Panthera pardus* (Creel and Creel 1997), and are therefore prevalent in private wildlife areas (Packer et al. 2013) where their populations can achieve exponential growth rates given the protection and resources afforded by well-managed operations (Smuts et al. 1978; Loveridge et al. 2007b; Kettles and Slotow 2009; Miller and Funston 2014).

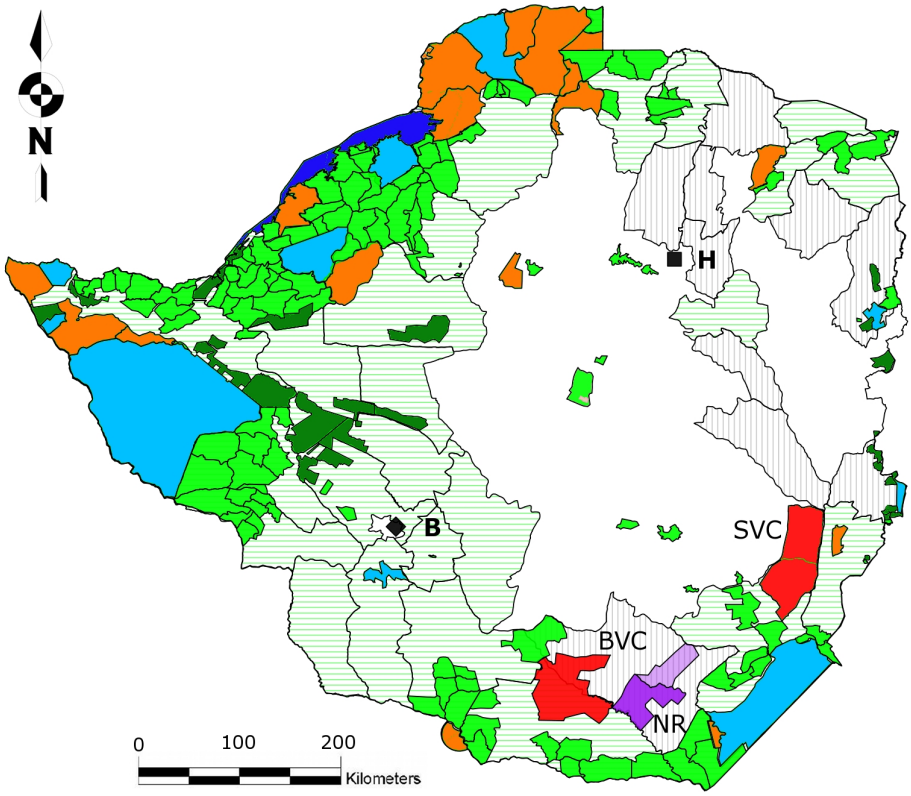

Figure 3: Map of Zimbabwe's main wildlife areas: [*i*] National Parks are represented in light blue; [*ii*] Safari areas are represented in orange; [*iii*] Forestry areas are represented in dark green; [*iv*] Community and Private wildlife areas are represented in light green; [*v*] Communal Land (CAMPFIRE Areas) in which sport-hunting may occur is represented by light green horizontal stripes; [*vi*] Communal Land in which sport-hunting does not occur is represented by grey vertical stripes. [*vii*] The Bubye Valley [BVC] and Savé Valley [SVC] Conservancies are represented in red. [*viii*]The Nuanetsi Ranch [NR] on which sport-hunting takes place is represented in dark purple (light purple represents the Nuanetsi Ranch cattle area); [*ix*] Lake Kariba is represented in dark blue. Harare (the capital city) is represented by a black square and letter '**H**'. Bulawayo is represented by a black diamond and letter '**B**'. Sport-hunting may occur in areas: *ii*, *iii*, *iv*, *v*, *vii* & *viii*

The ability of lions to rapidly increase in abundance is an aspect of their ecology that is often overlooked. Lion populations can achieve exponential growth rates (Miller and Funston 2015; Groom and Watermeyer 2015; du Preez et al. in prep.), and the problems associated with high lion densities fast present themselves and require significant investment in their solution (Hunter et al. 2007; Kettles and Slotow 2009; Loveridge et al. 2007; Packer et al. 2013; Smuts 1978). Whilst unregulated sport-hunting of lions (in particular that of dominant males and pride females) may result in population declines (e.g. Packer et al. 2010; Packer et al. 2009), restricting offtake to only males over

a certain age (i.e. have already bred and/or are no longer dominant) has no impact on lion population persistence, irrespective of quota size (Whitman et al. 2004). Such is the situation currently facing both the Bubye Valley and Savé Valley Conservancies, where the lion populations continue to grow despite sport-hunting and increasing quotas. Whilst sport-hunting may not alleviate over-population in these areas, it does somewhat offset the cost of keeping lions. Culling of lions may be the only realistic option for controlling numbers in larger areas, as the use of contraceptives is likely to be inefficient and expensive. Because of fears about public sentiment associated with sport-hunting, it has now become common practice for managers to cull excess lions in more than 45 wildlife areas in South Africa to which lions have been introduced, and which resulted in the wasteful destruction of about 200 lions in 2012 (Miller and Funston 2014).

Conservation and Sport-Hunting

There is more land area in Africa conserved for hunting than there is in all of Africa's formally protected areas combined: approximately 1.4 million km^2, which exceeds the total area covered by national parks by 22% (Lindsey et al. 2007). For wildlife conservation to be successful outside of national parks, these areas must be self-sufficient and able to generate sufficient revenue to cover the considerable costs of protecting the habitat and wildlife therein (Lindsey et al. 2006). Indeed, conservation would benefit from an incentive to utilise land for wildlife rather than the alternatives of livestock grazing, agriculture, and deforestation.

The international trade of lions, including trophies, is controlled by a strict CITES licensing system on the basis that this trade does not endanger the ultimate survival of the population (https://www.cites.org/eng/disc/how.php [accessed 2015-01-19]). The positive aspects of sport-hunting as a conservation tool include a focus on males and a low percentage off-take; neither of which generally jeopardise populations, and also suggest that hunting could play a role in population recovery (Leader-Williams et al. 2005).

The recommendation of setting uniform harvest limits, e.g. 1 lion 2,000 km^{-2} (Lindsey et al. 2012; Packer et al. 2010), may be overly simplistic, affect the economics of wildlife based landscape use, and disincentivise investment in conservation (Lindsey et al. 2007). A more practical approach to sustainably setting realistic lion sport-hunting quotas could involve using a positive/negative feedback method that calculates a fluid quota per area based on the previous season's performance. Such an adaptive quota management system has already been implemented in Zimbabwe.

Zimbabwe's Adaptive Lion Quota Management System

An adaptive quota management system for lion hunting based on the ages of lions hunted was agreed on in July 2013 in Harare, Zimbabwe, during a meeting hosted by the Zimbabwe Parks and Wildlife Management Authority (ZPWMA) and an independent non-governmental conservation organisation. The points system is summarised in Table 1.

Table 1: *Points allocated to hunting blocks arising from the harvest of lions of different ages*

	≥ 6 years	No trophy	5 years old	4 years old	< 4 years	Failure to submit return, or incomplete return
For quotas of ≥3	4	3	3	2	-3	0
For quotas of 2	4	3	3	2	0	0
For quotas of 1	6	3	3	2	0	0
Resultant quota	*These points are added up and divided by 3 to yield the quota for next year*					

During 2013, operators were requested to submit hunt returns and photos as a trial run to get the system up and running. In 2014 operators were requested to do the same but were informed that the age of the lions hunted in 2014 would determine their lion quotas in 2015. The 2015 lion hunt results would thus also determine the 2016 quota.

Results of the Adaptive Lion Quota Management System

In 2015 there was a marked increase in the age of lions hunted in Zimbabwe as a whole. Notably, only one lion of <4 years of age was hunted and the large majority of lions were 5 years or older (Figure 4). In 2013, only 28% of the lions hunted were 5 years or older, in 2014 that figure had risen to 49% and in 2015 to 77.3% (Figure 5). The proportion of lions hunted that were less that 5 years of age dropped overall between 2013 and 2015 (Figure 6). For this achievement, credit is due to the hunting community for showing greater selectivity of harvest. A word of caution however, is that the majority of lions hunted were on the cusp of 5 - 6 years of age and were not older than six years. Restricting hunting to individuals that are at least six (and preferably older) is desirable from a biological perspective due to the reduced risk of the loss of pride males and infanticide of cubs associated with the harvest of such individuals (Whitman et al. 2004).

In 2015 the Zimbabwe national lion hunting quota was set at 85 lions. Of this 85, only 39 were hunted in 2015, and based on the resultant score from aging the trophies, and the fact that operators chose not to hunt lions of inadequate age (see Figures 4, 5 & 6), the recommended quota for 2016 was set at 75 [Harare 2015-11-11]. (The Rural District Council areas in which lions occur are currently exempted from the age restrictions, as was agreed upon at the 2013 lion management meeting in Harare, as a means of ensuring that impoverished communities obtain the opportunity to benefit from the presence of lions, recognising the potential negative impacts the species has on the livelihoods of livestock farmers).

Using these figures and estimating the average value of a lion safari at approximately US$ 80,000 then a 50% offtake (35 lions) would generate US$ 2,800,000 annually. If management costs are approximately \$150 km^{-2} (V. Booth, pers. comm.), then the lion safaris alone can support 18,600 km^{-2} of wildlife habitat in Zimbabwe.

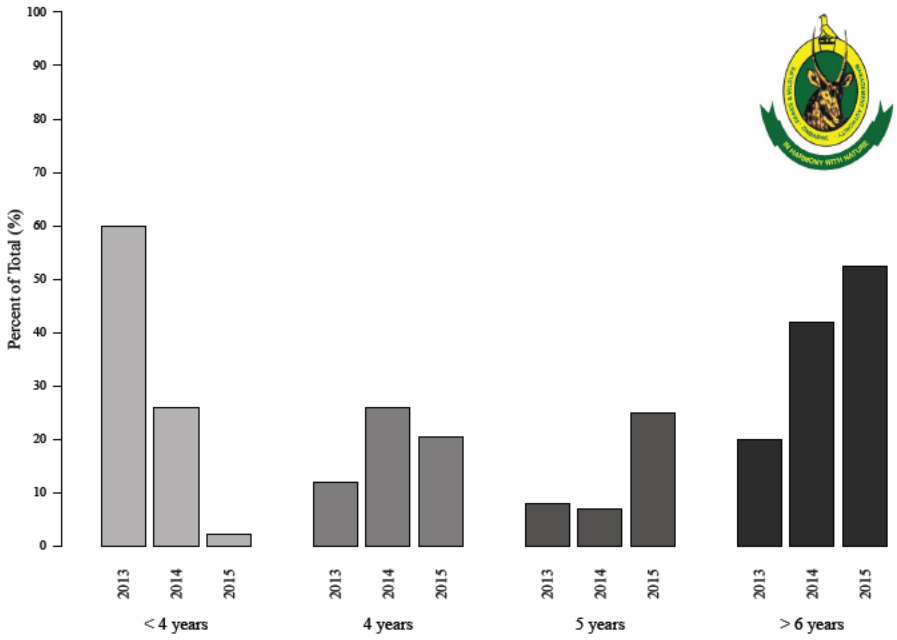

Figure 4: The percentage of lions hunted in each age class in 2013, 2014 and 2015 in Zimbabwe.

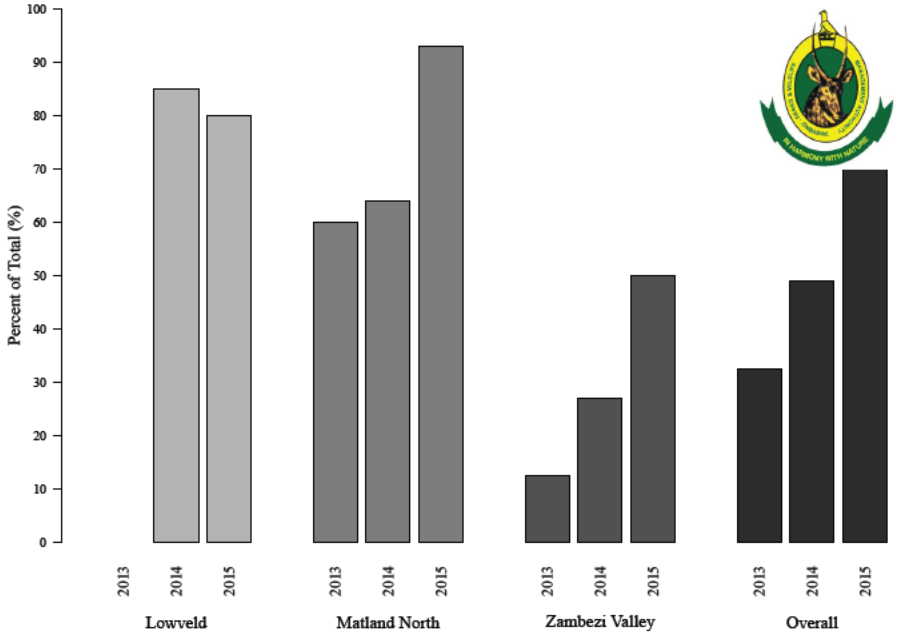

Figure 5: The proportion of lions hunted that were 5 years or older in the three main lion-hunting areas of Zimbabwe.

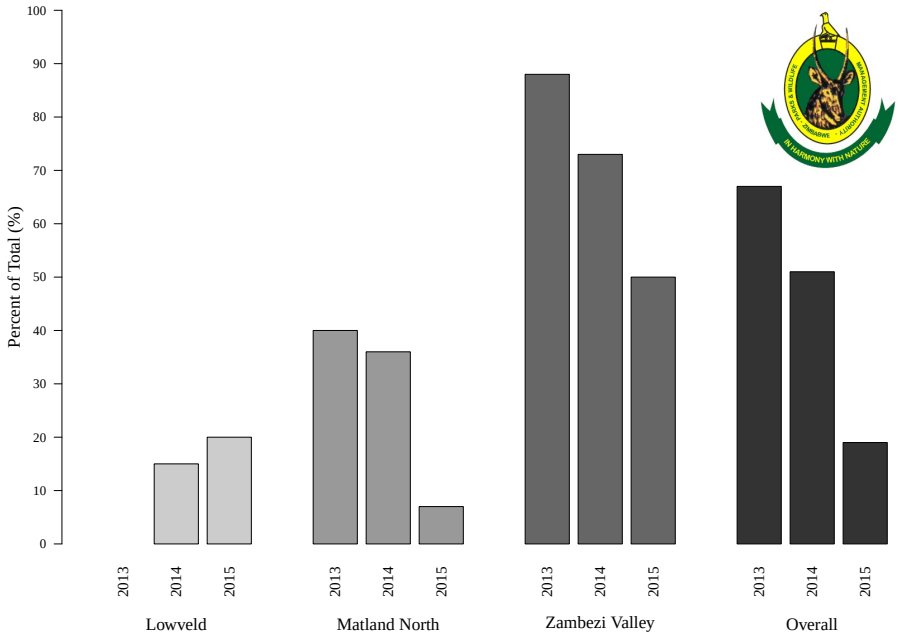

Figure 6: The proportion of lions hunted that were less than 5 years of age in the three main lion-hunting areas of Zimbabwe.

Table 2: *Human and Lion Conflict (2009 - 2011) in Zimbabwe, including human mortality caused by lion (CAMPFIRE Association, 2012)*

District	Total incidents	Livestock killed	*People Injured*	*People Killed*
Hurungwe	5	1	*2*	*2*
Chiredzi	25	136	*0*	*0*
Mbire	5	7	*0*	*5*
Binga	9	39	*0*	*0*
Total	**44**	**183**	***2***	***7***

Human-Lion Conflict

The lion is a flagship species and powerful symbol of Africa; yet living with lions poses hardships for many communities (e.g. Table 2). In some areas, the lion is a major predator on domestic livestock, inevitably leading to conflicts with local herders. Both sides suffer in this situation.

Outside of protected areas, the lion's prey base is much reduced, which results in relatively greater chance of encountering livestock. Co-existence of lions with people may be enhanced by giving value to lions through tourism and hunting promoted in communal lands under the Communal Area Management Programme for Indigenous Resources (CAMPFIRE). This hunting contributes to the conservation of lions via the financial revenue generated, which is ploughed back into conservation of the resource and empowers local communities to invest in their own rural development programs.

The Bubye Valley Conservancy

History of the Bubye Valley Conservancy

Towards the end of the nineteenth century, the Liebig's Extract of Meat Company (LEMCO) founded an extensive cattle ranch in the Zimbabwean lowveld, to the detriment of the indigenous wildlife that was initially eliminated because of competition for grazing with the livestock, as well as a risk of disease transmission from buffalo and wildebeest *Connochaetes taurinus*. As their natural prey base became depleted, the predators were subsequently persecuted when they began to prey on the livestock. Some wildlife persisted in small pockets of remote habitat, however lion, elephant *Loxodonta africana*, buffalo and rhinoceros *Diceros bicornis* [black] & *Ceratotherium simum* [white] were all completely eradicated. A monoculture of cattle dominated the landscape and impacted on the environment for the better part of a century.

Then, in 1992, Zimbabwe suffered one of the worst droughts on record, a relatively short time after the devastating one of 1983 that LEMCO was still trying to recover from. The frequency and severity of the droughts effectively reduced confidence in the economic viability of cattle ranching in the area, and the Bubye Valley Conservancy was subsequently founded in 1994 with the realisation that endemic wildlife, which are better adapted than livestock to cope with the local climate, could be successfully commercialised (Child 1988; Bond 1993).

The conversion from cattle ranching back to a wildlife area was neither straightforward nor cheap, requiring a significant initial investment and annual running costs. In just 20 years of operation the Bubye Valley Conservancy now protects the world's third largest black rhinoceros population, one of Zimbabwe's largest lion populations, a large and increasing elephant population, and abundant game.

Sport-hunting is an essential step in converting areas that were previously dedicated to livestock farming into non-consumptive tourism areas (Child 1993), and was fundamental to the formation of Bubye Valley Conservancy and allowing the wildlife populations to recover. The Samanyanga area of the Bubye Valley Conservancy, probably the most scenic section, was originally set aside for non-consumptive photographic tourism, but made an annual loss for several years, before, largely due to Zimbabwe's land reform program and resultant instability in the country, it was reverted back to sport-hunting as the only practical and economically viable option (K. Leathem, pers. comm.). Sustainable sport-hunting provides the sole economic incentive to continue operating the Bubye Valley Conservancy as a wildlife conservation area.

Bubye Valley Conservancy Community Support

The Bubye Valley Conservancy donates over 45 tonnes of meat from sport-hunting to the local communities each year. This meat donation is worth over US$ 100,000 per year, and the communities are free to decide how they use it. In addition to this, the Conservancy also supports several schools, clinics, and community projects in the three surrounding districts of Mwenezi, Maranda and Jopempe. The local community thus

sees a direct benefit from the wildlife on the Bubye Valley Conservancy, but is also empowered by job opportunities created both with these special projects, as well as on the Conservancy. A summary of the Bubye Valley Conservancy community support effort between 2011 and 2015 is provided in Table 4.

Bubye Valley Conservancy Lion Monitoring and Management

After originally being eradicated by cattle ranchers in the area, 13 lions were reintroduced to the Bubye Valley Conservancy in 1999, and four young males broke into the Conservancy that same year. From the original 17 animals present in 1999, the Bubye Valley Conservancy lion population was estimated at approximately 280 individuals in 2009 when robust population surveys were initiated by a research team from the University of Oxford Wildlife Conservation Research Unit (WildCRU), and this population has continued to grow. Today it is estimated that there are over 500 lions on the Bubye Valley Conservancy (du Preez et al. 2015). The exponentially increasing Bubye Valley Conservancy lion population currently exists at one of the highest densities in Africa (∼0.187 lions km^{-2}: du Preez et al. 2015; Figure 7), greater than that of the Serengeti, Tanzania (0.100 lions km^{-2}: Pusey and Packer 1987; Spong 2002), Selous, Tanzania (0.080 - 0.130 lions km^{-2}: Creel and Creel 1996, 1997), Kruger National Park, South Africa (0.096 - 0.112 lions km^{-2}: Mills 1995), and Hwange National Park, Zimbabwe (0.027 lions km^{-2}: Loveridge et al. 2007). This equates to one of the largest contiguous lion populations in Zimbabwe.

Bubye Valley Conservancy Lion Hunting

The Bubye Valley Conservancy offsets the cost of lion predation on its wildlife via sport-hunting of the species, and which began in 2002. In 2014, the lion hunting quota allocated to the Bubye Valley Conservancy by ZPWMA was 10 individuals. Based on the fact that the entire quota was harvested and that maximum points were scored for each individual trophy (more than six years in age), the allocated quota was raised to 13 lions for 2015. Only 12 out of 13 lions were hunted in 2015 due to a late cancellation; nevertheless eight lions over six years old and four lions of five years old were harvested and the resultant points justifying a quota of 15 lions for 2016.

Table 3: *The Bubye Valley Conservancy annual lion hunting quota and offtake from 2002 to 2015.*

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Approved quota	1	2	3	2	2	2	3	3	5	8	12	10	10	13
Quota taken	1	2	3	2	2	2	2	3	5	8	12	10	10	12
Percentage success	100	100	100	100	100	100	67	100	100	100	100	100	100	92

Note that while the lion hunting quota for Zimbabwe has been voluntarily reduced by the national steering committee, the Bubye Valley Conservancy lion hunting quota has been successively raised twice based on both hunt success and age of lions hunted and the resultant points scored under the national adaptive quota management system (Table 3).

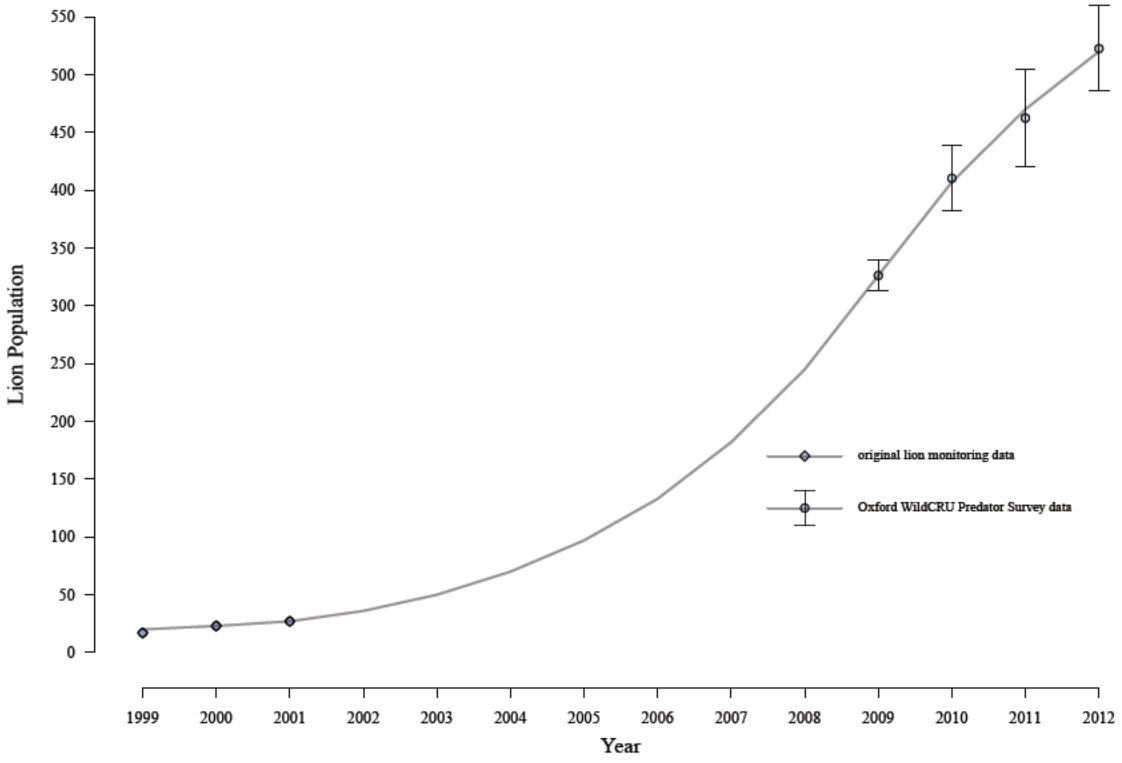

Table 4: *Summary of the Bubye Valley Conservancy support to the surrounding local communities (2011 - 2015)*

Boreholes:	- 1 x Jompembi Village 2 - 1 x Penemene - 1 x Jompembi Village 4 - 1 x Nyimani village (Mwenezi) - 1 x Driehoek School - 1 x Mgaladhivha School - 2 x Mtetengwe to supply water to the clinic site - 2 new bush pumps (complete) purchased and installed at Village 2 & Village 3 and troughs built at both sites *Drinking trough for cattle built at Village 2 borehole* *All boreholes equiped with new bushpumps, piping and cylinders* *Boreholes at Village 3, Mtetengwe, Mdzwiti, Vumani and Penemene and Makado Police post repaired and maintained* *All new piping and pumps etc. are supplied by BVC*
Buildings:	- Mtetengwe Clinic's main building built - 3 x F13 staff houses built *Clinic and House fenced - everything funded and built by BVC* *The clinic is a standard large Government clinic - male & female wards + maternity ward and outpatients* *Storerooms, offices etc. also built* *All houses and buildings are electrified, painted and supplied with running water* - Mtetengwe School school office block and staff room built and painted *All classroom windows repaired and the schools second borehole repaired.* - Secure engine house was built at the second borehole site - Borehole equipped with BH15S mono pump unit driven by a rebuilt Lister LT 1 engine - 5000 litre header tank and stand errected - new 5000 litre header tank purchased and fitted - pipeline laid to connect the borehole to the clinic - another pipeline connected to the same borehole to supply the Mtetengwe school with fresh water - New coldroom and refrigeration unit purchased and fitted at the Lutumba butchery *Part of aid program to get the Beit Bridge RDC self funding projects up and running* - New coldroom and refrigeration unit was purchased and fitted at the Rutenga butchery *Part of aid program to get the Mwenezi RDC self funding projects up and running*
Meat Donations:	- BVC donates meat on a regularly basis to the Mwenezi Orphange - Numerous donations of meat were made to support school sports days & speech nights/prize giving events *Both Beit Bridge & Mwenezi districts* - 1600 kgs of meat has been donated each month since July 2011 to a Maranda trust *Administered by Chiefs andlocal headmen* *Excess meat sold and funds used for community projects* *Classroom roof replaced at Vhongwe school* *4 new classroom blocks constructed at other schools using funds from these monthly allocations* - 1000 kgs of meat per month is been donated to Beit Bridge communities since April 2014 - 1000 kgs of meat per month is been donated to Mwenezi communities since August 2013
Miscellaneous:	- Sports uniforms for the Penemene school team purchased ($2600) *Sports uniforms required for inter-schools sports* - Transport the soccor teams representing Mgaladivha, Jompembi and Tongwe *To Lutumba for the inter-school competitions* - 2 sets of soccer goal posts & 2 sets of Netball poles were made for Mgaladivha School *New soccer field graded by BVC* - 2m security fencing supplied to Penemene School - Second hand door and window frames donated to Mapiri school (ex Mazunga School) - 1 new 3 1/2 " rod pump cylinder was purchased and fitted to the Vumhani borehole *All repairs to b/holes in the Vumhani area are done by BVC* - 26 bags of cement were donated to Mgaladivha School - Fencing donated to the Mgaladivha School - Supplied 10 x 5/8" mono shafts for the Botalele Clinic (Maranda) borehole - Water supply to Mlelezi Clinic - 400 m pipeline laid to supply the Nyimani Villarge's cattle with water *3.5 m drinking trough build for this same project* - 60 bags cement donated to the Welkom for repairs to a dam wall - 6 loads of riversand and 20 cement donated to Vumani Preschool - Various school renovations in both the Beit Bridge and Maranda areas
Current Projects:	- Construction of a School admin block at Mgaladhivha School - Supply of 24 loads of riversand to Mdzwiti School (value $1200) - All roofing materials supplied to Mdzwiti School - Supply roofing materials, cement, all window and door frames for Vumani Preschool

The Savé Valley Conservancy

History of the Savé Valley Conservancy

The Savé Valley was a wildlife-rich wilderness until the early 1900's, when the first cattle ranching initiatives started in the area. The establishment of Devuli Ranch and Angus Ranch in 1920 paved the way for seven decades of commercial cattle ranching in the area we know today as the Savé Valley Conservancy. Roads were cut, fences erected and an everlasting 'battle' ensued against the wildlife, especially against all predators.

The large predators, especially lions, were virtually eradicated (Pole 1999). However, by the late 1980's, declining range productivity, depressions and droughts forced the landowners to consider alternative options. Around that time, empirical evidence of the competitive advantage of wildlife over livestock began to emerge (Child 1988; Bond 1993), especially in arid areas (Jansen et al 1992; Cumming 1993), and wildlife was finally given serious consideration as a viable land use option.

In 1989, a proposal was drawn up (du Toit 1989) to turn what was then the Sabi Valley Intensive Conservation Area into a wildlife conservancy. The plan was to create a single large wildlife area, especially for the re-establishment of endangered species and overexploited species, with cattle remaining the primary income generator. The Savé Valley Conservancy was constitutionally inaugurated in June 1991, and following the severe 1991/1992 drought, wildlife ranching became the primary land-use. At the time this was the largest private wildlife conservancy in the world (3,410 km^2).

The conservancy members then restocked the wildlife, removed all internal fencing, erected a common perimeter fence and developed effective security systems. A double, electrified, veterinary-approved fence was completed in 1995, and the following decade saw a massive investment in wildlife re-stocking and security systems.

Sport-hunting was essential for the successful transition of the conservancy from cattle to wildlife. During the early years, wildlife densities were low, resulting in poor potential for ecotourism, and hunting generated the income needed to erect the fence, re-stock game, and improve security, especially because of the significant numbers of black rhinoceros now found there. Gradually, some of the ranchers shifted more into ecotourism. One property, Senuko Ranch, completed a 16 bed up-market lodge with a view of marketing non-consumptive safaris, offering game drives and bush walks and specializing in rhino walks and African wild dog *Lycaon pictus* den visits. Lodge occupancy rose from 0% in 1996 to 62% by the end of 1999.

However, the Zimbabwean land reform program, which was initiated in February 2000, soon made a strong negative impression in the international community, and resulted in travel bans and warning from most of Zimbabwe's source markets. This, together with the political instability meant that the wildlife industry and ecotourism industry collapsed over-night: sport-hunting became the only economically viable land use option, and has remained the only tangible source of income to the landowners of the Savé Valley Conservancy. In the case of the Senuko Lodge, for example, the land reform program resulted in a 98% cancellation of

the confirmed bookings. After four years of seeking alternative markets, the lodge could achieve no higher than 17% occupancy, and in 2005 moved back into a hunting-based operation.

A more direct impact of the land reform program for the Savé Valley Conservancy was the loss of 33% of the area of the conservancy to invading subsistence farmers (Lindsey et al 2008). The loss of land was catastrophic and the related pressure from wire snare poaching was extreme. In the following eight years (2001 to 2009), 10,520 illegal hunting incidences were recorded, 84,396 wire snares were removed and at least 6,454 wild animals killed (Lindsey et al. 2011).

Savé Valley Conservancy Community Support and Anti-Poaching

In 2012, conservancy members provided over US$ 100,000 worth of support to adjacent villages or farmers in the resettled areas. Assistance included drilling boreholes, maintaining boreholes, dredging of dams, assisting with building projects in clinics and schools, assisting with repairs, maintenance and materials at schools, education initiatives, school field trips, provision of computer equipment in schools, craft programs and regular donations of meat.

Moreover, the conservancy recently entered into a mutually dependent agreement with the Chiefs representing the communities surrounding the Savé Valley Conservancy. The agreement links the communities to the Natural Resource Utilisation that occurs through the business operation of the conservancy and opens up opportunities for the local indigenous populations to share in any wealth creation. This agreement strengthens relations between the conservancy and the surrounding local communities and creates an environment that helps to protect, conserve and sustain the natural assets of the area. The hunting tourism of the conservancy is currently the only form of income by which the surrounding communities can benefit. Revenues from trophy lion hunting constitute a significant portion of inflow and thus an important part of the community benefits. Any reduction would seriously jeopardise the growth of this infant positive relationship and community empowerment initiative.

The Savé Valley Conservancy is thus pioneering private-community partnerships in Zimbabwe, and trade restrictions on lion trophies will indirectly adversely affect these already seriously impoverished communities through a reduction in available income to share with communities. This is very likely to have a knock on impact on the lions themselves with a significantly reduced tolerance and an increase in retaliatory poisoning of lions for livestock predation. Without a demonstration of income from lions, the political pressure from the surrounding communities to remove them from the conservancy altogether will be a challenge to resist.

Savé Valley Conservancy Lion Monitoring and Management

After the Conservancy was formed, and persecution stopped, lions, mainly males, recolonized the area and their numbers started to increase in the late 1990's / early 2000's. Few lionesses were observed until 2003, when small family groups and male-female pairs were seen, and by 2004 - 2005 there were some reports of cubs. During this period 13

lions were also reintroduced into the Savé Valley Conservancy. After an initial lag phase the lion population on the Savé Valley Conservancy has increased dramatically and at present is growing exponentially (Figure 8; Groom and Watermeyer 2015).

Monitoring of the lion population began in 1999 (Pole 1999) with track index or call-up surveys being conducted sporadically until 2006. From 2007 to present, annual conservancy-wide track index surveys have been conducted using a standardized methodology (Groom and Watermeyer 2015). The resulting population estimates were verified in 2011 by a baited lion call-up survey and a collation of managers' estimates, all of which provided similar results.

Prey availability models (Hayward et al. 2007) suggest that the carrying capacity for the lion population in the Savé Valley Conservancy is approximately 271 lions. The population estimate for 2015 was 284 lions, suggesting lions have reached their ecological carrying capacity, even whilst being responsibly hunted.

A professional lion management plan was commissioned by the conservancy in 2011 (Funston 2011), to provide the Savé Valley Conservancy members with a science-based plan to help them ethically and sustainably manage their lion population. This plan specifically advocates the use of hunting as a conservation management tool. It also demonstrates willingness by the conservancy to guide their lion management based on science and advice from professionals.

Savé Valley Conservancy Lion Hunting

Lions have been hunted in the Savé Valley Conservancy since 2002, although that was largely for removal of problem animals. Hunting began properly in 2005 with quotas increasing annually to a maximum of seven per year from 2009 onwards (Table 5), with the quota being raised to ten for 2016 based on trophy ages.

Despite offtakes of lions through sport-hunting, the lion population has continued to increase in the Conservancy. The revenue generated from hunting lions has enabled landowners to invest in proper land management, anti-poaching, water provision and fence maintenance, all of which benefit the lion population (especially as lions seem to be vulnerable to being caught in wire snares; Becker et al 2013; R. Groom, pers. obs.).

Table 5: *The Savé Valley Conservancy annual lion hunting quota and offtake from 2002 to 2015.*

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Approved quota	5	5	1	3	3	4	6	7	7	7	4	2	3	5
Quota taken	1	0	1	3	3	3	3	6	5	3	4	1	3	5
Percentage success	20	0	100	100	100	75	50	86	71	43	100	50	100	100

Sport-hunting of lions brings considerable revenue to the Conservancy, revenue that is vital for the continued functioning of the area for wildlife conservation. Without the costs of lions being offset by the income from sport-hunting, landowners cannot reasonably be expected to tolerate such high lion densities, and their numbers would have to be reduced significantly.

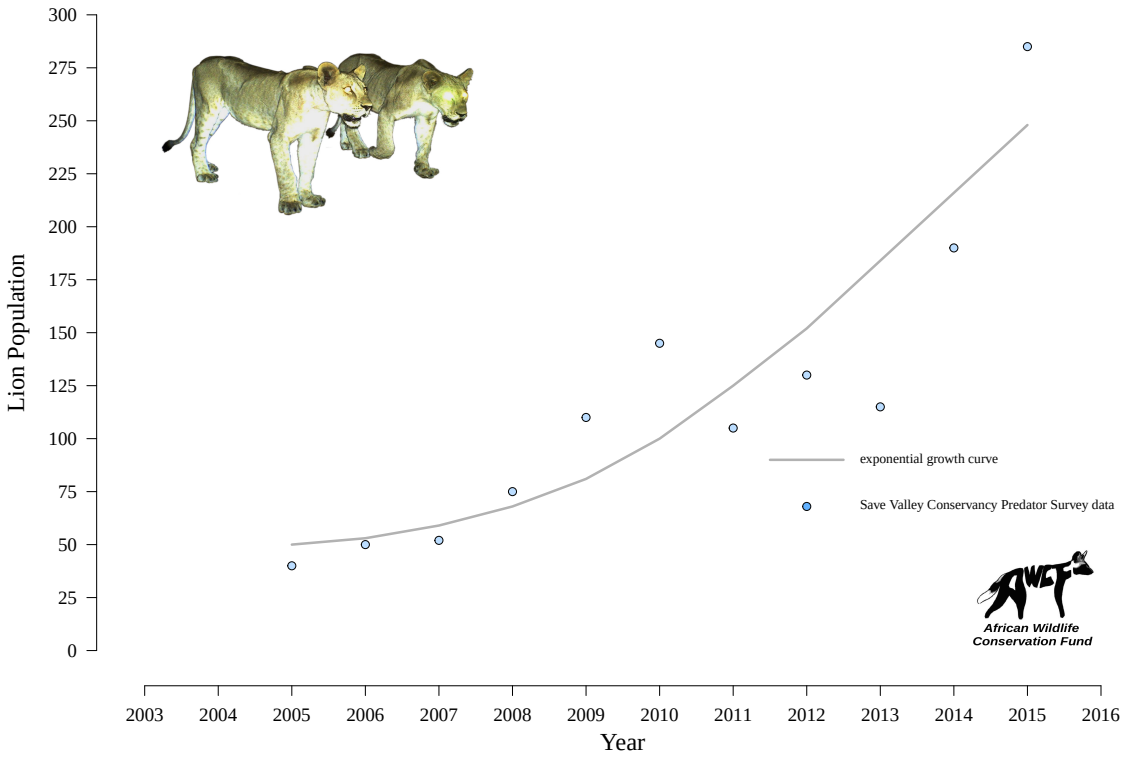

Figure 8: The Savé Valley Conservancy lion population, like that of the Bubye Valley Conservancy, has grown exponentially. Points indicate estimated lion abundance calculated from field surveys; the line represents the exponential growth curve.

The Pros and Cons of Conserving Lions

The saturation of lions in wildlife areas on both state and private land is positive for their future conservation security; but it is also critical to that of incidentally conserved endangered species, such as both species of rhinoceros on private wildlife conservancies in Zimbabwe (Lindsey et al. 2009; Suzuki 2001), which benefit from the same resources and protection that are incentivised and provided by the revenue generated from sport-hunting. The Bubye Valley Conservancy now boasts the world's third largest black rhinoceros population (N. Anderson [Lowveld Rhino Trust], pers. comm.), which is classified as Key 1 by the African Rhino Specialist Group and means that this population is considered key to the overall survival of the species. The Savé Valley Conservancy has the second largest black rhinoceros population in Zimbabwe after Bubye. These are not coincidences. These rhinoceros (and other endangered species, such as wild dog) strongholds are the result of the incidental conservation benefits derived entirely from sport-hunting activities - there are no photographic tourists visiting either the Bubye Valley or Savé Valley Conservancies, and the rhinoceros are not hunted. Having rhinoceros on the land therefore generates no revenue - and in fact there is a significant cost associated with protecting these animals; US$ 590,000 (not including incentive and reward bonuses donated for these purposes) was spent on anti-poaching by the Bubye Valley Conservancy during 2015 (K. Leathem, pers. comm.), and US$ 546,000 is spent annually on anti-poaching by the Savé Valley Conservancy (Lindsey et al. 2012). This expense is covered mainly by the revenue generated by sport-hunting with additional donations from the clients; and most importantly, the habitat for the rhinoceros is preserved by maintaining the land as a conservation area, as opposed to converting it into agricultural or grazing land for example.

However, the high densities of lion populations achieved within commercial wildlife areas have the potential for intense intraguild persecution. Lions are aggressively competitive, and research on the relationship between lions and leopards has shown that high densities of lions can negatively affect leopard population density, demographic structure, cub survival, and spatial ecology down to even the step-wise decisions that leopards make regarding habitat use and behaviour based on both the actual and potential risk of encountering lions (du Preez 2014; du Preez 2015). Leopards are a generalist species that are able to cope with persecution by adapting their behaviour and ecological niche, and even they suffer under a burgeoning lion population; ecological specialists and endangered species, such as cheetah *Acinonyx jubatus* and wild dog, do not fare nearly as well under such intense competitive pressure. In fact, competition with lions has been directly linked to reductions in cheetah (e.g. Durant 1998, 2000; Laurenson 1995) and wild dog (e.g. Creel 2001; Creel and Creel 1996; Vucetich and Creel 1999) densities, both of which face local extinction where lion abundance, and the respective level of persecution, is high. Excessive lion densities may also result in population declines of ungulate prey (e.g. Wegge et al. 2009). It is vital to holistic conservation that wildlife managers can understand and deal with the level of impact that lions exert on other species; particularly those that

are elusive difficult to observe, and which face decline if not carefully monitored. To this end, a conservation research initiative in partnership with WildCRU was established on the Bubye Valley Conservancy in 2009, and research conducted on the Savé Valley Conservancy since 2007.

Based on the number of kills made (du Preez et al. in prep.) and the current value of the meat (K. Leathem, pers. comm.), the Bubye Valley Conservancy lion population consumes hundreds of thousands of dollars worth of prey each year. These lions are mainly tolerated because of their ability to generate the revenue that helps to offset this expense - although it is estimated that economically it is still not worth keeping the lions whose cost outweighs their value (Funston et al. 2013).

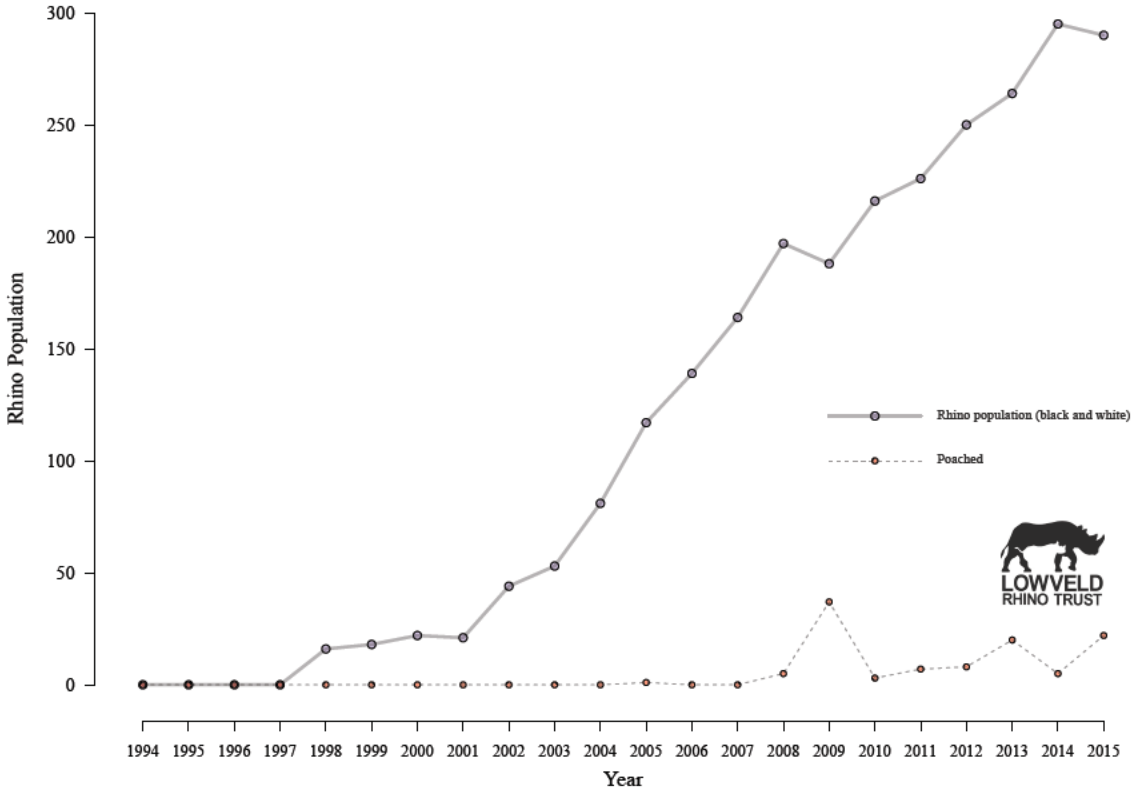

Figure 9: The Bubye Valley Conservancy black rhino population is rated as Key 1 by the African Rhino Specialist Group which means that the population is considered key to the overall survival of the species.

Where the Money Goes: The Finances of Lion Sport-Hunting and Reinvestment in their Conservation

Break-down of the finances involved in a typical lion hunt on the Bubye Valley Conservancy:

Lion Trophy fee: US$ 42,000
Lion Hunt Daily rate: US$ 2,950 day^{-1}
(Minimum lion hunt duration: 18 days [*total daily rate of US$ 53,100 lion hunt^{-1}*])

Additional costs include:
ZPWMA scout
Observers
Bait used
Other trophy species taken during the lion hunt, etc.
[*These additional costs average approximately US$ 6,500 lion hunt^{-1}*]

Bubye Valley Conservancy - Lion Sport-Hunting Revenue Generated (2015):

((18 days × 2,950 day^{-1}) + 42,000 trophy fee + 6,500 additional costs) × 12 lions
= **US$ 1,219,200**

Lion sport-hunting therefore represents approximately 33.9% of the Bubye Valley Conservancy's total annual revenue generation (which includes post-hunt meat and hide sales).

All of the revenue generated from lion sport-hunting on the Bubye Valley Conservancy has gone back into the running costs of the Conservancy, which is all part of conservation, and which includes: anti-poaching and fence monitoring and maintenance (approximately US$ 506,000 year^{-1}), research (approximately US$ 34,700 year^{-1} not including client and sponsor donations), and community support assistance (approximately US$ 210,000 year^{-1}).

[*No profit after costs has been declared, nor dividends taken by shareholders, since the Bubye Valley Conservancy was formed in 1994. All revenue generated to date has been spent on running costs, improvements and restocking.*]

Discussion

Here we have shown that since their reintroduction after historical eradication, both the Bubye Valley and Savé Valley Conservancies' lion populations have increased exponentially - not despite sport-hunting, but because of sport-hunting and the incentive it provides for protection.

The success of the Bubye Valley and Savé Valley Conservancies, in terms of both of their hunted lion and non-hunted rhinoceros populations, may also provide the motivation for other areas in the country to sustainably manage their wildlife resource. A case in point is the Nuanetsi Ranch, a wildlife area that is also a legacy of failed cattle ranching, located almost directly between the Bubye Valley and Savé Valley Conservancies in Zimbabwe (Figure 3). At present there is a single lion on the Nuanetsi Ranch but management is not able to justify introducing more due to the current uncertainty over the future of lion hunting (B. Lees-May [Nuanetsi Ranch Conservator], pers. comm.). The Nuanetsi Ranch is a wildlife area of 1,489 km^2, and could conceivably sustainably hold between 201 and 278 lions (based on the most recently estimated lion densities of the Savé Valley [0.135 lions km^{-2}; Groom and Watermeyer 2015]; and Bubye Valley [0.187 lions km^{-2}; du Preez et al. 2015] Conservancies respectively). However, the Nuanetsi Ranch has invested in building up an abundant wildlife population, which is sport-hunted, and the management will not risk losing a significant amount of valuable game, that could otherwise be sold as trophies or meat, to a species from which it can not recuperate lost revenue, and instead that requires further investment in control measures (B. Lees-May [Nuanetsi Ranch Conservator], pers. comm.).

Between 2005 and 2015 the United States market has represented 70.4% of the total Zimbabwean lion sport-hunting industry (http://trade.cites.org/en/cites_trade/ [accessed 2015-01-19]), though in reality it constituted over 90% for both the Bubye Valley and Savé Valley Conservancies. If this market was effectively lost due an inability of prospective clients to import their trophies, based on the economics involved it would become unviable to continue managing the Bubye Valley Conservancy as a wildlife area in its current form, and lions would either have to be re-exterminated, or at least severely reduced via culling; or else what is the largest privately owned wildlife area in the world would be converted back into a cattle ranching area (K. Leathem, pers. comm.). This is the reality of any business, in that it needs to cover costs and pay staff and cannot run at a loss for luxury of conservation. Child (1993) states "*A refusal to treat wildlife in the same way as other resources and maintenance of centralised protectionist management prejudices its survival. Only by raising its commercial value will wildlife be able to compete for space on the scarce African landscape. Trade bans which detract from wildlife's commercial value prejudice its chances of survival in the long term*".

Although the USFWS understandably categorises lion conservation by country for simplicity, rather than individual properties, the Bubye Valley and Savé Valley Conservancies currently and deservedly hunt more than a third of the total Zimbabwean lion quota between them. Here we have shown that this sport-hunting does not negatively affect the lion population, which remains in positive growth despite off-take. In addition

to this, other areas, such as the Nuanetsi Ranch, could be incentivised to invest in lion conservation if the ability to sustainably utilise the lions as a resource was guaranteed.

The USFWS identified five primary factors that threaten lion survival in the wild, namely: habitat loss; loss of prey; retaliatory killing due to increased human-lion conflicts; inadequate regulatory mechanisms; and weak management of protected areas (http://www.fws.gov/endangered/what-we-do/lion.html [accessed 2015-01-19]). Each and every point on this list, which notably does not include sport-hunting, supports the fact that incentivising tolerance for lions through sustainable use would enhance the species' overall survival.

As responsible conservationists, we are not arguing against tight regulation of sport-hunting, especially with regard to sensitive species such as lions, and we support the need for transparency and accountability within the industry. However, this reform is a process being driven from within, as any indiscretion is an affront on all stakeholders. For example, long-term lion monitoring by WildCRU in Hwange National Park (HNP), Matabeleland North, Zimbabwe, documented a 'vacuum effect' and reduction in male lion density in the Park as a result of sport-hunting in the surrounding areas (Loveridge et al. 2007). A result of this research was the recommendation that ZPWMA implement a hunting moratorium in western Zimbabwe, which was accepted and enforced from 2005 to 2008 (Davidson 2009). Subsequent monitoring of the HNP lion population showed that the perturbation effects caused by sport-hunting were reversed during the moratorium, and sport-hunting was reinstated at a reduced, more sustainable quota (Davidson 2009). This example demonstrates both the relationship between independent researchers and ZP-WMA, and that the research assists ZP-WMA in robust decision making. This study has also shown that the lion population was able to recover quickly, and that a blanket-ban would have been as unnecessary as it would have been detrimental to overall lion conservation in the country.

In addition to the self-imposed hunting moratorium in the Matabeleland North district, Zimbabwe has voluntarily stopped sport-hunting of any lioness. The fixed-quota concept, in which hunting quotas had to be paid for upfront before the hunting season even began, and which was resultantly attributed to poor quality trophies and young animals being hunted, has also been abandoned. The adaptive quota management system for lion hunting based on the ages of lions hunted has been accepted and embraced by all stakeholders. This adaptive quota management system has not only led to a reduced national lion hunting quota, but has also resulted in a significant increase in the age of harvested lions to a level that is considered to have minimal ecological impact, being old individuals that are no longer contributing to the gene pool nor protecting cubs.

The IUCN Red List lion conservation status has remained unchanged for 20 years even in the face of Africa's ever-changing landscape. Despite fears that lion abundance is decreasing overall, in southern Africa it is in fact increasing (Bauer et al. 2015b).

Conclusion

Given the evidence presented, the arguments against sport-hunting would appear to be based more in emotion than logic and reality (e.g. Lindsey et al. 2015). Conservation, however, is not about individuals within populations, but the overall populations themselves. Sustainable sport-hunting of lions is just that: *sustainable* - and ironically, without it, the lions themselves become unsustainable. Conservation objectives need to be balanced with both social and economic factors if they are to be achieved.

The USFWS states "Well-managed conservation programs use trophy hunting revenues to sustain lion conservation, research and anti-poaching activitie" (http://www.fws.gov/endangered/what-we-do/lion.html [accessed 2015-01-19]). The Bubye Valley and Savé Valley Conservancies both fully meet each one of these conditions: clearly contributing to lion conservation in Zimbabwe; having long-term conservation research programs; and self-funded anti-poaching units.

The histories regarding the formation of both the Bubye Valley and Savé Valley Conservancies were both presented in this report, despite being remarkably similar; the point being that lion conservation in both areas, and many others, has the same fate either way. The Bubye Valley and Savé Valley Conservancies are both excellent examples of focussed and determined efforts to make wildlife based land use viable in an otherwise cattle dominated landscape. However, the fact remains that the cost of having lions, both ecologically and financially, is high. Simply increasing the abundance of one species at the expense of another cannot be considered a conservation success.

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United States Department of the Interior

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FEB - 1 2015

Dear Olivia,

As you are aware, The U.S. Fish and Wildlife Service (Service) published a final rule on December 23, 2015, listing the lion under the Endangered Species Act (ESA). After evaluating the available information on lion, the Service determined that *Panthera leo leo*[1], located in India and western and central Africa, should be listed as endangered, and *P. l. melanochaita*[1], located in eastern and southern Africa, should be listed as threatened. I encourage you to visit the Service's web page for more information (www.fws.gov/endangered).

Due to the listing under the ESA, our stricter domestic measure, any imports of a sport-hunted lion trophy into the United States, regardless of the subspecies, would require an import permit. In order to issue a permit, the Service, through its Division of Management Authority, must determine that the import of a sport-hunted lion trophy will enhance the propagation or survival of the species in the wild. This is the same finding that we have to make for the import of sport-hunted elephants, although no permit is required for elephants. The Service will examine the overall conservation and management of the species and whether that management addresses the three main threats that have been identified as to the decline of the species: Habitat loss, loss of prey base, and human-lion conflict. In that review, we will evaluate whether the import contributes to the overall conservation of the species by considering whether the biological, social, and economic aspects of a program from which the specimen was obtained provide a net benefit to the species and its ecosystem, and how U.S. hunters are contributing to this effort.

In evaluating these factors, we have found that the IUCN Species Survival Commission (SSC) Guiding Principles on Trophy Hunting as a Tool for Creating Conservation Incentives, Ver. 1.0 (IUCN SSC 2012), provides useful principles, which, considered in conjunction with our permit issuance criteria, will aid us when making the required enhancement finding for importation of sport-hunted trophies. This document sets out guidance from experts in the field on the use of trophy hunting as a tool for "creating incentives for the conservation of species and their habitats and for the equitable sharing of the benefits of use of natural resources" (IUCN SSC 2012, p. 2)

[1] Based on new taxonomy identified in: Bauer, H., Packer, C., Funston, P.F., Henschel, P., & Nowell, K. (2015). *Panthera leo*. The IUCN Red List of Threatened Species. Version 2015.2. (http://www.iucnredlist.org/details/full/15951/0).

and recognizes that recreational hunting, particularly trophy hunting, can contribute to biodiversity conservation and more specifically, the conservation of the hunted species. The SSC document lays out five guiding: (a) Biological sustainability: The hunting program cannot contribute to the long-term decline of the hunted species; (b) Net Conservation Benefit: The biologically sustainable hunting program should be based on laws, regulations, and scientifically based quotas, established with local input, that are transparent and periodically reviewed; (c) Socio-Economic-Cultural Benefit: A well-managed hunting program can serve as a conservation tool when it respects the local cultural values and practices; (d) Adaptive Management: Planning, Monitoring, and Reporting: Hunting can enhance the species when it is based on appropriate resource assessments and monitoring (e.g., population counts, trend data), upon which specific science-based quotas and hunting programs can be established; and (e) Accountable and Effective Governance: A biologically sustainable trophy-hunting program should be subject to a governance structure that clearly allocates management responsibilities.

As has been stated many times over the last few years, the Service believes that hunting can generate significant economic benefits if properly conducted. To assist us in our evaluation, I have included a list of questions regarding the management and conservation of lions in your country, the population status, your hunting regulations, and hunting program. Given the numerous discussions and exchange of information we have had over the last several years, we have a large amount of information regarding Zimbabwe's overall management process, but very little on lions themselves. If your office has the time and resources, we would greatly appreciate your effort in addressing the attached questions.

We hope that through authorization of import of sport-hunted lion from your country, the United States can assist in the conservation of the lion. While the United States has specific stricter domestic measures that require additional findings beyond those required for the issuance of an export permit by your country, there is every reason to believe that through scientifically based management programs and close monitoring and control of hunting within your country, that U.S. hunters can both enjoy their hunting experiences within your country and provide a significant benefit to African lion conservation within your country. If you have any questions, please feel free to contact me by mail, email, or telephone (Tim_VanNorman@fws.gov; (703) 358-2350).

Sincerely,



Timothy J. Van Norman, Chief
Branch of Permits
Division of Management Authority
U.S. Fish and Wildlife Service

I. Overview

The lion is listed in Appendix II of CITES. As such, the Scientific Authority of the exporting country must make a determination that the export of a sport-hunted trophy will not be detrimental to the survival of the species (Article III, 2(a)). While the finding that the U.S. Fish and Wildlife Service must go beyond the "Non-detriment" standard, it would be very beneficial to our review if you could provide a copy of a recent "Non-detriment" finding made by your Scientific Authority.

II. Management Plan (a comprehensive plan addressing specific management goals or actions)

1. It is our understanding that Zimbabwe has a national management plan for lions. Could you please provide a copy? Are there regional plans as well, and if so, could you please provide copies?

2. Have you developed a mechanism (i.e., adaptive management approach) for implementing the plan(s) and determining its effectiveness? Could you describe how implementation of the plan is progressing and if there are management or logistical problems that still need to be addressed?

3. Are there any other management plans or conservation plans that contribute to or interact with the lion management plan(s) (i.e., regional plans, hunting concession plans)?

II. Population Status

1. What is the status of lion populations within your country (e.g., population numbers; population trends; sex and age class distribution)?

2. Do you have a standardized process to conduct population censuses? If so, how often? What areas are censused? Do they include all hunting areas? What is the censusing methodology?

3. What is the current distribution of lions within your country (i.e., widespread, environmentally confined to specific areas, confined to national or regional protected areas)?

4. Even with protection activities and legal intervention, poaching could still occur. Do you have any estimates on the number of specimens lost to illegal killing annually?

5. What impact are human-lion conflicts having on local or national populations? Is there a standardized national policy to address such conflicts and problem lion control? If so, does this policy include culling of surplus animals and removal of nuisance animals? Is there domestic harvesting of lions for local consumption or use?

III. Conservation and Management

1. Please describe potential threats to the species, such as poaching and human-animal conflicts, and how these threats are being addressed.

2. Is your agency currently conducting any research efforts addressing conservation issues involving lion? What about other agencies or departments within your national or regional governments and what are their roles? Are you aware of any NGO projects currently underway that

involve lion conservation or management? If so, could you describe such projects or provide contact information to the organization carrying out the work?

IV. Hunting Policies/Regulations

1. Is it correct to state that the hunting program for lions functions in the same manner as elephant hunting? Specifically, do you have an established national/regional hunting quota? How is this quota determined? It is our understanding that Zimbabwe has established an age restrictions on harvesting lions and uses this requirement as an incentive/deterrent to professional hunters in future distributions of quotas. Please describe the age restrictions and how quotas are adjusted for professional hunters that abide by it or disregard it?

2 How much do hunting licenses cost foreign hunters? How does your government utilize this revenue? Does a percentage go directly back to lion conservation efforts or into more general wildlife management efforts? If so, what percentage is allocated to each? Is any of this revenue provided to local communities? If so, what percentage?

3. How does the sport-hunting program provide any other tangible benefits, besides revenue, to local communities (i.e., increase employment, jobs in antipoaching units)?

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Science & Society

Banning Trophy Hunting Will Exacerbate Biodiversity Loss

Enrico Di Minin,[1,2,*] Nigel Leader-Williams,[3] and Corey J.A. Bradshaw[4,5]

International pressure to ban trophy hunting is increasing. However, we argue that trophy hunting can be an important conservation tool, provided it can be done in a controlled manner to benefit biodiversity conservation and local people. Where political and governance structures are adequate, trophy hunting can help address the ongoing loss of species.

International Outrage over Trophy Hunting in Africa

An American hunter killed a charismatic male lion (*Panthera leo*) called Cecil in Zimbabwe in July 2015. This sparked international outrage, mainly via a storm of social and other media. Several alleged aspects of the hunt itself, such as baiting close to national park boundaries, were done illegally and apparently against the spirit and ethical norms of well-managed trophy hunts. Online outrage had also been sparked earlier in 2015 by the legal hunt of a Critically Endangered male black rhino (*Diceros bicornis*). This hunt was sanctioned by the Namibian Government via an auctioned permit that cost the hunter US$350 000 for the privilege. This outrage arose even though the male was considered 'surplus' to the national black rhino management plan, and the revenue generated from the hunt was to be reinvested into a conservation trust fund to the wider good of conservation in Namibia. These two high-profile hunts and the ensuing public backlash against the ethics and conduct of trophy hunting in general have led to proposals to ban the practice throughout Africa. Furthermore, some commercial passenger and cargo airlines have decided to stop, or may soon stop, the transport of trophies of hunted animals shot legally and sustainably by foreign tourists, irrespective of international conventions, such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and national laws that allow trophy hunting.

Hunting Industry in Sub-Saharan Africa

Trophy hunting strongly contributes to the conservation enterprise in sub-Saharan Africa, where large areas support important terrestrial biodiversity that is currently allocated to trophy hunting use (Table 1). While most of the hunted individuals (e.g., 96% in South Africa in 2012) [1] are often from more common and less valuable species (Table 1), most of the trophy hunting revenue is generated from a few species carrying valuable trophies, particularly the charismatic 'Big Five' (lion leopard *Panthera pardus*; elephant *Loxodonta africana*; buffalo *Syncerus caffer*; and black or white rhinoceros *Ceratotherium simum*) [2]. Out of the US$68 million of gross revenue generated from trophy hunting in South Africa in 2012, over US$28 million (at least 41%) was generated from the Big Five alone (i.e., $5 635 625 from 635 buffaloes; $1 194 600 from 33 elephants; $647 500 from 37 leopards; $15 270 750 from 617 lions, $300 000 from one black rhinoceros; and $5 355 000 from 63 white rhinoceroses) [1]. Southern African countries and Tanzania exported most of the Big Five trophies between 2009 and 2013 (Figure 1). At the same time, two countries that do not typically attract many tourists (the Central African Republic, currently undergoing a conflict, and Cameroon, where poaching pressure is high) allowed trophy hunting of big cats and elephants, respectively, over the same period (Figure 1).

Concerns about Trophy Hunting

Overall, land allocated to trophy hunting has the potential to assist countries to achieve biodiversity conservation goals [3]. However, the contribution of hunting to conservation is often contentious for various reasons. There can be uncertainty over the sustainability of offtake rates and their potential impact on wildlife populations [4]. This concern arises because quotas and offtakes are not often based on scientific assessments. Furthermore, restrictions on the age of hunted

Table 1. Hunting Contribution to Biodiversity Conservation and National Economies in Sub Saharan Countries

Country	Area Covered by Game Ranches (% of Total Land Area)[a]	Terrestrial Protected Areas (% of Total Land Area)[b]	Top 3 Most Exported Trophies in 2012[c,d]	Annual Revenue (US$ million)[e]
South Africa	13.1	6.2	impala, warthog, kudu	68.0[f]
Tanzania	26.4	32.2	leopard, hippopotamus, elephant	56.3[g]
Botswana	23.0	37.2	elephant, leopard, lechwe	40.0[g]
Namibia	11.4	43.2	zebra, chacma baboon, leopard	28.5[h]
Zimbabwe	16.6	27.2	elephant, leopard, chacma baboon	15.8[g]
Mozambique	10.5	17.6	Nile crocodile, elephant, hippopotamus	5.0[g]
Zambia	21.3	37.8	lechwe, hippopotamus, leopard	3.6[g]
Total				217.2

[a][13].
[b]World Bank (http://data.worldbank.org/indicator/ER.LND.PTLD.ZS).
[c]CITES trade database (http://trade.cites.org/).
[d]Chacma baboon (*Papio ursinus*), elephant (*Loxodonto africana*), hippopotamus (*Hippopotamus amphibius*), impala (*Aepyceros melampus*), greater kudu (*Tragelaphus strepsiceros*), lechwe (*Kobus leche*), leopard (*Panthera pardus*), Nile crocodile (*Crocodylus niloticus*), warthog (*Phacochoerus africanus*), zebra (*Equus quagga*).
[e]Data not adjusted for inflation.
[f][1].
[g][6] (data for 2008 for Botswana, Tanzania and Mozambique, 2007 for Zimbabwe, and 2002 for Zambia).
[h]African Indaba (http://www.africanindaba.com/wp content/uploads/2014/03/AfricanIndabaVol3 4.pdf).

individuals are not often implemented [5]. In addition, the contribution of some forms of trophy hunting to conservation is debatable. This is particularly the case for 'canned lion hunting', where future targets are bred and raised in captivity and kept in confined enclosures until shot, to ensure that hunters are guaranteed a kill. In South Africa, which is by far the largest exporter of lion trophies across sub-Saharan Africa (Figure 1), 80% of the trophies between 2009 and 2013 were from lions raised in captivity or ranched. The ethics of canned hunting are dubious, and this abhorrent practice requires reform before it brings down ethically practiced hunting.

The profitability of their respective hunting industries is hard to compare across sub-Saharan countries [5]. Nevertheless, it is known that the gross annual revenue generated by the hunting industry comprises tens of millions of US$ in countries such as South Africa, Tanzania, and Botswana (Table 1). Despite this, the amount of accrued revenue allocated to conservation authorities that could in principle be reinvested in improved management appears to be limited. In Tanzania, for example, the accrued revenue allocated to the Wildlife Division in 2008 amounted to 22% (US$12 353 180) of the gross revenue generated by hunting in that year [5]. The remainder of the revenue went to the private sector.

Another limitation is that revenue generated from trophy hunting currently provides few benefits to local communities sharing habitats with biodiversity [6,7]. In Namibia, however, revenue generated from trophy hunting has encouraged local community participation in conservation, which in turn has resulted in substantial increases in the abundance of many wildlife species and in the total area of land falling under community protection through conservancies [6]. It is less clear in other African countries what proportions of hunting-permit revenue are directed to community-development projects, whether they are payments to community-based organizations, or payments to communities for concession fees, resource fees, or payments for welfare and education. Finally, legal controls over biological, ethical, and financial aspects of the hunting industry can be more easily circumvented in many sub-Saharan countries where management capacity and governance structures are ineffective [8].

Why Blanket Bans Could Exacerbate Biodiversity Loss

One currently promoted solution to address such concerns is to ban trophy hunting altogether. However, a blanket ban on trophy hunting could lead to worse conservation outcomes for three main reasons. First, financial resources for conservation are limited, particularly in developing countries. Hence, both nonconsumptive and consumptive uses of wildlife are necessary to generate enough funding to support meaningful conservation success over large areas [9]. While ecotourism can help reduce poverty in communities coexisting with biodiversity [3], ecotourists generally prefer travelling to more accessible areas [10], greatly limiting the opportunities for conservation in more remote regions. Instead, sustainable hunting can create important incentives for biodiversity conservation in areas where ecotourism is not economically viable [11]. At a time when greater proportions of conservation budgets are being spent on enforcement, the revenue from trophy hunting can empower

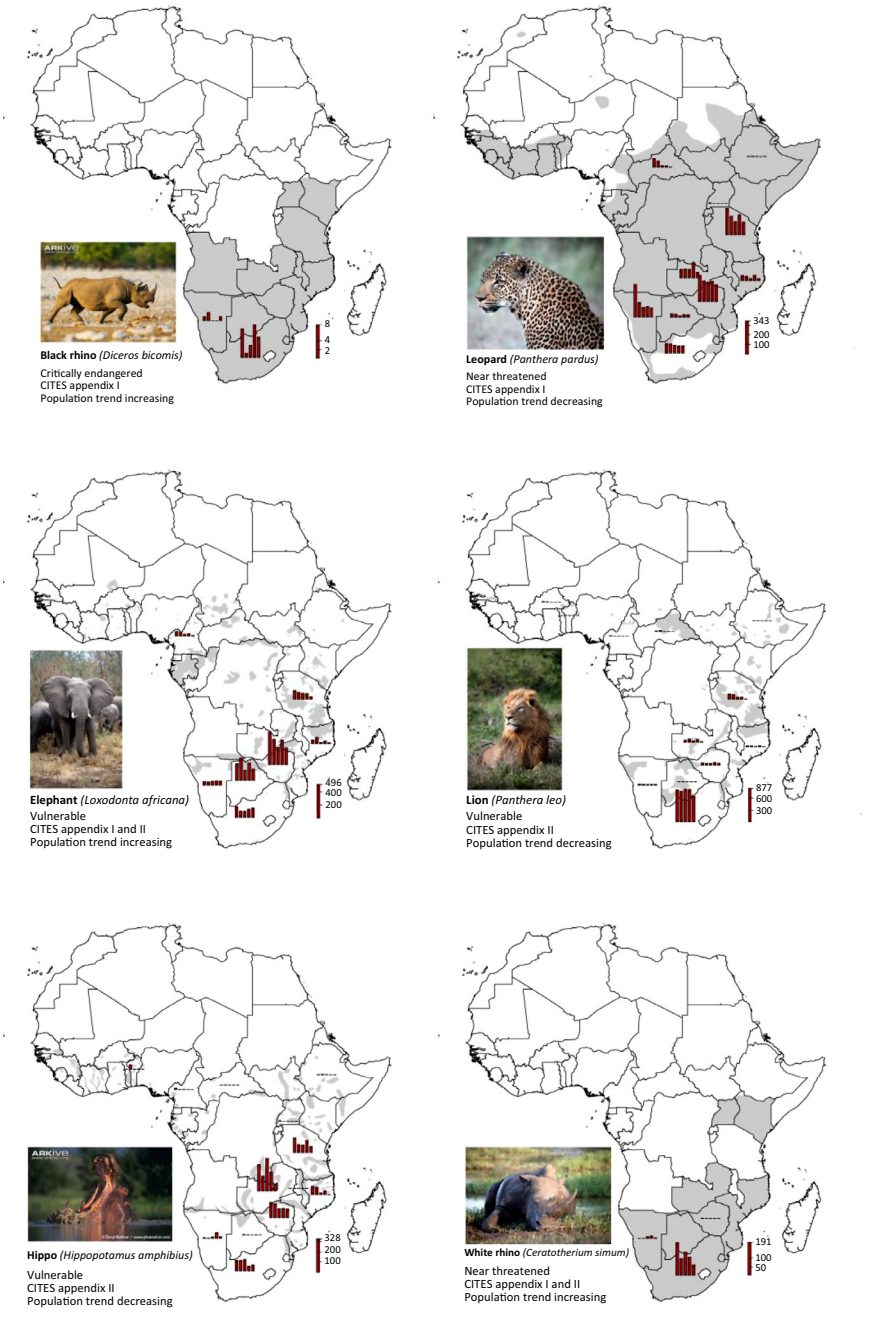

Figure 1. Number of Trophies Exported from 2009 to 2013 (Red Bars) for Six Charismatic African Species Subject to Trophy Hunting. Gray shaded areas correspond to the range maps of species obtained from www.iucnredlist.org/technical documents/spatial data. Each species is listed under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Net export data for each species retrieved from the CITES Trade Database (http://trade.cites.org) by searching for 'trophies' under the 'trade terms' bar. Information about the conservation status, population trend, and CITES listing retrieved from www.iucnredlist.org and www.cites.org. Numbers next to the external bar in each panel indicate the scale to interpret bar charts of annual trophies taken per species and per country.

communities to protect their resources by the employment of more antipoaching rangers or the construction of disincentive infrastructure [12]. If revenue cannot be generated from trophy hunting, natural habitats will be transformed to other forms of land use that provide higher return on investments compared with conservation [3], but have negative impacts on biodiversity.

Second, trophy hunting can have a smaller footprint than ecotourism in terms of carbon emissions, infrastructure development, and personnel, and can generate more revenue from a lower volume of tourist hunters. An often-neglected relation exists between ecotourism and aviation with regard to energy use and greenhouse gas emissions. Compared with ecotourism, the trophy-hunting industry relies on fewer tourist hunters, because the income generated per hunter is higher [13]. Additionally, hunters are interested in maintaining good-quality habitat for the simple reason that the quality of the individuals harvested therein is also high [14]. Finally, hunters are prepared to hunt in areas lacking attractive scenery, and require less infrastructure, therefore minimizing habitat degradation.

Third, management for hunting places emphasis on maintaining large wildlife populations for offtake, as opposed to ecotourism, where the presence of only a few individual animals is sufficient to maximize profits [2]. Both the consumptive and nonconsumptive uses of biodiversity can generate important revenue, so allowing local stakeholders, such as private landowners and communities, to retain property rights over these species is a necessary precursor for them to justify offsetting the direct and opportunity costs of conservation. Thus, the economic models underlying ecotourism and trophy hunting may lead to diverging management strategies. Empirical evidence shows that the strategy of artificially managing small populations within electrified fences to maximize economic return from

Box 1. Prescriptions to Make Trophy Hunting More Effective for Conservation

1. Net Conservation Benefit

1.1 Mandatory levies imposed on safari operators by governments that are invested directly into trust funds for conservation and management.

1.2 Ecolabeling certification schemes adopted for trophies originating from areas that contribute to broader biodiversity conservation and respect animal welfare concerns.

2. Biological Sustainability

2.1 Mandatory population viability analyses to ensure that harvests cause no net population decline.

2.2 Ban posthunt sales of any portion of the quarry shot, to avoid illegal wildlife trade.

3. Socio-Economic-Cultural Benefit

3.1 Promote and fund trophy hunting enterprises run (or leased) by local communities.

3.2 Create trusts to facilitate equitable benefit sharing within local communities and promote long term economic sustainability.

4. Adaptive Management: Planning, Monitoring, and Reporting

4.1 Mandatory scientific sampling of hunted animals, including tissue for genetics, teeth for age analysis, stomach contents, full morphometrics, disease screening, and so on.

4.2 Mandatory 5 year reviews of all individuals hunted and detailed population management plans submitted to government legislators to extend permits.

5. Accountable and Effective Governance

5.1 Full disclosure to the public of all data collected (including levied amounts), although personal details of proponents held by government legislators only.

5.2 Independent government observers placed randomly and without forewarning on safari hunts as they happen.

5.3 Trophies are confiscated and permits are revoked when illegal practices are disclosed.

6. Animal welfare

6.1 Backup professional shooters and trackers present for all hunts to minimize welfare concerns

ecotourism and minimize management costs might be the most appropriate to enhance tourist experiences [2]. By contrast, wildlife populations potentially have higher hunting value when their sizes are larger (i.e., are more viable) and populations are better connected to enhance gene flow, because the latter can affect the fitness and quality of the individuals harvested.

Concluding Remarks

Inadequate political, legal, and governance structures are currently preventing trophy hunting from being an effective tool for creating conservation incentives in sub-Saharan Africa. At the same time, banning trophy hunting might not be the best solution because biodiversity loss could even be worse in its absence. Therefore, we propose a set of prescriptions that could enhance the contribution of trophy hunting to conservation and to the equitable sharing of the benefits with local people (Box 1). To make these prescriptions more relevant for decision-makers, we have summarized them according to the guiding principles on trophy hunting promoted by the International Union for the Conservation of Nature [15]. In particular, we make suggestions on how net biodiversity benefits and stakeholder returns can be achieved simultaneously, and highlight how the hunting industry and governance structures can be made more transparent to avoid unethical or illegal practices. Finally, we provide additional guidelines to account for animal welfare concerns. Promoting these and other prescriptions could enhance the role of trophy hunting in addressing the ongoing loss of species.

Acknowledgments

We thank M. Festa Bianchet and an anonymous reviewer for comments that helped improve the manuscript. E.D.M. acknowledges ERC StG Grant 260393 (GEDA) and the Academy of Finland Centre of Excellence Programme 2012–2017 (Grant 250444) for support. Unless specified otherwise, photographs in Figure 1 by E.D.M.

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Barry, Anna <anna_barry@fws.gov>

ARTICLE: Banning Trophy Hunting will Exacerbate Biodiversity Loss

1 message

Moore, Kathleen <kathleen_moore@fws.gov> Tue, Feb 2, 2016 at 11:52 AM
To: FWHQ AIA-STAFF <fwhq_arl_aia-staff@fws.gov>

Thought folks would be interested in this publication in Trends in Ecology and Evolution.

Very short article. Not real innovative but interesting nonetheless.

--
Kathleen Moore
USFWS/Division of Management Authority
Branch of Permits, MS: IA
5275 Leesburg Pike
Falls Church, VA 22041-3803
1-800-358-2104 (Phone)

Check out the new CITES species database at **www.speciesplus.net** to find out more information about how species are listed and protected under the Convention.

Minon et al. 2016 Banning Trophy Hunting will Exacerbate Biodiversity Loss.pdf
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Vargas, Darcy <darcy_vargas@fws.gov>

Re: Conservation Status of African Lion in Zimbabwe

Vannorman, Tim <tim_vannorman@fws.gov> Tue, Feb 16, 2016 at 11:29 AM
To: Olivia Mufute <omufute@zimparks.co.zw>
Cc: Darcy Vargas <darcy_vargas@fws.gov>

Dear Olivia,

Thank you for the e-mail this morning. There was not a document attached, but I am assuming that it is the same document that is currently on your web page; is that correct? If so, I can download it from the web site, so there is no need to resend the document.

I also see that there is a document on captive-bred lions on the web page. While the document defines "canned hunts", it does not state that canned hunting is illegal. Is it legal to hunt a captive-bred lion and, if so, how are these hunts handled in regards to conservation of wild lions?

On the subject of elephants, when I met with your colleagues in Las Vegas, I learned that Zimbabwe had finalized the national elephant strategy (I have a copy of this document), as well as the four regional plans. I don't have a copy of the regional plans. Would it be possible to send me copies of these documents? I did not see them posted on your web page, but if they are there I could download them.

Thank you again.

Tim

On Tue, Feb 16, 2016 at 10:49 AM, Olivia Mufute <omufute@zimparks.co.zw> wrote:

> Dear Tim,
>
> Further to the meeting at the 44th SCI Convention in Las Vegas, please find attached a document: Conservation Status of African Lions in Zimbabwe.
>
> Regards
>
> Olivia Mufute
>
> Zimbabwe Parks and Wildlife
>
> Chief Ecologist
>
> Direct line: +263-4-790570



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Timothy J. Van Norman, Chief
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Barry, Anna <anna_barry@fws.gov>

Fwd: Conservation Status of African Lion in Zimbabwe

2 messages

Vannorman, Tim <tim_vannorman@fws.gov> Tue, Apr 5, 2016 at 8:43 AM
To: Brenda Tapia <brenda_tapia@fws.gov>, Anna Barry <anna_barry@fws.gov>

info from Zimbabwe on lions

---------- Forwarded message ----------
From: **Olivia Mufute** <omufute@zimparks.co.zw>
Date: Wed, Feb 17, 2016 at 12:15 AM
Subject: RE: Conservation Status of African Lion in Zimbabwe
To: "Vannorman, Tim" <tim_vannorman@fws.gov>

Dear Tim,

Thanks for responding to my email and my apologies for not attaching the document in my previous email. I have now attached the document; ***Conservation Status of African Lion in Zimbabwe***.

The document on the website is the ***Conservation Strategy and Action Plan for Lion (Panthera leo)*** in Zimbabwe and it is a different document from the one I have attached. Yes you can download this document from our website.

Canned hunting is not allowed in Zimbabwe. It is therefore illegal to conduct a canned hunt in Zimbabwe.

Regarding elephant management, the Regional Elephant Management Plans that I sent to you as separate documents are part of the ***National Elephant Management Plan (2015-2020)***. The regional plans are Annexes 9.4 to 9.7 in the National Elephant Management Plan.

Thanks and best regards,

Olivia Mufute

Zimbabwe Parks and Wildlife

Chief Ecologist

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From: Vannorman, Tim [mailto:tim_vannorman@fws.gov]
Sent: Tuesday, February 16, 2016 6:30 PM
To: Olivia Mufute
Cc: Darcy Vargas
Subject: Re: Conservation Status of African Lion in Zimbabwe

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Regards

Olivia Mufute

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CONSERVATION STATUS OF THE AFRICAN LION (*Panthera leo*) IN ZIMBABWE



ZIMBABWE PARKS AND WILDLIFE MANAGEMENT AUTHORITY
JULY 2014

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1.0 INTRODUCTION

The African lion (*Panthera leo*) is an important species that plays a big role in the savannah ecosystem. It is a flagship species with huge social, economic and ecological values. It is a powerful symbol for Africa, and yet living with lions poses hardships for many communities. In some areas, the lion is a major predator on domestic livestock leading to profound conflicts with local communities.

The lion is not only a source of personal and economic damage and danger but is also of economic and personal benefits. The species contributes positively to the livelihoods of local communities through sport hunting. Trophy hunting also contributes to the conservation of lions through financial benefits that are ploughed back into its conservation and that local communities use for rural development programmes. Trophy hunting of the African lion is undertaken through a strict scientific based quota setting process with an objective of ensuring that utilization and any form of harvesting is sustainable.

Zimbabwe is one country that sustainably manages its lion population inside and outside protected areas. The African lion population is increasing in most areas. Research and monitoring of the species is at an advanced stage as there is a lot of baseline information and publications on the conservation status of the species. Zimbabwe has a lion management plan and strategy that are being implemented and reviewed on a regular basis. Rigorous monitoring of lion trophy hunting through adaptive management principles is carried out in Zimbabwe. Non-detrimental findings are conducted for all exports. In conclusion, harvesting and any other forms of off take are not detrimental to the survival of the African lion in Zimbabwe.

2.0 SPECIES BIOLOGY AND LIFE HISTORY CHARACTERISTICS

2.1 Taxonomy

Class	Mammalia
Order	Carnivora
Family	Felidae
Species	*Panthera leo*
English	African lion
Shona	Shumba
Ndebele	Islwane

African lions are the only social felids, with each pride being comprised with an average of 4 to 6 adult lionesses, their dependent offspring, and a temporary coalition of pride males. In lion prides there is no dominance hierarchy amongst lionesses, and female lions are 'free agents' who only contribute to communal care when they have cubs of their own. Although the pride is a stable social unit, it is a fission–fusion social group, in which individuals are typically found in a range of subgroup sizes and compositions. Although earlier studies suggested otherwise, grouping patterns within lion prides are, not associated with foraging efficiency or any other aspect of hunting. However Packer et al. (1990) concluded that group territoriality and group defence of cubs are the main reasons for sociality in lions. Mosser et al. (2009) conclude that female sociality has largely to do with interactions between neighbouring prides – supporting the group territorial hypothesis. Larger prides/subgroups usually 'win' encounters with neighbouring prides (Packer et al. 1990; Grinnell et al. 1995). Larger prides are generally found in higher quality habitats, which typically have numerous buffalo herds and several river confluences (Mosser 2008). The threat posed by neighbours leads to larger group sizes than does the threat of infanticide (Mosser et al. 2009). Cooperative defence against infanticide is another benefit of grouping for female lions (Pusey & Packer 1994). Playback experiments revealed that pride with dependent cubs typically retreat from

foreign males, but that lionesses approach female intruders (McComb et al. 1993, 1994). Leaving cubs unprotected puts them at considerable risk, suggesting that the need to respond to territorial threat may often override the value of protecting cubs. Cooperative defence against infanticide is another benefit of grouping for female lions (Pusey & Packer 1994). However, the threat posed by neighbours leads to larger group sizes than does the threat of infanticide (Mosser et al. 2009).

Although pride males are not always with the pride they fulfil a key function defending the pride and chasing off would be invading or "infanticidal males". In order to do so, males typically form coalitions of two or three males, with solitary males seldom being able to defend a territory. Territories are defended through roaring, patrolling, scent marking and direct aggressive encounters. Importantly male lions impact their reproductive success, mortality and wounding of females. Neighbouring resident males also influence the female grouping patterns within larger prides, and improve the quality of their own pride's territory. Thus male lions are important in group-territorial competition and may use lethal aggression to tip the balance of power in favour of their prides (Mosser et al. 2009). Numerical advantage may additionally benefit large male coalitions by reducing levels of inter-pride competition for their females. The effects of intergroup competition between females are direct and immediate, so much so that male coalitions attempt to modify the dynamics of territorial competition. Group-territorial competition therefore provides strong selection for sociality in both male and females lions. Lions are matrilineal (females stay in their natal pride), with one-third of females dispersing to form new prides (Pusey & Packer 1987). Males leave their natal pride by the age of 4 years and remain solo or form a coalition with other males (Pusey & Packer 1987). Large coalitions of young males (4-5 years of age) are able to easily oust single pride males from their territories, and in areas with no males older than six years of age successfully maintain reproduction in lion prides

Although there is *not yet any empirical evidence* on how the group territorial nature of lions is affected by excessive trophy hunting, the findings from Mosser et al. (2009) suggest that these could be substantive. Without males to co-operate in group territorial defence lionesses might:

- Have to alter their groupings patterns (which may have as yet not described negative consequences)
- Lose more cubs to infanticide, both from foreign males and ***importantly to lionesses from neighbouring prides*** that will kill cubs if the opportunity exists
- Experience higher wounding and mortality rates

3.0 LION DISTRIBUTION AND RANGE

In Zimbabwe, lions are found in three broad land use types, namely gazetted protected areas (parks estate and indigenous forest areas), community-based natural resource management areas and on private land.

3.1 Parks and Wildlife Estate

Parks Estate is under the jurisdiction of the Zimbabwe Parks and Wildlife Management Authority and covers about 13% of the area of the country (390 580 km^2). The Parks Estate comprises six categories of protected areas that are gazetted under the Parks and Wildlife Act, Chapter 20:14. The six categories of protected areas are national parks, recreational parks, sanctuaries, safari areas, botanical reserves and botanic gardens. In these areas, wildlife is the primary and only land use permitted except in botanic gardens. The African lions occur in most of Zimbabwe parks and wildlife estates with the exception of a few areas located in the high and central parts of the country i.e. Matopos National Park, Sebakwe, Ngezi, Chivero, Kyle and Chegutu Safari Area. There are no free ranging lions found in the country's recreational parks, which are located in areas of high human densities where conventional agricultural practices in the surrounding areas preclude the establishment of viable population sizes. Recreational Parks are not suitable for lions due to the small size of the areas, existing prey base and are therefore subject to high human-wildlife conflict. Most of the National Parks and Safari Areas located on the borders of the country support lion populations. Connectivity of lion range has been enhanced by the creation of Transfrontier Conservation Areas such as Greater Limpopo Transfrontier Park (GLTP) and Greater Mapungubwe Transfrontier Conservation Area. Trophy hunting of wildlife is legally permitted in safari areas. There are sixteen safari

3.3 Commercial Ranches

In 1960's there was a shift in wildlife policy from State control to individual proprietorship for white commercial farmers who could now benefit financially from the wildlife on their farms. In 1975, the Parks and Wildlife Act 14/1975 gave commercial farmers the right to exploit wildlife, including lions on their land. The Act legally formalized the policy shift towards sustainable utilization by aiming to confer privileges on owners or occupiers of alienated land as custodians of wildlife. The Act designated these owners or occupiers of alienated land as Appropriate Authorities over wildlife. On commercial private land, lions are found on single ranches and on conservancies. Conservancy are defined as a contractually legitimated entity which involves two or more recognized land and resource authorities. Most of the private farms that have lions are adjacent to major gazetted protected areas.

3.4 Communal Area Management Programme for Indigenous Resources

It was until 1982 that the right to exploit wildlife was extended to communal through granting the Appropriate Authority Status over their wildlife resources to rural district councils. Such Authority allows Rural District Councils to manage and benefit from wildlife resources occurring in them. The intention was to return rights of access to natural resources through legislative change, devolve responsibility and economic empowerment. The Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) is the process through which Government is devolving the management of wildlife resource to communal farmers. Currently (July 2014), 58 Rural Districts have been granted the Appropriate Authority status to manage wildlife resources in their areas. Lions are found in communal areas that are adjacent to major protected areas (Figure2). Lion hunting is allowed in CAMPFIRE districts. Outside of protected areas, lions largely exist on areas peripheral to National Parks.

areas found in the country and lions are found in Matetsi in the north-western area, Chete, Chirisa (in the Sebungwe region), Charara, Hurungwe, Sapi, Doma (in the Zambezi Region), Malipati (South-eastern part of the country) and Tuli safari areas (Figure 1).

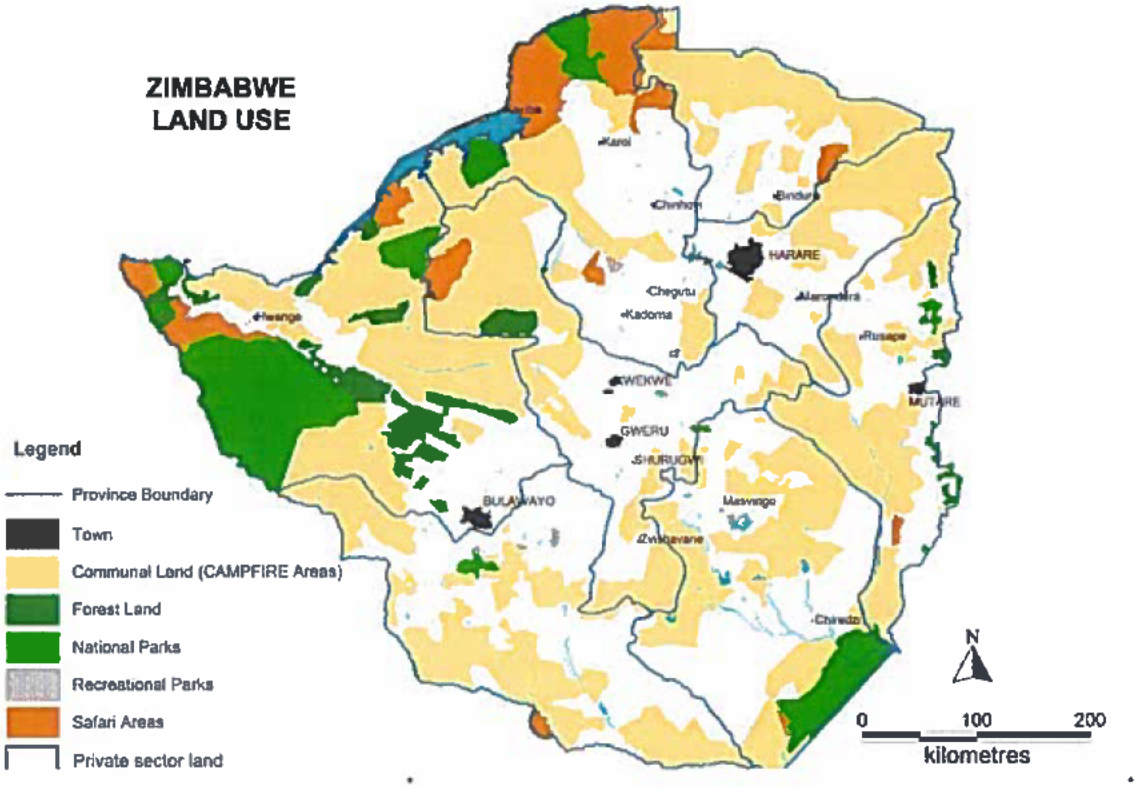

Figure 1: Map of Zimbabwe showing safari areas where trophy hunting is legally permitted.

3.2 Gazetted Indigenous Forest Areas

According to the Forest Act, Chapter 19:05, twenty-four gazetted indigenous forest areas are under the jurisdiction of a State parastatal, Forestry Commission and cover about 880 000 ha (2%) of the area of the country. In gazetted indigenous forest areas, lions are found and hunted in Fuller, Kazuma, Pandamasuwe, Ngamo, Sikumi, Gwayi, Sijarira and Gwampa Forests. The above mentioned State gazetted areas are found on Kalahari sands in the north-western part of the country Zimbabwe.

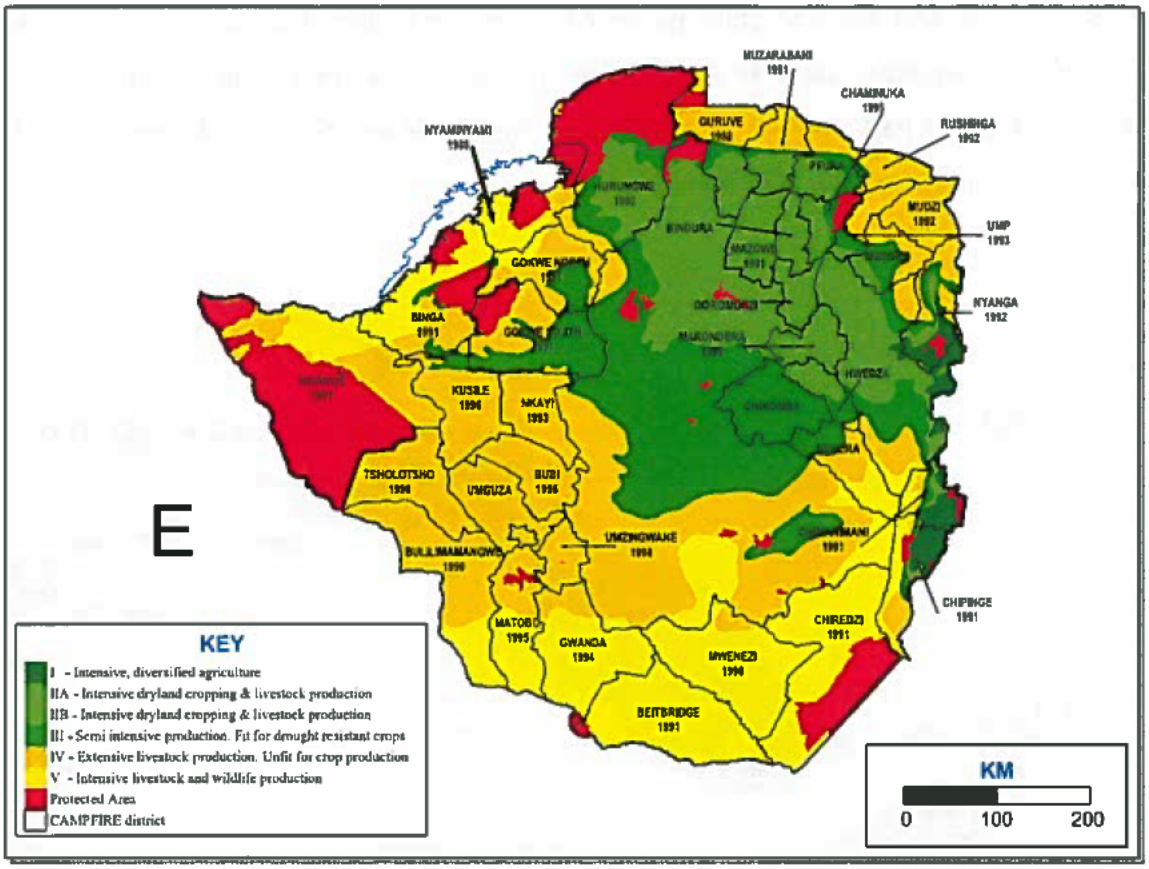

Figure 2: Map of Zimbabwe showing CAMPFIRE districts

3.5 Summary Distribution of Lions

Figure 3 shows a summary of the distribution of lions in Zimbabwe. The distribution of the African lion in Zimbabwe coincides with the major wildlife areas in the country; which are as follows, the North West Matabeleland Region, Sebungwe Region, the Mid-Lower Zambezi valley and South-Eastern part of the country (Gonarezhou National Park, Save Valley Conservancy, Chiredzi River Conservancy, Malilangwe Conservancy, Beitbridge-Tuli complex). Zimbabwe's main lion range includes the Hwange-Matetsi Ecosystem which is about 25000 km^2, the Mid Zambezi Valley (17127 km^2), Sebungwe (15622 km^2) and the South East Lowveld (11000 km^2) (Table 3). The Hwange Ecosystem covers Hwange National Park, Matetsi Safari Area, Gwayi Intensive Conservation Area and Forestry Commission forests such as Sikumi, Gwampa and Fuller. In addition to the main geographic ranges listed above, lions are found on privately owned game farms,

conservancies, and isolated state protected areas throughout the country. Occasional African lion sightings have been recorded in other areas from time to time such as Nyanga National Park in Zimbabwe's Eastern Highlands and Nyatana Wilderness in the North Eastern border with Mozambique.

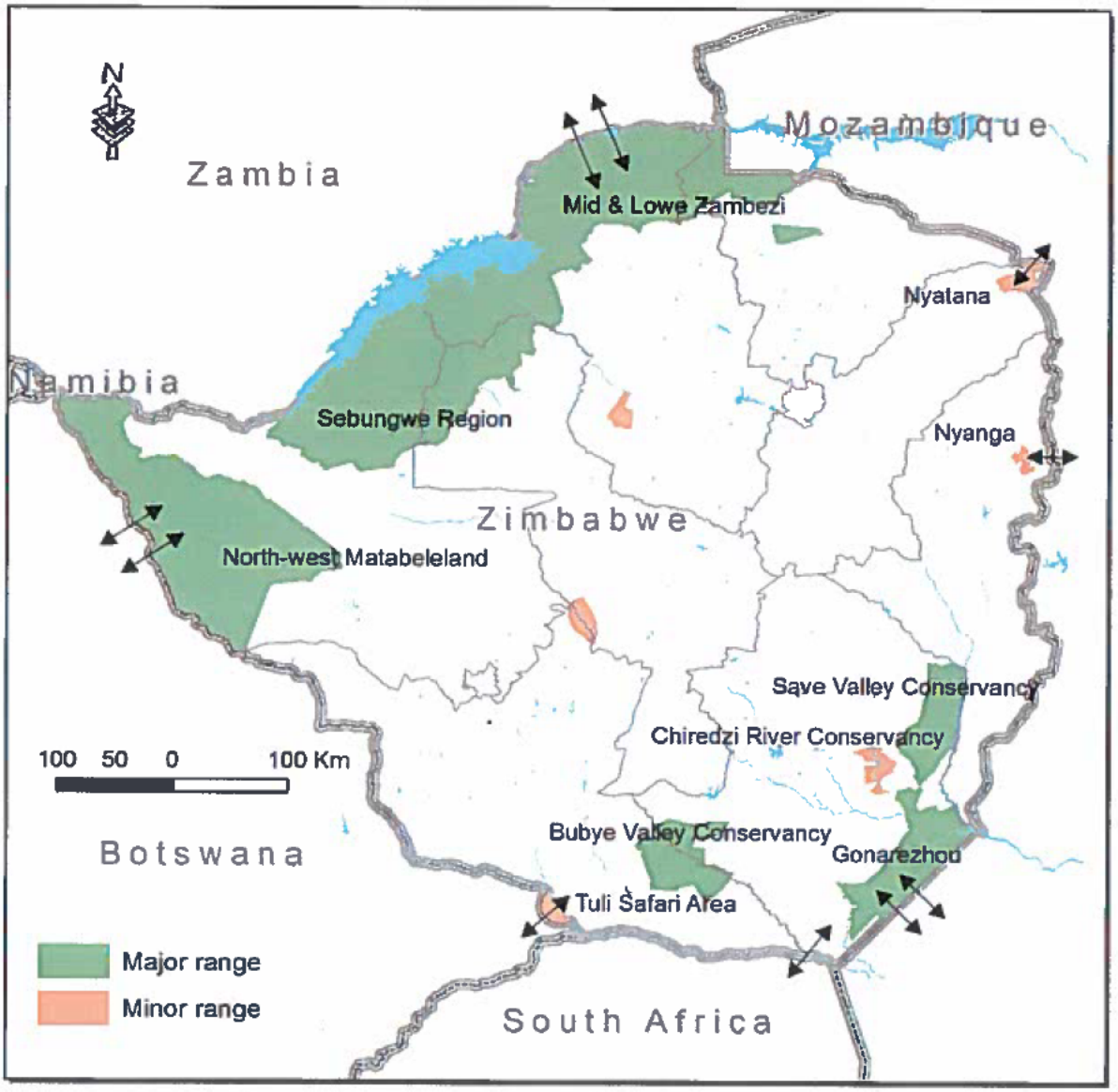

Figure 3: African Lion (*Panthera leo*) Range in Zimbabwe (Zimbabwe Parks and Wildlife Management Authority, 2014)

4.0 SURVEY METHODOLOGY

The population estimates of African lions in Zimbabwe are determined through carnivore spoor surveys, systematic lion collaring and call-up surveys. With the strategy to maintain the wilderness values of most protected areas, there is low road penetration in the parks estates, however all suitable roads are used as transects, and in areas of suitable substrate, spoor surveys have shown to be an effective and efficient means to assess wildlife densities (Stander 1998: Fuston et al. 2001; Davidson and Romanach 2007). Patrol reports, field observations by Zimbabwe Parks and Wildlife Management Authority rangers and other sightings by tour operators and tourists also contribute to knowledge of the status of lions in Zimbabwe's protected areas. Between 2006 and 2012 leopard and lion spoor surveys were conducted in the major wildlife areas. The surveyed areas are shown in the map in Figure 4. A total of 28 sites were surveyed between 2006 and 2012. The survey covered the major areas within the lion range in the country. The survey sites covered 48123km^2 **(12% of the country)** and 14 400km of transects.

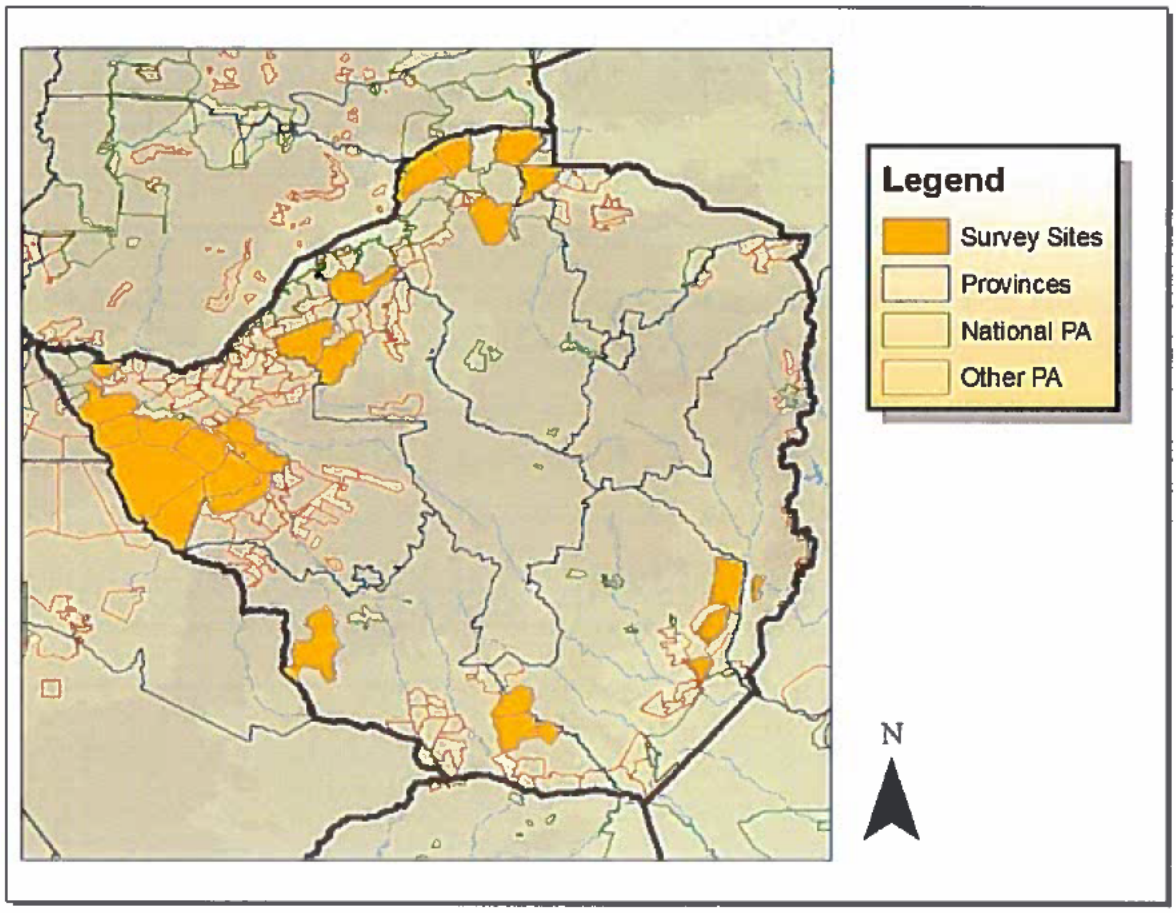

Figure 4: African Lion Survey Sites in Zimbabwe (2012)

Lion population surveys provide useful indices of abundance that can be used to determine spatial distribution, as well as temporal trends in population numbers. Different survey methods are conducted in most of the wildlife estates and areas of minor distribution for purposes of generating information for setting sustainable lion trophy hunting quotas and for population management. In most protected areas, lions compete for food with other carnivores such as spotted hyenas, leopard and wild dog. Carnivore density information can offer early warnings about conservation needs, and provide information for successful future management as well as offer input for decisions regarding hunting quotas or any management requirement. Moreover, carnivore density trends are a reflection of prey densities and therefore save as useful indicator (Conservation Strategy and Action plan for the Lion (*Panthera leo*) In Zimbabwe, 2006).

5.0 POPULATION ESTIMATES

The lion population estimate at national level ranges from 1700 to 2043 animals (Chardonnet 2002, Bauer and Van Der Merwe 2004) (Table 1). The current lion population estimate for the Hwange Matetsi complex is 750, South Eastern Lowveld 350, between 150-175 in the Save Valley Conservancy, 59 in Gonarezhou National Park, 37 in Malilangwe and 400 animals in Bubye Valley Conservancy. The Mid Zambezi Valley comprising of Matusadonha and Mana Pools National Parks, Charara, Chewore and Sapi Safari Areas has a current population estimate of 600 lions (Zimbabwe Parks and Wildlife Management Authority Reports 2011). The current lion population estimates in the minor range areas are also significant.

Table 1: Lion Population Estimates (Bauer & Van Der Merwe, 2004, Chardonnet, 2002).

Area	Sq km's	Estimated population	Estimated minimum	Estimated maximum	Estimated population	Estimated minimum	Estimated maximum
Charara Safari Area	2207	40	24	56			
Chete/Sijarira	1530	40	24	56			
Chewore Safari Area	2704	100	60	140			
Chirisa Safari Area	1788	60	24	56			
Chizarira National Park	1878	60	36	84			
Dande Safari Area	988	50	30	70			
Doma Safari Area	1933	35	21	49			
Gonarezhou/Save Chiredzi/Malilangwe/ Beitbridge/Tuli	5200	130	91	169	188	130	245
Hurungwe Safari Area	2606	80	48	112			
Hwange Ecosystem	25000	120	72	168	543	434	652
Matetsi Safari Area	10349	60	36	84	150	120	180
Mana Pools National Park	14400	97	83	112	495	396	594
Matusadona National Park	1392	120	90	150	310	248	372
Sapi Safari Area.		40	24	56	.		
Zambezi National Park	865	25	15	35			
Totals	72 840	1057	678	1397	1686	1328	2043

6.0 POPULATION DENSITIES

Table 2 shows the current lion population estimates and densities in the Hwange-Matetsi ecosystem. The 12 year average density in the Hwange National Park is 2.8 lions per 100km^2 (2000-2011) with the population fluctuating over this time. This estimate is based on spoor transects and detailed population estimates and on individual recognition of animals in an intensively studied population.

Table 2: Results of lion population surveys of lions in the North West Matabeleland (Hwange Lion Research, 2014)

	Density	Area (km2)	Estimated number of lions	Year of survey
Hwange NP	3.75	14900	559	2013
Matetsi Units 1-5	3.04	1934	59	2008
Matetsi Units 6-7 and Zambezi NP	2.98	1585	47	2013
Ngamo & Sikumi Forest	0.45	1386	6	2008
Gwaai Conservancy	2.40	927	22	2007
Hwange Communal Land (Mvutu & Shana area)	0.61	392	2	2012
Tsholotsho buffer adjacent HNP	0.54	1275	7	2010-11
Chizarira NP	0.83	1948	16	2012
Chirisa SA	0.00	1713	0	2012
Matusadonha NP	2.17	1427	31	2013
TOTAL Lion Estimate			**750**	

The South Eastern Lowveld has a lion population density of about 6 lions per 100km^2 in the Save Valley Conservancy, 9 lions per 100 km^2 in Malilangwe and 0.8 lions per 100 km^2 in the Gonarezhou National Park (Zimbabwe Parks and Wildlife Management Authority Annual Report, 2013) (Figure 5).

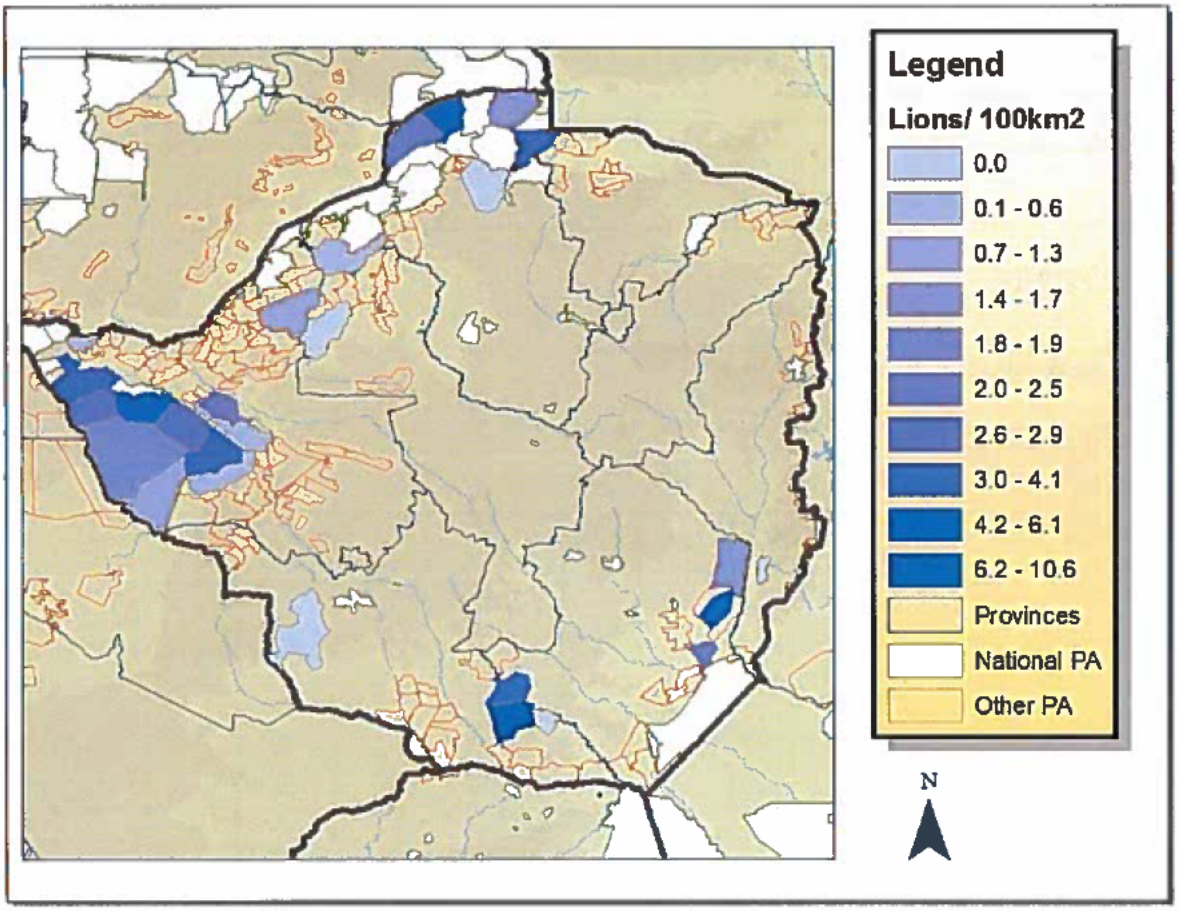

Figure 5: Lion densities in Zimbabwe (Leopard and Lion Spoor Survey Report, 2012).

The Matetsi-Kazuma-Zambezi complex to the North West of Hwange (4935km^2; composed of Deka and Matetsi Safari Areas, Kazuma and Zambezi National Parks and Kazuma and Pandamasuie Forests) is estimated to have a population of 222 lions based on a density of 4.5 lions per 100km^2. This estimate is extrapolated from a spoor survey of 1600km^2 area of the Matetsi-Kazuma-Zambezi complex in 2007. Table 3 shows lion population estimates and densities in selected survey sites in the Zambezi Valley and

surrounding areas from the spoor survey done between 2011 and 2012. Table 4 shows the population estimates for Gonarezhou National Park in 2013.

Table 3: Population estimates and lion densities in selected survey sites in the Zambezi Valley (Hwange Lion Research, 2014)

Survey Site	Density/ $100km^2$	Area (km^2)	Estimated number	Year of Survey
Omay	0.28	1865	5	2012
Chewore North	1.92	1648	32	2012
Dande	1.83	1155	21	2012
Hurungwe (Nyakasanga & Rifa)	1.89	1709	32	2011
Mana Pools	4.52	1287	58	2011
Hurungwe Mukwichi CAMPFIRE Area	0	1853	0	2011

Table 4: Population estimates from call up survey for Gonarezhou National Park (Lion Call Up Survey, 2013)

Parameter	Northern GNP	Southern GNP	Total
Area (km^2)	1665	2121	3786
Combined transect length (km)	229.8	301.8	531.6
Penetration ratio	1:7.25	1:7.03	1:7.12
Results			
Number of individual lion spoor seen	22	5	27
Lion spoor frequency (km/spoor)	10.45	60.36	19.69
Spoor density (spoor/100km)	9.57	1.66	5.08
Density of lions per $100km^2$ (Y=0.3049X)	2.9	0.5	1.5
Estimated number of lions	48	11	59

7.0 POPULATION TRENDS

In Zimbabwe, trends in the population estimates of African lions show a growing population trend. The average lion densities in most protected areas are also showing an increasing trend. For example in Gonarezhou National Park as shown in Table 5, an estimate of 24 lions was established in 2009 and by 2013 the population had grown by 150% to an estimated 60 individuals within a period of 4 years. Other areas within other protected areas with similar management regimes are also reflecting similar trends in population estimates.

Table 5: African Lion population estimates for Gonarezhou National Park (2009 to 2013) (Annual Report, 2013)

Species	2009	2010	2011	2012	2013
Lion	24	34	55	49	59

Bubye Valley Conservancy is a closed protected are system with a large resident lion population. Figure 6 shows the trend in lion population growth for the Conservancy from the time of introduction of lions into the property in 1999 to present. Bubye valley conservancy has the highest lion density of 14 lions per $100km^2$.

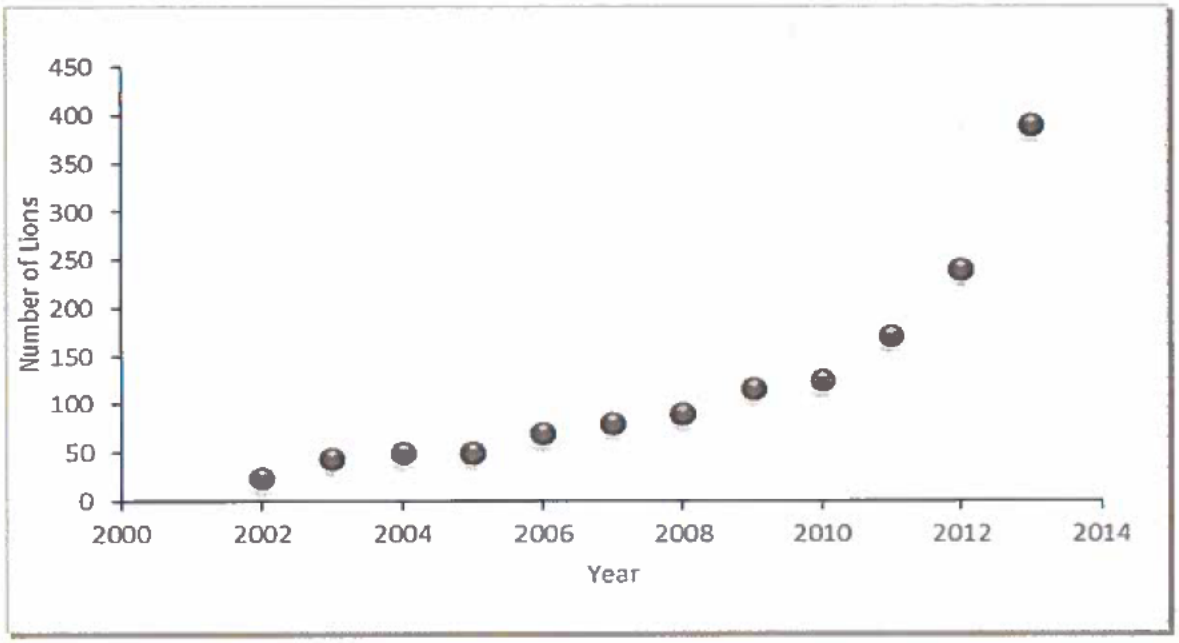

Figure 6: Trends in lion population for Bubye Valley Conservancy (Lion Report, 2014)

8.0 LEGAL UTILIZATION OF LIONS

8.1 Annual Trophy Quotas

Lions are used for consumptive and non-consumptive purposes. The main uses are trophy sport hunting, photographic safaris and educational purposes in captive breeding operations. Table 8 shows national annual lion trophy quotas for different broad land use types. The quotas set for trophy hunting are declining from 114 in 2004 to 89 in 2014 as part of adaptive management of the lions.

Table 8: National Annual Lion Trophy Quotas (ZPWMA Utilisation Unit, 2014)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Parks	36	30	34	30	29	25	26	29	31	36	38
Communal	58	45	43	34	35	38	34	33	31	24	26
Forestry	9	8	3	3	3	3	3	4	4	4	4
Private	11	15	22	26	25	24	19	20	17	21	21
Totals	**114**	**98**	**102**	**93**	**92**	**90**	**82**	**86**	**83**	**85**	**89**

8.2 Quota Setting

Zimbabwe uses scientific information in the setting of adaptive lion quotas. Information from spoor surveys, camera traps, ranger based sighting is used during the quota setting process. Other sources of indirect information include the actual offtake, duration of hunt, trophy size and historical data are also considered. In Campfire areas incidences of Human lion conflict is also taken into consideration where surveys have not been possible.

The Quota setting process involves all stakeholders namely the ZPWMA, Landowners, Safari Operators, Campfire managers and their representatives. During the workshops presentations are made by the proponents who are rigorously questioned by the stakeholders. The Quota setting process is a participatory process where proponents present their proposals which are scrutinised according to set criteria. The Lion quota is therefore adaptively issued depending on the biological factors that are presented at the workshop. Where it is felt that not enough information has been presented a precautionary quota is issued. The Authority reserves the right to carry out verification of the presented information in the form of site visits.

8.3 Annual Trophy Quotas

In Zimbabwe the lion is not listed on the CITES appendix and as such the country is able to set quotas which are sustainable with the numbers not limited by CITES.

9.0 ILLEGAL TRADE IN LIONS AND THEIR PRODUCTS

Illegal trade in lions and their products is very insignificant. There are no records of people found in possession of illegally acquired lion specimens in Zimbabwe. Anyone found in possession of illegally acquired lion specimens pays a fine of USD5000 or faces a mandatory jail sentence. In On conviction for lion poaching, courts may ask the convict to pay compensation fee of US$**20 000.** Some illegal off takes occur when lions are accidentally killed through snares or chemical poisoning meant for herbivores. Other cases involve retaliatory killing of lions as a result of livestock predation outside protected areas. Figure 5 show that poaching of lions is increasing since 2009.

10.0 HUMAN AND LION CONFLICT MANAGEMENT

The lion is a flagship species and powerful symbol of Africa, and yet living with lions poses hardships for many communities. In some areas, the lion is a major predator on domestic livestock, leading to profound conflicts with local herders.

Table Human and Lion Conflict (2009 to 2011) (CAMPFIRE Association, 2012)

District	**Total incidents**	**People Injured**	**People Killed**	**Livestock killed**
Hurungwe	5	2	2	1
Chiredzi	25	0	0	136
Mbire	5	0	5	7
Binga	9	0	0	39
Total	**44**	**2**	**7**	**183**

11.0 MANAGEMENT INITIATIVES AND CONTROL MEASURES WITH REGARD TO LION CONSERVATION

Outside of protected areas, lion's prey base is much reduced. The conservation of habitat outside protected areas is important. Co-existence of lions and people is promoted through giving value to lions, through tourism and hunting Communal Area Management Programme for Indigenous Resources (CAMPFIRE) is promoted in a number of communal lands. Government policy initiatives and control measures regarding lion conservation include the following:

- Appropriate Authority Status where land holders are given the rights to utilize and benefit from wildlife on the areas under their jurisdiction this is through CAMPFIRE, a community based natural resource management programme.
- Wildlife Based Land Reform Policy (2002)
- Conservation strategy and action plan for the lion (*Panthera leo*) in Zimbabwe (2006). Prepared following a Workshop. 30-31 October 2006. Harare

There are a number of collaborative research and monitoring programmes in the major range areas covering land within and around Hwange National Park, Matusadona National Park as well as Bubye and Save Valley Conservancies. These research programmes cover population dynamics, behaviour and prey dynamics as well as impact of trophy hunting, economic value of lions to consumptive and non-consumptive tourism and conflict between lions and local people with a view to mitigating of conflicts and improved conservation of lions in these areas. Other management initiatives and control measures include the following:

- Undertaking non-detriment findings for all lion exports quotas
- Research and monitoring in major parks estates like Hwange NP and Gonarezhou National Park
- Implementing a rigorous Quota setting Methodology across all hunting areas.
- Training of Rural District Councils in alternative Problem Animal Control methods.

- Participatory land use planning to minimize human-lion conflict.
- Development of updated park development plans for all protected areas and surrounding land uses.
- Lion Workshops for various targeted stakeholders.
- Training modules on lion management and lion aging at the Mushandike Wildlife College and National Universities.
- Holding Judiciary Stakeholder workshops to ensure appropriate deterrent sentences to offenders.
- Education and Awareness
- Captive Breeding of lions for tourism and educational programmes.

Starting from 2015 lion spoor surveys will be done at 2 year interval in all wildlife areas and lion call up survey will be done in the third year in all major lion range areas.

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Barry, Anna <anna_barry@fws.gov>

Fwd: Zimbabwe Lion

1 message

Vannorman, Tim <tim_vannorman@fws.gov> Tue, Apr 5, 2016 at 8:41 AM
To: Anna Barry <anna_barry@fws.gov>

Zimbabwe lion information
——— Forwarded message ———
From: **Eckert, Matthew** <MEckert@safariclub.org>
Date: Tue, Mar 29, 2016 at 4:32 PM
Subject: Zimbabwe Lion
To: Tim Van Norman <Tim_Vannorman@fws.gov>

Hi Tim,

Zimbabwe is asking for our support on some lion work. Before we help them, we wanted to ask whether you see anything that is missing from this scope of work that would be important to include for making an enhancement finding. I'm in the office tomorrow through Friday if you wouldn't mind calling me on this issue. They want to start work next week.

Thanks,

Matt
202-543-8733

–
Timothy J. Van Norman, Chief
Branch of Permits
Division of Management Authority
U.S. Fish and Wildlife Service
(703) 358-2350

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2 attachments



ZPWMA SCI Support Letter.jpg
388K

Lion NDF Proposal.pdf

211K

ZIMBABWE PARKS AND WILDLIFE MANAGEMENT AUTHORITY

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: 793867, 250658

Email : info@zimparks.co.zw

All correspondence to be directed to Director General

Head Office

Botanical Gardens
Cnr Borrowdale Rd/Sandringham Dr
P.O.Box CY 140
Causeway
Harare

www.zimparks.org

Ref:

22 March 2016

SCI Africa Chapter

ATTENTION: Mr George Pangeti

RE: LION (*Panthera leo*) NON DETRIMENT FINDING FOR ZIMBABWE

The Zimbabwe Parks and Wildlife Management Authority (ZPWMA) in conjunction with Zimbabwe Professional Hunters and Guides Association (ZPHGA) are requesting financial support to prepare the Zimbabwe lion non detrimental finding in order to comply with the USFWS general ruling under section 4d of the ESA. The ZPWMA would be working with the ZPHGA on the document under the following terms of reference and guidelines (see attached document).

1. Establish population status
2. Establish population trends
3. Distribution of lions in Zimbabwe
4. Harvest/ utilization of lions
5. trade information and legal status
6. local community involvement
7. use of hunting fees for conservation
8. other biological and ecological factors

The ZPWMA has assigned Mrs Rose Mandisodza-Chikerema to work on the project with Mr Vernon Booth from ZPHGA.

Our budget to undertake this work is outlined in the documents attached.

A. Musakwa (Mr)
For DIRECTOR GENERAL

Study of the contribution of sustainable trophy hunting to the management and conservation of lion in Zimbabwe

Background

On the 23rd December 2015, the U.S. Fish and Wildlife Service (USFWLS), determined that the status of the lion subspecies from West Africa (*Panthera leo leo*) is endangered while the southern and eastern African subspecies (*P. l. melanochaita*) is threatened in terms of the Endangered Species Act of 1973, as amended (ESA)[1]. Consequently, the USFWLS published a rule under section 4(d) of the ESA that provides for conservation measures for *P. l. melanochaita*. This rule is effective from January 22, 2016 and is available on the Internet at http://www.regulations.gov.

In 2011, the USFWLS received a petition from several international animal welfare organisations requesting that the African lion subspecies be listed as endangered under the ESA. In 2012 the USFWLS published a "positive" 90-day finding confirming that it would initiate a status review of the African lion. In October 2014, the results of this review were published in the Federal Register concluding that the listing of the subspecies *Panthera leo leo* as a threatened species was warranted. Moreover, USFWLS proposed a rule under section 4(d) of the ESA to provide conservation measures for the African lion.

Following this announcement, USFWLS received additional comments from the public and peer reviewers that were taken into consideration to determine the final listing status of lion. This final rule incorporates changes based on the comments that were received as well as newly available scientific and commercial information that became available after the close of the comment period. In particular, USFWLS took into consideration additional information on the practices of trophy hunting that experts identified as undermining the sustainability of trophy hunting of lion populations. This prompted USFWLS to expand its assessment of the level of threat that trophy hunting presents to the species that resulted in further factors been take into consideration when making an enhancement finding for importation of sport-hunted trophies of *P. l. melanochaita.*

Information required to support Non-Detrimental Findings (NDF) under the 4(d) Rule for *Panthera leo melanochaita*

The purpose of the ESA is to provide a means whereby the ecosystems upon which endangered and/or threatened species depend may be conserved, to provide a programme for the conservation of such endangered and/or threatened species, and to take such steps as may be appropriate to achieve the purposes of the treaties and conventions set forth in the ESA. As a result, an import permit is now required under 50 CFR 17.32 for the

[1] The Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 *et seq.*), is a law that was passed in the USA to prevent extinction of species by providing measures to help alleviate the loss of species and their habitats. Before a plant or animal species can receive the protection provided by the Act, it must first be added to the Federal List of Endangered and Threatened Wildlife or the Federal List of Endangered and Threatened Plants in part 17 of title 50 of the Code of Federal Regulations (CFR). Section 4 of the Act and its implementing regulations at 50 CFR part 424 set forth the procedures for adding species to these lists.

importation of all *P. l. melanochaita* specimens. Therefore, through the promulgation of the 4(d) rule, all otherwise prohibited activities, including all imports of *P. l. melanochaita* specimens, require prior authorization or permits in terms of the ESA.

The regulations are covered under 50 CFR 17.32 which authorises the permit holder to carry out an otherwise prohibited activity for: scientific purposes, the enhancement of propagation or survival of the species, economic hardship, zoological exhibitions, educational purposes, or special purposes consistent with the purposes of the ESA. Applications for these activities are available from either *http://www.fws.gov/forms/3-200-20.pdf* or *http://www.fws.gov/forms/3-200-37.pdf.*

After extensively reviewing the available data regarding the biology and ecology of lion in Africa, and taking into consideration the benefits from sustainable hunting as well as the threats to continued survival of lion population in southern Africa, the USFWLS has identified the following factors that need to be provided in terms of the permitting regulations at 50 CFR 17.32. Specifically, the issuance criteria for threatened species permits are provided under 50 CFR 17.32(a)(2)), but do not specify what would constitute the enhancement of propagation or survival with regard to authorizing the import of parts or products of *P. l. melanochaita,* including sport-hunted trophies.

Therefore, when making a determination USFWLS will examine:

- The overall conservation and management of the subspecies in the country where the specimen originated;
- Whether that management of the subspecies addresses the threats to the subspecies (i.e., that it is based on sound scientific principles and that the management programme is actively addressing the current and longer term threats to the subspecies).
- Evaluate whether the import contributes to the overall conservation of the species by considering whether the biological, social, and economic aspects of a programme from which the specimen was obtained provide a net benefit to the subspecies and its ecosystem.

The Service will evaluate any application received that involves *P. l. melanochaita* in the context of enhancement of propagation or survival in accordance with its threatened species permitting regulations at 50 CFR 17.32, and issuance criteria for threatened species permits (50 CFR 17.32(a)(2)). These include, in addition to the general permitting criteria in 50 CFR 13.21(b):

(i) Whether the purpose for which the permit is required is adequate to justify removing from the wild or otherwise changing the status of the wildlife sought to be covered by the permit;
(ii) The probable direct and indirect effect that issuing the permit would have on the wild populations of the wildlife sought to be covered by the permit;
(iii) Whether the permit, if issued, would in any way, directly or indirectly, conflict with any known programme intended to enhance the survival probabilities of the population from which the wildlife sought to be covered by the permit was or would be removed;
(iv) Whether the purpose for which the permit is required would be likely to reduce the threat of extinction facing the species of wildlife sought to be covered by the permit;

(v) The opinions or views of scientists or other persons or organizations having expertise concerning the wildlife or other matters germane to the application; and
(vi) Whether the expertise, facilities, or other resources available to the applicant appear adequate to successfully accomplish the objectives stated in the application.

In addition to these factors, particularly in relation to sport hunting, USFWLS will take into consideration the *IUCN Species Survival Commission (SSC) Guiding Principles on Trophy Hunting as a Tool for Creating Conservation Incentives, Ver. 1.0* (IUCN SSC 2012), to assist them when making an enhancement finding for importation of sport-hunted trophies of *P. l. melanochaita*. This document sets out guidance on the use of trophy hunting as a tool for "*creating incentives for the conservation of species and their habitats and for the equitable sharing of the benefits of use of natural resources*" (IUCN SSC 2012, p. 2) and recognizes that recreational hunting, particularly trophy hunting, can contribute to biodiversity conservation and more specifically, the conservation of the hunted species.

The SSC document lays out five guiding principles that, considered in conjunction with the USFWLS threatened species issuance criteria, will aid the Service when making an enhancement finding for importation of sport-hunted trophies of *P. l. melanochaita*. These are:

(a) *Biological sustainability:* The hunting programme cannot contribute to the long-term decline of the hunted species. It should not alter natural selection and ecological function of the hunted species or any other species that share the habitat. The programme should not inadvertently facilitate poaching or illegal trade in wildlife by acting as a cover for such illegal activities. The hunting programme should also not manipulate the ecosystem or its component elements in a way that alters the native biodiversity.

(b) *Net Conservation Benefit:* The biologically sustainable hunting programme should be based on laws, regulations, and scientifically based quotas, established with local input, that are transparent and periodically reviewed. The programme should produce income, employment, and other benefits to create incentives for reducing the pressure on the target species. The programme should create benefits for local residents to co-exist with the target species and other species. It is also imperative that the programme is part of a legally recognized governance system that supports conservation.

(c) *Socio-Economic-Cultural Benefit:* A well-managed hunting programme can serve as a conservation tool when it respects the local cultural values and practices. It should be accepted by most members of the community, involving and benefiting local residents in an equitable manner. The programme should also adopt business practices that promote long-term economic sustainability.

(d) *Adaptive Management: Planning, Monitoring, and Reporting:* Hunting can enhance the species when it is based on appropriate resource assessments and monitoring (*e.g.*, population counts, trend data), upon which specific science-based quotas and hunting programmes can be established. Resource assessments should be objective, well documented, and use the best science available. Adaptive management of quotas and programmes based on the results of resource assessments and monitoring is essential. The programme should monitor hunting activities to ensure that quotas and sex/age restrictions of harvested animals are met. The

programme should also generate reliable documentation of its biological sustainability and conservation benefits.

(e) *Accountable and Effective Governance:* A biologically sustainable trophy-hunting programme should be subject to a governance structure that clearly allocates management responsibilities. The programme should account for revenues in a transparent manner and distribute net revenues to conservation and community beneficiaries according to properly agreed decisions. All necessary steps to eliminate corruption should be taken and to ensure compliance with all relevant national and international requirements and regulations by relevant bodies such as administrators, regulators and hunters.

The Service's approach to enhancement findings for the importation of sport-hunted trophies of *P. l. melanochaita* is consistent with the purpose and intent of the Endangered Species Act. Before it will authorize the importation of a sport-hunted trophy, it must determine that the trophy hunting programme is managed to ensure the long-term survival of the species. In particular, the hunting programme should demonstrate that communities who share the same habitat and compete with humans living in these areas for space and resources benefit from the presence of wildlife.

Thus, when evaluating whether the importation of a trophy of *P. l melanochaita* would be authorized pursuant to 50 CFR 17.32, in accordance with the threatened species issuance criteria, USFWLS will examine how a country's management programme for lions addresses the following three main threats: Habitat loss, loss of prey base, and human-lion conflict.

Some of the factors taken into consideration include:

- Whether the programme is based on sound scientific information and identifies mechanisms that would arrest the loss of habitat or increase available habitat (i.e., by establishing protected areas and ensuring adequate protection from human encroachment).
- Whether the management programme actively address the loss of the lion's prey base by addressing poaching or unsustainable offtake within the country.
- A component of a management plan from which trophy imports would meet the issuance criteria would be whether there are government incentives in place that encourage habitat protection by private landowners and communities and incentives to local communities to reduce the incursion of livestock into protected areas or to actively manage livestock to reduce conflicts with lions.
- Examine if the hunting component of the management programme supports all of these efforts by looking at whether hunting concessions/tracts are managed to ensure the long-term survival of the lion, its prey base, and habitat.
- Examine if the trophy hunting provides financial assistance to the wildlife department to carry out elements of the management programme and if there is a compensation scheme or other incentives to benefit local communities that may be impacted by lion predation.
- Consider how a U.S. hunter's participation in the hunting programme contributes to the overall management of lions within a country.
- Management programmes for *P. l. melanochaita* would be expected to address, but are not limited to,
    - evaluating population levels and trends;
    - the biological needs of the species;

- quotas; management practices;
- legal protection;
- local community involvement; and
- use of hunting fees for conservation.

In evaluating these factors, USFWLS will work closely with the range country and interested parties to obtain the information. By allowing entry into the United States of *P. l. melanochaita* trophies from range countries that have science-based management programmes, it is anticipated that other range countries would be encouraged to adopt and financially support the sustainable management of lions that benefits both the species and local communities. In addition to addressing the biological needs of the subspecies, a scientifically based management programme would provide economic incentives for local communities to protect and expand *P. l. melanochaita* habitat.

Under this 4(d) rule any person wishing to conduct an otherwise prohibited activity, including all imports of *P. l. melanochaita* specimens, must first obtain a permit under 50 CFR 17.32. The onus is on individual requesting the import permit to provide all the information in their application showing that the activity meets the requirements for issuance criteria under 50 CFR 17.32.

Where it is not possible for the applicant to provide all of the necessary information needed by the USFWLS to make a positive determination under the ESA to authorize the activity, the Service will typically consult with the range country to the extent practicable and other interested parties to obtain necessary information.

The Service has the discretion to make the required findings on sport-hunted trophy imports of *P. l. melanochaita* on a country-wide basis, although individual import permits will be evaluated and issued or denied for each applicant. While the Service may make enhancement findings for sport-hunted trophy imports of *P. l. melanochaita* on a country-wide basis, the Service encourages the submission of information from individual applicants.

Steps taken to address the requirements of the 4(d) Rule for *Panthera leo melanochaita*

In 2006, the Zimbabwe Parks and Wildlife Management Authority (ZPWMA), with the help of IUCN, prepared the **"Conservation Strategy and Action Plan for the Lion (*Panthera leo*) in Zimbabwe".** Since then a number of detailed research programmes have been conducted in the Hwange National Park and surrounding protected areas as well as on private conservancies (Malilangwe, Bubye and Save). It has also introduced criteria to monitor the age of trophy hunted lions which in turn is used to assist with quota allocations using a points system.

More recently (2015) the ZPWMA prepared an initial report on the **"Conservation Status of the African Lion (*Panthera leo*) in Zimbabwe".** This report was submitted to the European Union and later to the USFWLS.

Scope of work

In conjunction with the Zimbabwe Parks and Wildlife Authority, Safari Operators Association (SOAZ), Zimbabwe Professional Hunters and Guides Association (ZPHGA) and the

CAMPFIRE Association, the consultant is expected to assess the requirements to fulfil the criteria called for under the 4(d) Ruling issued by the United Stated Fish and Wildlife Services. This will include, but is not limited to the following:

- Assess the overall legal and regulatory framework of the sport hunting sector, and indicate where these might be improved or better enforced.
- Assess the opportunities for improving the governance and transparency in the management of the lion hunting industry.
- Assess the opportunities in the non-government sector that could contribute to improving governance and management of wildlife and protected areas, with a special focus on community participation.
- Assess the reliability of data from the conservation and wildlife sector and indicate activities that may improve data collection for monitoring purposes.
- Assess the suitability of some of the policies and management practices developed in other countries in the region, and indicate opportunities for adapting these for the Zimbabwe setting.
- Identify the knowledge gaps required to complete the Zimbabwe NDF for lion in terms of the 50 CFR 17.32 Permit requirements
- Assist the ZPWMA to prepare the national NDF for lion in accordance with the requirements listed above.

Methodology

The assignment will be a combination of literature studies and limited field work. The consultant will work closely with the ZPWMA and ZPHGA to gather and analyse data related to the administration and management of lion conservation in the country. The consultant will liaise with relevant institutions on the government and non-government side, with selected researchers in national and international research entities with special expertise on the wildlife and conservation sector in Zimbabwe. Special attention is to be given to extracting key economic data from the safari hunting industry that clearly demonstrates its contribution to the conservation of lion in Zimbabwe. If necessary, the consultant will conduct a short field visit to at least one safari area, one CAMPFIRE Area and to a conservancy.

Time frame and reporting

The assignment will take place from 4th April till 27th May, 2016. The consultant will develop a draft report in conjunction with the ZPWMA and conduct a half-day workshop for the relevant stakeholders. The report will be in English, and will be of a maximum of 50 pages plus relevant annexes. The draft report should be submitted by 30th April, and a final report should be submitted one week after receiving written comments from the ZPHGA and ZPWMA.

Barry, Anna <anna_barry@fws.gov>

Fwd: African Lion - 2015 Zimbabwe NDF (sent on behalf of John Jackson)

1 message

Vannorman, Tim <tim_vannorman@fws.gov> Mon, Jan 11, 2016 at 1:26 PM
To: Anna Barry <anna_barry@fws.gov>
Cc: Lisa Lierheimer <lisa_lierheimer@fws.gov>

Anna,

As discussed at last Thursday BOP meeting, the evaluation of lion trophy imports has been divided up between the biologists and senior biologists. You were selected to analyze Zimbabwe's lion trophy program.

While there is a draft letter saved on the R drive (R:/dma/bop/lions/zimbabwe), I am not sure we need to send it yet. Attached is Zimbabwe's non-detriment finding which may cover much of what we need to make our enhancement finding (either pro or con). Please review the non-detriment finding with an eye towards enhancement. We can then talk about whether we need additional information or not. Remember I have been working on Zimbabwe elephant program, so have a lot of additional background information that will help in your evaluation.

Thanks,

Tim

---------- Forwarded message ---------
From: **Regina A. Lennox** <regina.lennox@conservationforce.org>
Date: Mon, Jan 11, 2016 at 1:20 PM
Subject: Re: African Lion - 2015 Zimbabwe NDF (sent on behalf of John Jackson)
To: "Vannorman, Tim" <tim_vannorman@fws.gov>

Hi Tim,
Great. Do you have Zimbabwe's aging guidelines for 2014 and forward? I attach that too, just in case. It is available on ZimParks' website, but I am not sure it ever made it to you. It explains some of the decisions in the NDF.
Cheers,
Regina

On Mon, Jan 11, 2016 at 11:57 AM, Vannorman, Tim <tim_vannorman@fws.gov> wrote:

> Regina,
>
> Thank you for the e-mail. I was about to send a letter to Olivia with a series of questions regarding lions - your e-mail may make that letter unnecessary at this time.
>
> I will have one of my staff review the non-detriment finding to see if it answers all of our questions regarding whether the lion hunting program is enhancing the survival of the species (the requirement under the Endangered Species Act). If we have additional questions, we will contact Olivia directly.
>
> Sincerely,
>
> Tim

On Mon, Jan 11, 2016 at 12:44 PM, Regina A. Lennox <regina.lennox@conservationforce.org> wrote:

Dear Tim,

Attached please find Zimbabwe's 2015 Non-Detriment Finding for African Lion. It is being submitted to assist FWS in making its enhancement finding for import of lion hunting trophies from Zimbabwe. We hope to be able to provide other relevant documents as they become available.

We intend to refer to these documents in permit applications in lieu of attaching them to each individual application unless you would prefer they be attached to each.

We note that the current population estimates have increased since those in the attached document. Example: Bubye Valley Conservancy is reported to now have 510 lion.

Most sincerely,

John J. Jackson, III

—
Conservation Force
3240 S I-10 Service Road W, Suite 200
Metairie, Louisiana 70001 USA
504-837-1233 (office)
www.conservationforce.org

--
Timothy J. Van Norman, Chief
Branch of Permits
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—
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Lion trophy age restrictions Zimbabwe 2014.pdf
500K

NDF N

AGE RESTRICTIONS ON LION TROPHIES AND THE ADAPTIVE MANAGEMENT OF LION QUOTAS IN ZIMBABWE



PANTHERA
LEADERS IN WILD CAT CONSERVATION



Photos: P. Funston

Introduction

African lions are one of the most sought after species by international hunting clients and are key for the viability of the trophy hunting industry. However, during recent years there has been increasing awareness of the negative impacts associated with lion hunting on lion populations in some areas, including in Zimbabwe. However, research has also demonstrated that lion hunting can be sustainable if quotas are established in a scientific manner, and that lion populations are able to recover quickly from over-harvest if the pressure on them is removed.

There has been increasing international pressure on lion hunting during recent years, manifested in a proposal to list lions on CITES Appendix I in 2004, and more recently in a petition of the United States Fish and Wildlife Service by a consortium of animal welfare groups to list lions as endangered pursuant to the US endangered species act. The European Union is also under pressure to ban imports of lion trophies. Any of those measures, if adopted would restrict lion hunting by preventing the import of lion trophies into the key markets for trophy hunting in Africa.

The best way to avoid pressure for bans on the trade in lion trophies is to ensure that the management of lion hunting is as sustainable as possible. To that end, ZPWMA hosted a meeting in July 2013 (supported by Panthera), attended by ZPWMA ecologists and regional managers and head office staff (including the Board Chairman), key scientists, hunting industry, CAMPFIRE, conservancy and forestry representatives, among others. At that meeting, consensus was gained on steps needed to make lion hunting more sustainable in Zimbabwe.

Age restrictions

Consensus at the meeting was that Zimbabwe should introduce age restrictions on lions that may be shot as trophies. Such age restrictions would be in line with developments in other major hunting countries, and in line with recognition within the hunting community of the need to restrict off-takes of lions to old males (as per the definition of a 'huntable male lion' created by a panel of experts and adopted by Dallas Safari Club) and others (http://www.accuratereloading.com/2012/dhl.pdf). Age restrictions are currently in place in Tanzania and in Niassa National Reserve in northern Mozambique and have been agreed on in principle by Benin (Lindsey et al. 2013). The latest scientific evidence suggests that if harvest of lions is restricted to animals of 5-6 years of age or older, the population impacts of trophy hunting are likely to be minimal (Whitman et al. 2007). The reason for this is that by the age of 5 or 6, lions have usually had chance to sure at least one litter. Furthermore restricting offtakes to older lions increases the net number of lions that can be harvested over

time, which allows lion hunting to generate more revenue for operators and parks authorities (Whitman et al. 2007).

Points system for adaptively managing lion quotas in Zimbabwe

The points system that will be used to adaptively manage lion quotas has been developed following similar systems that have been implemented in Tanzania and northern Mozambique. The systems that are in place in Tanzania and Niassa differ slightly, but both lion quotas are set according to the age of the lions harvested during the previous hunting season (Begg 2008; Tanzania Wildlife Division 2013). The Tanzanian system is more punitive with significant quota reductions, trophy confiscation and fines for non-compliance, whereas the Niassa system is more accommodating but nevertheless can result in quota reductions if five year old lions are hunted. The latter was aimed at a means of accommodating the difficulty of telling five year old lions apart from four year olds. After reviewing the Tanzanian and Mozambican age restriction systems and debating possible models for application in Zimbabwe, the representatives present at the Zimbabwe lion management meeting agreed on an approach for Zimbabwe with four as opposed to three key age categories (Table 1).

Table 1. Proposed points system for lion age restrictions and quota setting in Zimbabwe

	≥6 years	No trophy	5 years old	4 years old	<4 years	Failure to submit hunt return/incomplete hunt returns
For quotas of 3/more	4	3	3	2	-3	0
For quotas of 2	4	3	3	2	0	0
For quotas of 1	6	3	3	2	0	0
Quota setting process	These points are added up and divided by 3 to yield the quota for next year					

The key distinction of the Zimbabwean system is that the quota will not be affected if they hunt animals that are 5 years old. The reason for this is that according to the population models, hunting animals of 5 years of age or older is predicted to be comparatively safe from a population perspective (Whitman et al. 2007). Furthermore, after reviewing aging techniques, attendees at the meeting felt confident that hunters could be expected to categorize lions as being 5 or above or below 5 years of age. According to the proposed system, operators would be rewarded with increased quotas if they hunted animals of six years and older, would not be penalized if they hunted animals of 5 years or if they did not shoot a lion that they have on quota, but would have their quotas cut if they hunted animals if younger than 5 years or if they failed to complete hunt returns.

Lions would be aged by triangulating multiple different aging characteristics, including: the degree of facial scarring; the teeth colour and degree of wear; the mane development

(particularly regarding the shape around the ear and the mohawk); and through post mortem analysis of the width of the pulp cavity of the second premolar (which becomes narrower with age). Panthera and ZPWMA are in the process of developing aging guidelines from Zimbabwean lions. However, in the meantime, comprehensive guidelines are available from Tanzania which can be used by operators in the interim to assist with aging of lions.

The process for quota setting

Consensus from the workshop was that the following procedures be followed for quota setting and implementation of age restrictions:

- Step 1: Allocate existing quota to each block

The starting point for implementation of age-restrictions and adaptive quota management was to allocate existing lion quotas. This quota would then be managed adaptively in line with the age of lions hunted. In future, it is envisaged that fixed quotas for lions would fall away as quotas would be based on the age of lions hunted in the previous year.

- Step 2: Hunters complete and submit return forms and photos after each lion hunt

The data would be compiled into a database by a ZPWMA representative (currently Roseline Mandisodza-Chikerema). Export permits for trophies will not be issued unless completed hunt return forms (all of the required photographs and the first upper premolar is provided to ZPWMA for aging and monitoring purposes). Furthermore, because the following year's quotas will be based on the ages of the lions hunted in the current year, operators must submit their lion hunt returns and photographs soon after the hunt. At the end of the season, all of the teeth would be taken to a dentist to have x-rays conducted to allow for measurement of the size of the pulp cavity.

- Step 3: ZPWMA and Panel of experts assign an age value to each lion trophy

Lion trophies will be aged by ZPWMA, with input from lion scientists and representatives from the hunting industry at a trophy aging session.

- Step 4: Calculate the next years quotas based on a points system for the ages of lions hunted

A quota setting meeting would then be held where lion quotas were established for each area based on the age of lions hunted in those areas the year before.

This programme has commenced in 2014, and so the ages of lions hunted in 2014 will affect the lion quotas in 2015.

Sport-Hunting and Lion *Panthera leo* Conservation in Zimbabwe

Dr Byron du Preez[†1], Dr Rosemary Groom[‡2], Olivia Mufute[§3] and Roseline Mandisodza-Chikerema[¶3]

[1]Bubye Valley Conservation Research Initiative
[2]African Wildlife Conservation Fund
[3]Zimbabwe Parks and Wildlife Management Authority

January 31, 2016





BUBYE VALLEY CONSERVATION RESEARCH
ZIMBABWE



African Wildlife Conservation Fund

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§ omufute@zimparks.co.zw
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SUMMARY OF STEPS TAKEN BY ZIMBABWE TO IMPROVE THE MANAGEMENT OF LION SPORT-HUNTING

i – Banning of all lioness hunting in Zimbabwe

ii – Hunting moratoria around the Gonarezhou and Hwange National Parks

iii – Removal of fixed hunting quotas

iv – Age restrictions on sport-hunted lions

v – Scientifically-based adaptive quota management system

SUMMARY OF LION SPORT-HUNTING'S CONTRIBUTION TO CONSERVATION

i – Lion sport-hunting contributes 33.9% to 42.4% of total revenue on private land

ii – Lion sport-hunting generates up to US$ 557 km^{-2}

iii – Anti-poaching (in particular that of rhinoceroses) costs ~US$ 216 km^{-2}

INTRODUCTION

THE United States Fish and Wildlife Service (USFWS) have recently evaluated the conservation status of the lion *Panthera leo* with particular regard to sport-hunting (http://www.fws.gov/endangered/what-we-do/lion.html [accessed 2015-01-19]). The results of this evaluation have led to the formal protection of two subspecies under the Endangered Species Act, classifying *P. l. leo* as endangered and *P. l. melanochaita* as threatened. Together these subspecies apparently represent all of the lions in Africa (Barnett et al. 2014).

Sport-hunting is a legal activity in which the international import/export of trophies is both sanctioned and carefully controlled by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The USFWS found that the sport-hunting of *P. l. melanochaita* "*if well managed, may provide a benefit to the subspecies*" (http://www.fws.gov/endangered/what-we-do/lion.html [accessed 2015-01-19]). Here we explore this statement further, and present data from three long-term *in situ* lion research projects; the Bubye Valley Conservation Research Initiative, Savé Val-

ley Conservancy Research, and the Hwange Lion Research Project.

The data presented in this report clearly illustrates the positive conservation benefit that well-managed trophy hunting of lions can have for the species, as well as the importance of hunting in maintaining the wildlife in an area; addressing Point 5 on page 3 of the Federal Fish and Wildlife Permit Application Form (Form 3-200-20) [i.e. "*Please be aware that the U.S. Fish and Wildlife Service must make a finding that your activities will enhance or benefit wild populations of the species involved. If you have any information that could support this finding (e.g., population status or trend data; how the funds from license/trophy fees will be spent; what portion of the hunting fee will support conservation), please submit such information on a separate page with your application*"].



Figure 1: The lions pictured here, known as Winston (*standing*) and Geronimo (*lying*), were both collared in March 2012 when they were the dominant males in the Matombosa area and have been continuously monitored ever since as part of the on-going long-term WildCRU Bubye Valley Conservation Research Initiative. In November 2015 Geronimo, who was approximately 9 years old, died after succumbing to injuries sustained from fighting with another male. Winston, also 9 years old, has since lost his dominant status, lost his territory to two 4.5 year old males, become nomadic and avoids contact with other males. As of this report being written, the recent litter of cubs that both Winston and Geronimo sired are still alive.

Most importantly, since July 2013 there has been a continuous self-imposed internal reform of the lion hunting industry in Zimbabwe that is actively participated in and supported by all of the relevant stakeholders, including; the Zimbabwe Parks and Wildlife Management Authority (ZPWMA), non-governmental organisations, professional hunters, safari operators, scientists and researchers.

Here we discuss the results of this process in terms of robust evidence regarding the sustainability and self-regulation of lion hunting in Zimbabwe.



Figure 2: Winston and Geronimo's cubs.

LIONS – *Panthera leo*

The IUCN Red List have recently reclassified lions as Vulnerable (remaining as such since 1996; IUCN 2015), estimating that there are between 20,000 and 30,000 free-ranging lions left (Bauer et al. 2015a) in less than 25% of their historic range (IUCN 2006). However, this generalised classification does not take into account an apparent conservation dichotomy: sample subpopulations of lions in Botswana, Namibia, South Africa and Zimbabwe have in fact increased overall (Bauer et al. 2015a). Lions were historically present throughout Africa, some of Europe, the Middle East and Asia (Bauer and Van Der Merwe 2004), but current conservation strongholds remain only in parts of eastern

and southern Africa (Brassine and Parker 2012; Nowell and Jackson 1996). The current lion population estimate for Zimbabwe's major lion areas is approximately 2,600 individuals [Hwange-Matetsi Complex: 750, South Eastern Lowveld: 350, Gonarezhou National Park: 60, Malilangwe: 37, Savé Valley Conservancy: 284, Bubye Valley Conservancy: 500, Mid-Zambezi Valley Complex: 600], though the actual number would be larger if there were data available for the countries minor lion areas that are yet to be surveyed] (ZPWMA 2015).

The lion is a uniquely social felid, forming coalitions of up to nine males associated with one or more female prides that may consist of more than 20 individuals (Macdonald et al. 2010; Schaller 1972). Lions are infamously infanticidal (Schaller 1972), where males will kill unrelated cubs so as to bring the female into oestrus and present an opportunity to sire their own litter, which is often used as an argument against sport-hunting of the species (e.g. Packer et al. 2010), where it is feared that the removal of dominant males causes cub mortality that eventually results in lowered population recruitment and survival (Packer et al. 2009). Infanticide, however, does not result from sport-hunting when age-appropriate males, past their prime and no longer territorial or with dependent cubs, are harvested (Whitman et al. 2004). Moreover, the fission-fusion nature of lion society (Mosser and Packer 2009; Pusey and Packer 1987) means that infanticide may still occur when the dominant males are simply not present there and then to defend their cubs (B. du Preez, pers. obs.).

In the 1990's, lions were successfully reintroduced into private areas in parts of their former range, where they achieved high reproductive and survival rates (Miller and Funston 2014). However, the resultant population growth inevitably led to the potential problem of overabundance (Funston 2008) and low genetic diversity (Trinkel et al. 2010), with both of these issues requiring active and intensive management (Hunter et al. 2007) and ultimately reducing the conservation value of these lion populations (Miller and Funston 2014). The ability to translocate lions originally facilitated the relief of overpopulation, but as the available areas for relocations were used up, sport-hunting and euthanasia have subsequently become the main methods of lion population control (Miller and Funston 2014).

The lion is the apex predator wherever it occurs (Macdonald et al. 2010), and is an ideal conservation umbrella; being large, charismatic and easily observable (e.g. Williams et al. 2000). Lions are important to commercial wildlife ventures, which risk losing significant market share where they cannot offer them to clients (Lindsey et al. 2007), and are thus prioritised in conservation; exploiting their charisma to attract tourists and raise the funds required in ensuring that wildlife areas remain viable. The lion is also a particularly valuable species in the sport-hunting industry, rivalled only in demand by buffalo *Syncerus caffer* and leopard *Panthera pardus* (Creel and Creel 1997), and are therefore prevalent in private wildlife areas (Packer et al. 2013) where their populations can achieve exponential growth rates given the protection and resources afforded by well-managed operations (Smuts et al. 1978; Loveridge et al. 2007b; Kettles and Slotow 2009; Miller and Funston 2014).

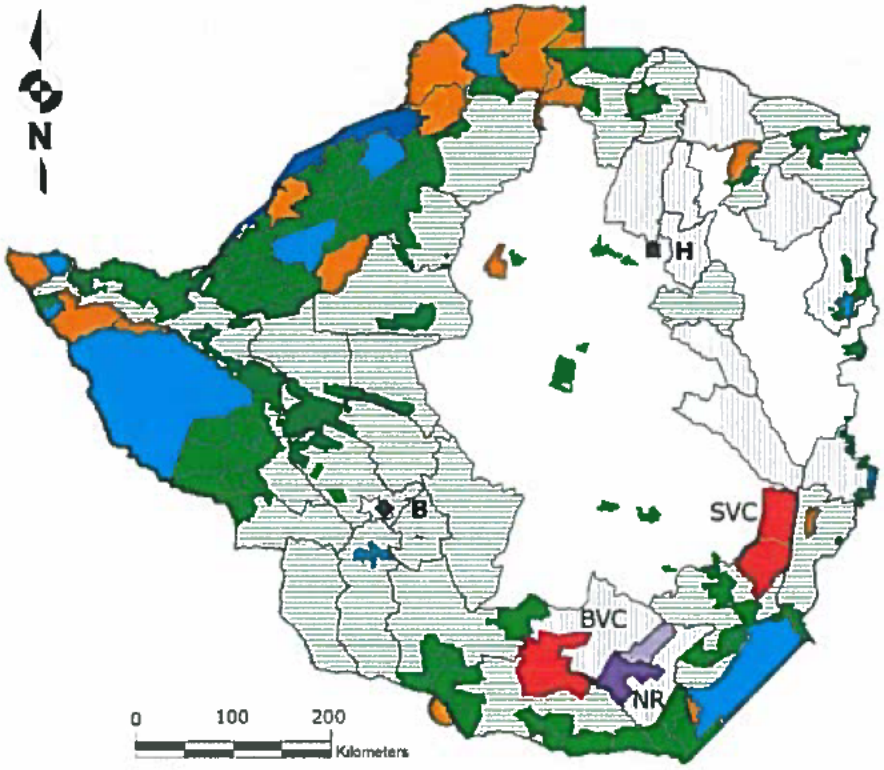

Figure 3: Map of Zimbabwe's main wildlife areas: [*i*] National Parks are represented in light blue; [*ii*] Safari areas are represented in orange; [*iii*] Forestry areas are represented in dark green; [*iv*] Community and Private wildlife areas are represented in light green; [*v*] Communal Land (CAMPFIRE Areas) in which sport-hunting may occur is represented by light green horizontal stripes; [*vi*] Communal Land in which sport-hunting does not occur is represented by grey vertical stripes. [*vii*] The Bubye Valley [BVC] and Savé Valley [SVC] Conservancies are represented in red. [*viii*] The Nuanetsi Ranch [NR] on which sport-hunting takes place is represented in dark purple (light purple represents the Nuanetsi Ranch cattle area); [*ix*] Lake Kariba is represented in dark blue. Harare (the capital city) is represented by a black square and letter '**H**'. Bulawayo is represented by a black diamond and letter '**B**'. Sport-hunting may occur in areas: *ii*, *iii*, *iv*, *v*, *vii* & *viii*

The ability of lions to rapidly increase in abundance is an aspect of their ecology that is often overlooked. Lion populations can achieve exponential growth rates (Miller and Funston 2015; Groom and Watermeyer 2015; du Preez et al. in prep.), and the problems associated with high lion densities fast present themselves and require significant investment in their solution (Hunter et al. 2007; Kettles and Slotow 2009; Loveridge et al. 2007; Packer et al. 2013; Smuts 1978). Whilst unregulated sport-hunting of lions (in particular that of dominant males and pride females) may result in population declines (e.g. Packer et al. 2010; Packer et al. 2009), restricting offtake to only males over

a certain age (i.e. have already bred and/or are no longer dominant) has no impact on lion population persistence, irrespective of quota size (Whitman et al. 2004). Such is the situation currently facing both the Bubye Valley and Savé Valley Conservancies, where the lion populations continue to grow despite sport-hunting and increasing quotas. Whilst sport-hunting may not alleviate over-population in these areas, it does somewhat offset the cost of keeping lions. Culling of lions may be the only realistic option for controlling numbers in larger areas, as the use of contraceptives is likely to be inefficient and expensive. Because of fears about public sentiment associated with sport-hunting, it has now become common practice for managers to cull excess lions in more than 45 wildlife areas in South Africa to which lions have been introduced, and which resulted in the wasteful destruction of about 200 lions in 2012 (Miller and Funston 2014).

CONSERVATION AND SPORT-HUNTING

There is more land area in Africa conserved for hunting than there is in all of Africa's formally protected areas combined: approximately 1.4 million km^2, which exceeds the total area covered by national parks by 22% (Lindsey et al. 2007). For wildlife conservation to be successful outside of national parks, these areas must be self-sufficient and able to generate sufficient revenue to cover the considerable costs of protecting the habitat and wildlife therein (Lindsey et al. 2006). Indeed, conservation would benefit from an incentive to utilise land for wildlife rather than the alternatives of livestock grazing, agriculture, and deforestation.

The international trade of lions, including trophies, is controlled by a strict CITES licensing system on the basis that this trade does not endanger the ultimate survival of the population (https://www.cites.org/eng/disc/how.php [accessed 2015-01-19]). The positive aspects of sport-hunting as a conservation tool include a focus on males and a low percentage off-take; neither of which generally jeopardise populations, and also suggest that hunting could play a role in population recovery (Leader-Williams et al. 2005).

The recommendation of setting uniform harvest limits, e.g. 1 lion 2,000 km^{-2} (Lindsey et al. 2012; Packer et al. 2010), may be overly simplistic, affect the economics of wildlife based landscape use, and disincentivise investment in conservation (Lindsey et al. 2007). A more practical approach to sustainably setting realistic lion sport-hunting quotas could involve using a positive/negative feedback method that calculates a fluid quota per area based on the previous season's performance. Such an adaptive quota management system has already been implemented in Zimbabwe.

ZIMBABWE'S ADAPTIVE LION QUOTA MANAGEMENT SYSTEM

An adaptive quota management system for lion hunting based on the ages of lions hunted was agreed on in July 2013 in Harare, Zimbabwe, during a meeting hosted by the Zimbabwe Parks and Wildlife Management Authority (ZPWMA) and an independent non-governmental conservation organisation. The points system is summarised in Table 1.

Table 1: *Points allocated to hunting blocks arising from the harvest of lions of different ages*

	≥ 6 years	No trophy	5 years old	4 years old	< 4 years	Failure to submit return, or incomplete return
For quotas of ≥3	4	3	3	2	-3	0
For quotas of 2	4	3	3	2	0	0
For quotas of 1	6	3	3	2	0	0
Resultant quota	*These points are added up and divided by 3 to yield the quota for next year*					

During 2013, operators were requested to submit hunt returns and photos as a trial run to get the system up and running. In 2014 operators were requested to do the same but were informed that the age of the lions hunted in 2014 would determine their lion quotas in 2015. The 2015 lion hunt results would thus also determine the 2016 quota.

Results of the Adaptive Lion Quota Management System

In 2015 there was a marked increase in the age of lions hunted in Zimbabwe as a whole. Notably, only one lion of <4 years of age was hunted and the large majority of lions were 5 years or older (Figure 4). In 2013, only 28% of the lions hunted were 5 years or older, in 2014 that figure had risen to 49% and in 2015 to 77.3% (Figure 5). The proportion of lions hunted that were less that 5 years of age dropped overall between 2013 and 2015 (Figure 6). For this achievement, credit is due to the hunting community for showing greater selectivity of harvest. A word of caution however, is that the majority of lions hunted were on the cusp of 5 - 6 years of age and were not older than six years. Restricting hunting to individuals that are at least six (and preferably older) is desirable from a biological perspective due to the reduced risk of the loss of pride males and infanticide of cubs associated with the harvest of such individuals (Whitman et al. 2004).

In 2015 the Zimbabwe national lion hunting quota was set at 85 lions. Of this 85, only 39 were hunted in 2015, and based on the resultant score from aging the trophies, and the fact that operators chose not to hunt lions of inadequate age (see Figures 4, 5 & 6), the recommended quota for 2016 was set at 75 [Harare 2015-11-11]. (The Rural District Council areas in which lions occur are currently exempted from the age restrictions, as was agreed upon at the 2013 lion management meeting in Harare, as a means of ensuring that impoverished communities obtain the opportunity to benefit from the presence of lions, recognising the potential negative impacts the species has on the livelihoods of livestock farmers).

Using these figures and estimating the average value of a lion safari at approximately US$ 80,000 then a 50% offtake (35 lions) would generate US$ 2,800,000 annually. If management costs are approximately $150 km^{-2} (V. Booth, pers. comm.), then the lion safaris alone can support 18,600 km^{-2} of wildlife habitat in Zimbabwe.

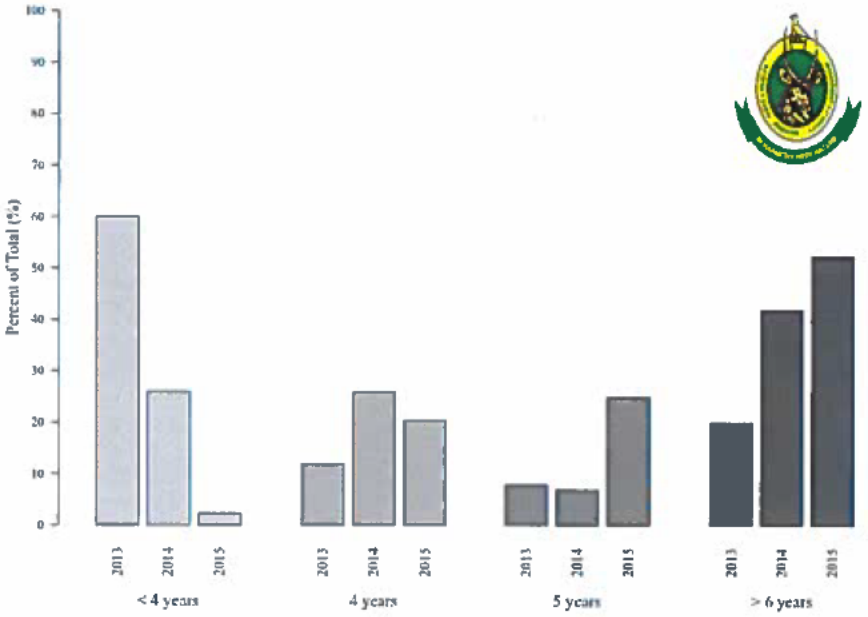

Figure 4: The percentage of lions hunted in each age class in 2013, 2014 and 2015 in Zimbabwe.

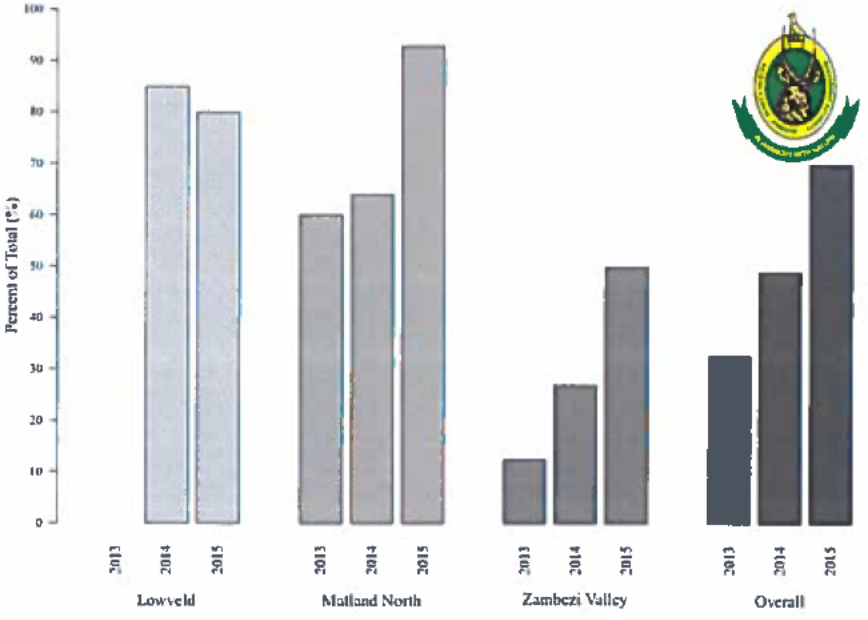

Figure 5: The proportion of lions hunted that were 5 years or older in the three main lion-hunting areas of Zimbabwe.

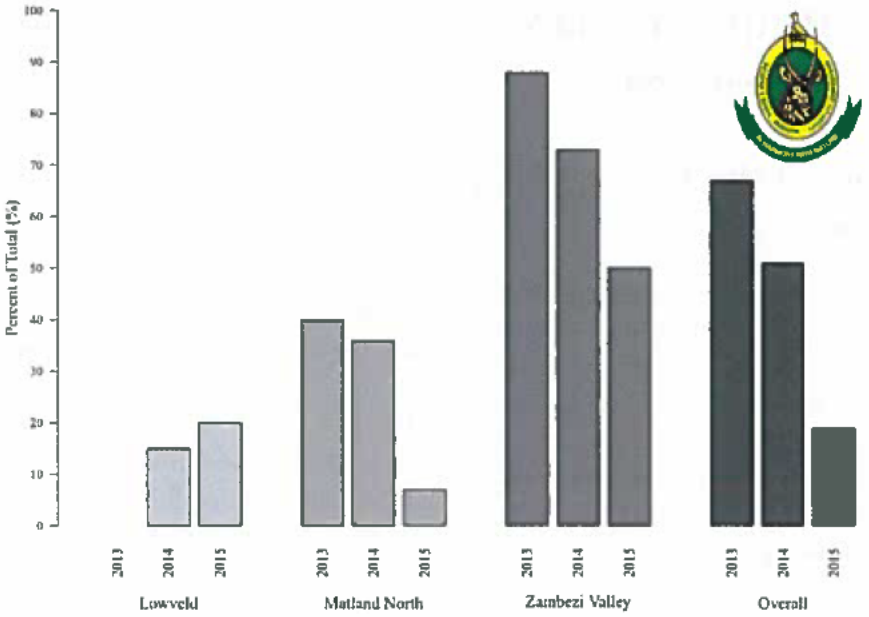

Figure 6: The proportion of lions hunted that were less than 5 years of age in the three main lion-hunting areas of Zimbabwe.

Table 2: *Human and Lion Conflict (2009 - 2011) in Zimbabwe, including human mortality caused by lion (CAMPFIRE Association, 2012)*

District	Total incidents	Livestock killed	*People injured*	*People Killed*
Hurungwe	5	1	*2*	*2*
Chiredzi	25	136	*0*	*0*
Mbire	5	7	*0*	*5*
Binga	9	39	*0*	*0*
Total	**44**	**183**	***2***	***7***

Human-Lion Conflict

The lion is a flagship species and powerful symbol of Africa; yet living with lions poses hardships for many communities (e.g. Table 2). In some areas, the lion is a major predator on domestic livestock, inevitably leading to conflicts with local herders. Both sides suffer in this situation.

Outside of protected areas, the lion's prey base is much reduced, which results in relatively greater chance of encountering livestock. Co-existence of lions with people may be enhanced by giving value to lions through tourism and hunting promoted in communal lands under the Communal Area Management Programme for Indigenous Resources (CAMPFIRE). This hunting contributes to the conservation of lions via the financial revenue generated, which is ploughed back into conservation of the resource and empowers local communities to invest in their own rural development programs.

THE BUBYE VALLEY CONSERVANCY

History of the Bubye Valley Conservancy

Towards the end of the nineteenth century, the Liebig's Extract of Meat Company (LEMCO) founded an extensive cattle ranch in the Zimbabwean lowveld, to the detriment of the indigenous wildlife that was initially eliminated because of competition for grazing with the livestock, as well as a risk of disease transmission from buffalo and wildebeest *Connochaetes taurinus*. As their natural prey base became depleted, the predators were subsequently persecuted when they began to prey on the livestock. Some wildlife persisted in small pockets of remote habitat, however lion, elephant *Loxodonta africana*, buffalo and rhinoceros *Diceros bicornis* [black] & *Ceratotherium simum* [white] were all completely eradicated. A monoculture of cattle dominated the landscape and impacted on the environment for the better part of a century.

Then, in 1992, Zimbabwe suffered one of the worst droughts on record, a relatively short time after the devastating one of 1983 that LEMCO was still trying to recover from. The frequency and severity of the droughts effectively reduced confidence in the economic viability of cattle ranching in the area, and the Bubye Valley Conservancy was subsequently founded in 1994 with the realisation that endemic wildlife, which are better adapted than livestock to cope with the local climate, could be successfully commercialised (Child 1988; Bond 1993).

The conversion from cattle ranching back to a wildlife area was neither straightforward nor cheap, requiring a significant initial investment and annual running costs. In just 20 years of operation the Bubye Valley Conservancy now protects the world's third largest black rhinoceros population, one of Zimbabwe's largest lion populations, a large and increasing elephant population, and abundant game.

Sport-hunting is an essential step in converting areas that were previously dedicated to livestock farming into non-consumptive tourism areas (Child 1993), and was fundamental to the formation of Bubye Valley Conservancy and allowing the wildlife populations to recover. The Samanyanga area of the Bubye Valley Conservancy, probably the most scenic section, was originally set aside for non-consumptive photographic tourism, but made an annual loss for several years, before, largely due to Zimbabwe's land reform program and resultant instability in the country, it was reverted back to sport-hunting as the only practical and economically viable option (K. Leathem, pers. comm.). Sustainable sport-hunting provides the sole economic incentive to continue operating the Bubye Valley Conservancy as a wildlife conservation area.

Bubye Valley Conservancy Community Support

The Bubye Valley Conservancy donates over 45 tonnes of meat from sport-hunting to the local communities each year. This meat donation is worth over US$ 100,000 per year, and the communities are free to decide how they use it. In addition to this, the Conservancy also supports several schools, clinics, and community projects in the three surrounding districts of Mwenezi, Maranda and Jopempe. The local community thus

sees a direct benefit from the wildlife on the Bubye Valley Conservancy, but is also empowered by job opportunities created both with these special projects, as well as on the Conservancy. A summary of the Bubye Valley Conservancy community support effort between 2011 and 2015 is provided in Table 4.

Bubye Valley Conservancy Lion Monitoring and Management

After originally being eradicated by cattle ranchers in the area, 13 lions were reintroduced to the Bubye Valley Conservancy in 1999, and four young males broke into the Conservancy that same year. From the original 17 animals present in 1999, the Bubye Valley Conservancy lion population was estimated at approximately 280 individuals in 2009 when robust population surveys were initiated by a research team from the University of Oxford Wildlife Conservation Research Unit (WildCRU), and this population has continued to grow. Today it is estimated that there are over 500 lions on the Bubye Valley Conservancy (du Preez et al. 2015). The exponentially increasing Bubye Valley Conservancy lion population currently exists at one of the highest densities in Africa (~0.187 lions km^{-2}: du Preez et al. 2015; Figure 7), greater than that of the Serengeti, Tanzania (0.100 lions km^{-2}: Pusey and Packer 1987; Spong 2002), Selous, Tanzania (0.080 - 0.130 lions km^{-2}: Creel and Creel 1996, 1997), Kruger National Park, South Africa (0.096 - 0.112 lions km^{-2}: Mills 1995), and Hwange National Park, Zimbabwe (0.027 lions km^{-2}: Loveridge et al. 2007). This equates to one of the largest contiguous lion populations in Zimbabwe.

Bubye Valley Conservancy Lion Hunting

The Bubye Valley Conservancy offsets the cost of lion predation on its wildlife via sport-hunting of the species, and which began in 2002. In 2014, the lion hunting quota allocated to the Bubye Valley Conservancy by ZPWMA was 10 individuals. Based on the fact that the entire quota was harvested and that maximum points were scored for each individual trophy (more than six years in age), the allocated quota was raised to 13 lions for 2015. Only 12 out of 13 lions were hunted in 2015 due to a late cancellation; nevertheless eight lions over six years old and four lions of five years old were harvested and the resultant points justifying a quota of 15 lions for 2016.

Table 3: *The Bubye Valley Conservancy annual lion hunting quota and offtake from 2002 to 2015.*

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Approved quota	1	2	3	2	2	2	3	3	5	8	12	10	10	13
Quota taken	1	2	3	2	2	2	2	3	5	8	12	10	10	12
Percentage success	100	100	100	100	100	100	67	100	100	100	100	100	100	92

Note that while the lion hunting quota for Zimbabwe has been voluntarily reduced by the national steering committee, the Bubye Valley Conservancy lion hunting quota has been successively raised twice based on both hunt success and age of lions hunted and the resultant points scored under the national adaptive quota management system (Table 3).

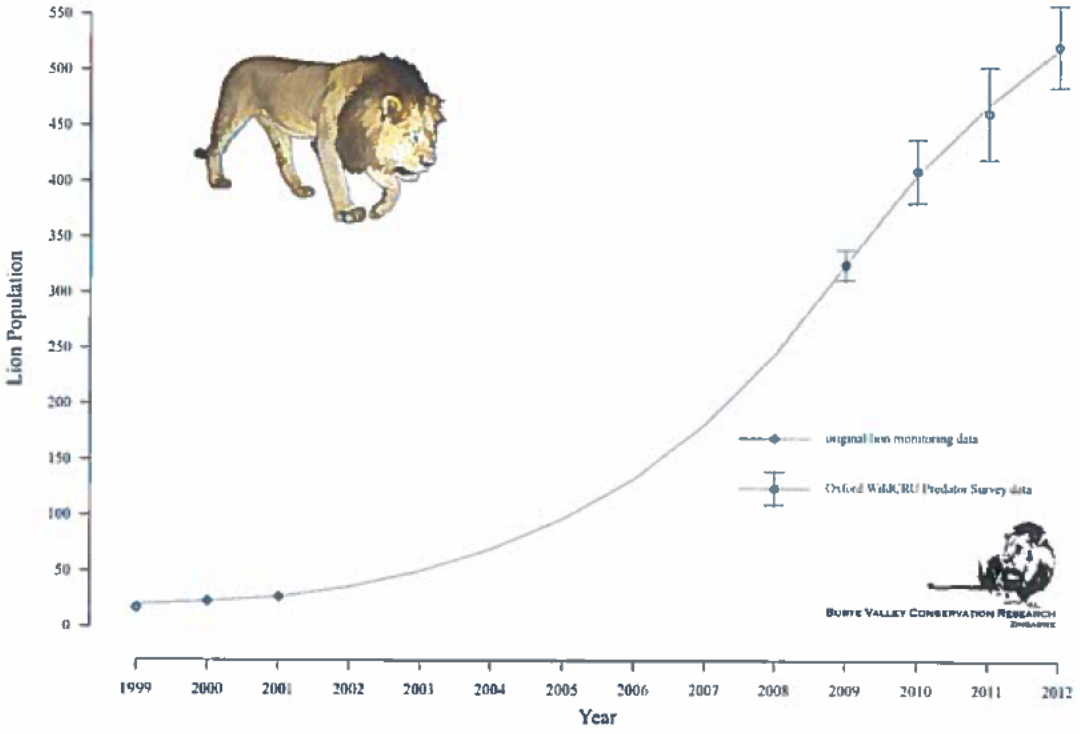

Figure 7: The Bubye Valley Conservancy lion population has grown exponentially since the reintroduction of lions in 1999. Diamonds represent the known lion abundance from monitoring of the original individuals introduced; Points indicate lion abundance calculated from spoor transect analyses; error bars represent the standard error of the mean.

Table 4: *Summary of the Bubye Valley Conservancy support to the surrounding local communities (2011 - 2015)*

Boreholes:	- 1 x Jompembi Village 2 - 1 x Penemene - 1 x Jompembi Village 4 - 1 x Nyimani village (Mwenezi) - 1 x Driehoek School - 1 x Mgaladhivha School - 2 x Mtetengwe to supply water to the clinic site
	- 2 new bush pumps (complete) purchased and installed at Village 2 & Village 3 and troughs built at both sites *Drinking trough for cattle built at Village 2 borehole* *All boreholes equiped with new bushpumps, piping and cylinders* *Boreholes at Village 3, Mtetengwe, Mdzwiti, Vumani and Penemene and Makado Police post repaired and maintained* *All new piping and pumps etc. are supplied by BVC*
Buildings:	- Mtetengwe Clinic's main building built - 3 x F13 staff houses built *Clinic and House fenced - everything funded and built by BVC* *The clinic is a standard large Government clinic - male & female wards + maternity ward and outpatients* *Storerooms, offices etc. also built* *All houses and buildings are electrified, painted and supplied with running water*
	- Mtetengwe School school office block and staff room built and painted *All classroom windows repaired and the schools second borehole repaired.*
	- Secure engine house was built at the second borehole site - Borehole equipped with BH15S mono pump unit driven by a rebuilt Lister LT 1 engine
	- 5000 litre header tank and stand erected - new 5000 litre header tank purchased and fitted - pipeline laid to connect the borehole to the clinic - another pipeline connected to the same borehole to supply the Mtetengwe school with fresh water
	- New coldroom and refrigeration unit purchased and fitted at the Lutumba butchery *Part of aid program to get the Beit Bridge RDC self funding projects up and running*
	- New coldroom and refrigeration unit was purchased and fitted at the Rutenga butchery *Part of aid program to get the Mwenezi RDC self funding projects up and running*
Meat Donations:	- BVC donates meat on a regularly basis to the Mwenezi Orphange
	- Numerous donations of meat were made to support school sports days & speech nights/prize giving events *Both Beit Bridge & Mwenezi districts*
	- 1600 kgs of meat has been donated each month since July 2011 to a Maranda trust *Administered by Chiefs andlocal headmen* *Excess meat sold and funds used for community projects* *Classroom roof replaced at Vhongwe school* *4 new classroom blocks constructed at other schools using funds from these monthly allocations*
	- 1000 kgs of meat per month is been donated to Beit Bridge communities since April 2014
	- 1000 kgs of meat per month is been donated to Mwenezi communities since August 2013
Miscellaneous:	- Sports uniforms for the Penemene school team purchased ($2600) *Sports uniforms required for inter-schools sports*
	- Transport the soccor teams representing Mgaladivha, Jompembi and Tongwe *To Lutumba for the inter-school competitions*
	- 2 sets of soccer goal posts & 2 sets of Netball poles were made for Mgaladivha School *New soccer field graded by BVC*
	- 2m security fencing supplied to Penemene School
	- Second hand door and window frames donated to Mapiri school (ex Mazunga School)
	- 1 new 3 1/2 " rod pump cylinder was purchased and fitted to the Vumhani borehole *All repairs to b/holes in the Vumhani area are done by BVC*
	- 26 bags of cement were donated to Mgaladivha School
	- Fencing donated to the Mgaladivha School
	- Supplied 10 x 5/8" mono shafts for the Botalele Clinic (Maranda) borehole
	- Water supply to Mielezi Clinic
	- 400 m pipeline laid to supply the Nyimani Villarge's cattle with water *3.5 m drinking trough build for this same project*
	- 60 bags cement donated to the Welkom for repairs to a dam wall
	- 6 loads of riversand and 20 cement donated to Vumani Preschool
	- Various school renovations in both the Beit Bridge and Maranda areas
Current Projects:	- Construction of a School admin block at Mgaladhivha School
	- Supply of 24 loads of riversand to Mdzwiti School (value $1200)
	- All roofing materials supplied to Mdzwiti School
	- Supply roofing materials, cement, all window and door frames for Vumani Preschool

THE SAVÉ VALLEY CONSERVANCY

History of the Savé Valley Conservancy

The Savé Valley was a wildlife-rich wilderness until the early 1900's, when the first cattle ranching initiatives started in the area. The establishment of Devuli Ranch and Angus Ranch in 1920 paved the way for seven decades of commercial cattle ranching in the area we know today as the Savé Valley Conservancy. Roads were cut, fences erected and an everlasting 'battle' ensued against the wildlife, especially against all predators.

The large predators, especially lions, were virtually eradicated (Pole 1999). However, by the late 1980's, declining range productivity, depressions and droughts forced the landowners to consider alternative options. Around that time, empirical evidence of the competitive advantage of wildlife over livestock began to emerge (Child 1988; Bond 1993), especially in arid areas (Jansen et al 1992; Cumming 1993), and wildlife was finally given serious consideration as a viable land use option.

In 1989, a proposal was drawn up (du Toit 1989) to turn what was then the Sabi Valley Intensive Conservation Area into a wildlife conservancy. The plan was to create a single large wildlife area, especially for the re-establishment of endangered species and overexploited species, with cattle remaining the primary income generator. The Savé Valley Conservancy was constitutionally inaugurated in June 1991, and following the severe 1991/1992 drought, wildlife ranching became the primary land-use. At the time this was the largest private wildlife conservancy in the world (3,410 km^2).

The conservancy members then restocked the wildlife, removed all internal fencing, erected a common perimeter fence and developed effective security systems. A double, electrified, veterinary-approved fence was completed in 1995, and the following decade saw a massive investment in wildlife re-stocking and security systems.

Sport-hunting was essential for the successful transition of the conservancy from cattle to wildlife. During the early years, wildlife densities were low, resulting in poor potential for ecotourism, and hunting generated the income needed to erect the fence, re-stock game, and improve security, especially because of the significant numbers of black rhinoceros now found there. Gradually, some of the ranchers shifted more into ecotourism. One property, Senuko Ranch, completed a 16 bed up-market lodge with a view of marketing non-consumptive safaris, offering game drives and bush walks and specializing in rhino walks and African wild dog *Lycaon pictus* den visits. Lodge occupancy rose from 0% in 1996 to 62% by the end of 1999.

However, the Zimbabwean land reform program, which was initiated in February 2000, soon made a strong negative impression in the international community, and resulted in travel bans and warning from most of Zimbabwe's source markets. This, together with the political instability meant that the wildlife industry and ecotourism industry collapsed over-night: sport-hunting became the only economically viable land use option, and has remained the only tangible source of income to the landowners of the Savé Valley Conservancy. In the case of the Senuko Lodge, for example, the land reform program resulted in a 98% cancellation of

the confirmed bookings. After four years of seeking alternative markets, the lodge could achieve no higher than 17% occupancy, and in 2005 moved back into a hunting-based operation.

A more direct impact of the land reform program for the Savé Valley Conservancy was the loss of 33% of the area of the conservancy to invading subsistence farmers (Lindsey et al 2008). The loss of land was catastrophic and the related pressure from wire snare poaching was extreme. In the following eight years (2001 to 2009), 10,520 illegal hunting incidences were recorded, 84,396 wire snares were removed and at least 6,454 wild animals killed (Lindsey et al. 2011).

Savé Valley Conservancy Community Support and Anti-Poaching

In 2012, conservancy members provided over US$ 100,000 worth of support to adjacent villages or farmers in the resettled areas. Assistance included drilling boreholes, maintaining boreholes, dredging of dams, assisting with building projects in clinics and schools, assisting with repairs, maintenance and materials at schools, education initiatives, school field trips, provision of computer equipment in schools, craft programs and regular donations of meat.

Moreover, the conservancy recently entered into a mutually dependent agreement with the Chiefs representing the communities surrounding the Savé Valley Conservancy. The agreement links the communities to the Natural Resource Utilisation that occurs through the business operation of the conservancy and opens up opportunities for the local indigenous populations to share in any wealth creation. This agreement strengthens relations between the conservancy and the surrounding local communities and creates an environment that helps to protect, conserve and sustain the natural assets of the area. The hunting tourism of the conservancy is currently the only form of income by which the surrounding communities can benefit. Revenues from trophy lion hunting constitute a significant portion of inflow and thus an important part of the community benefits. Any reduction would seriously jeopardise the growth of this infant positive relationship and community empowerment initiative.

The Savé Valley Conservancy is thus pioneering private-community partnerships in Zimbabwe, and trade restrictions on lion trophies will indirectly adversely affect these already seriously impoverished communities through a reduction in available income to share with communities. This is very likely to have a knock on impact on the lions themselves with a significantly reduced tolerance and an increase in retaliatory poisoning of lions for livestock predation. Without a demonstration of income from lions, the political pressure from the surrounding communities to remove them from the conservancy altogether will be a challenge to resist.

Savé Valley Conservancy Lion Monitoring and Management

After the Conservancy was formed, and persecution stopped, lions, mainly males, recolonized the area and their numbers started to increase in the late 1990's / early 2000's. Few lionesses were observed until 2003, when small family groups and male-female pairs were seen, and by 2004 - 2005 there were some reports of cubs. During this period 13

lions were also reintroduced into the Savé Valley Conservancy. After an initial lag phase the lion population on the Savé Valley Conservancy has increased dramatically and at present is growing exponentially (Figure 8; Groom and Watermeyer 2015).

Monitoring of the lion population began in 1999 (Pole 1999) with track index or call-up surveys being conducted sporadically until 2006. From 2007 to present, annual conservancy-wide track index surveys have been conducted using a standardized methodology (Groom and Watermeyer 2015). The resulting population estimates were verified in 2011 by a baited lion call-up survey and a collation of managers' estimates, all of which provided similar results.

Prey availability models (Hayward et al. 2007) suggest that the carrying capacity for the lion population in the Savé Valley Conservancy is approximately 271 lions. The population estimate for 2015 was 284 lions, suggesting lions have reached their ecological carrying capacity, even whilst being responsibly hunted.

A professional lion management plan was commissioned by the conservancy in 2011 (Funston 2011), to provide the Savé Valley Conservancy members with a science-based plan to help them ethically and sustainably manage their lion population. This plan specifically advocates the use of hunting as a conservation management tool. It also demonstrates willingness by the conservancy to guide their lion management based on science and advice from professionals.

Savé Valley Conservancy Lion Hunting

Lions have been hunted in the Savé Valley Conservancy since 2002, although that was largely for removal of problem animals. Hunting began properly in 2005 with quotas increasing annually to a maximum of seven per year from 2009 onwards (Table 5), with the quota being raised to ten for 2016 based on trophy ages.

Despite offtakes of lions through sport-hunting, the lion population has continued to increase in the Conservancy. The revenue generated from hunting lions has enabled landowners to invest in proper land management, anti-poaching, water provision and fence maintenance, all of which benefit the lion population (especially as lions seem to be vulnerable to being caught in wire snares; Becker et al 2013; R. Groom, pers. obs.).

Table 5: *The Savé Valley Conservancy annual lion hunting quota and offtake from 2002 to 2015.*

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Approved quota	5	5	1	3	3	4	6	7	7	7	4	2	3	5
Quota taken	1	0	1	3	3	3	3	6	5	3	4	1	3	5
Percentage success	20	0	100	100	100	75	50	86	71	43	100	50	100	100

Any data showing what is being provided to community?

Sport-hunting of lions brings considerable revenue to the Conservancy, revenue that is vital for the continued functioning of the area for wildlife conservation. Without the costs of lions being offset by the income from sport-hunting, landowners cannot reasonably be expected to tolerate such high lion densities, and their numbers would have to be reduced significantly.

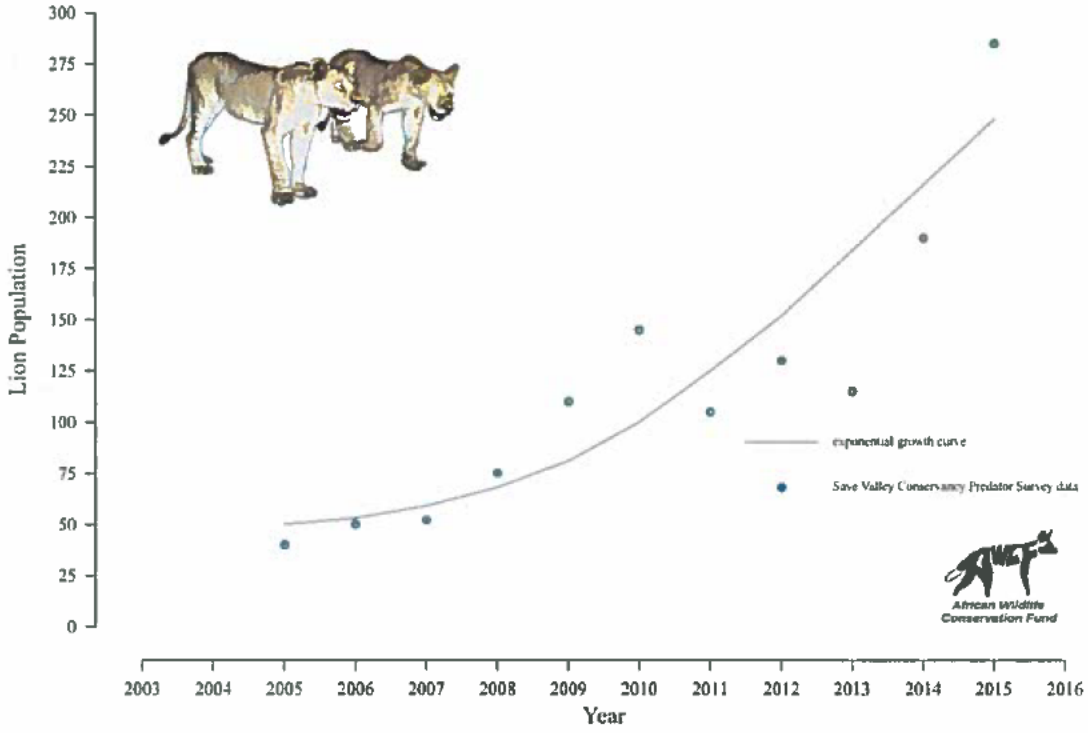

Figure 8: The Savé Valley Conservancy lion population, like that of the Bubye Valley Conservancy, has grown exponentially. Points indicate estimated lion abundance calculated from field surveys; the line represents the exponential growth curve.

THE PROS AND CONS OF CONSERVING LIONS

The saturation of lions in wildlife areas on both state and private land is positive for their future conservation security; but it is also critical to that of incidentally conserved endangered species, such as both species of rhinoceros on private wildlife conservancies in Zimbabwe (Lindsey et al. 2009; Suzuki 2001), which benefit from the same resources and protection that are incentivised and provided by the revenue generated from sport-hunting. The Bubye Valley Conservancy now boasts the world's third largest black rhinoceros population (N. Anderson [Lowveld Rhino Trust], pers. comm.), which is classified as Key 1 by the African Rhino Specialist Group and means that this population is considered key to the overall survival of the species. The Savé Valley Conservancy has the second largest black rhinoceros population in Zimbabwe after Bubye. These are not coincidences. These rhinoceros (and other endangered species, such as wild dog) strongholds are the result of the incidental conservation benefits derived entirely from sport-hunting activities - there are no photographic tourists visiting either the Bubye Valley or Savé Valley Conservancies, and the rhinoceros are not hunted. Having rhinoceros on the land therefore generates no revenue - and in fact there is a significant cost associated with protecting these animals; US$ 590,000 (not including incentive and reward bonuses donated for these purposes) was spent on anti-poaching by the Bubye Valley Conservancy during 2015 (K. Leathem, pers. comm.), and US$ 546,000 is spent annually on anti-poaching by the Savé Valley Conservancy (Lindsey et al. 2012). This expense is covered mainly by the revenue generated by sport-hunting with additional donations from the clients; and most importantly, the habitat for the rhinoceros is preserved by maintaining the land as a conservation area, as opposed to converting it into agricultural or grazing land for example.

However, the high densities of lion populations achieved within commercial wildlife areas have the potential for intense intraguild persecution. Lions are aggressively competitive, and research on the relationship between lions and leopards has shown that high densities of lions can negatively affect leopard population density, demographic structure, cub survival, and spatial ecology down to even the step-wise decisions that leopards make regarding habitat use and behaviour based on both the actual and potential risk of encountering lions (du Preez 2014; du Preez 2015). Leopards are a generalist species that are able to cope with persecution by adapting their behaviour and ecological niche, and even they suffer under a burgeoning lion population; ecological specialists and endangered species, such as cheetah *Acinonyx jubatus* and wild dog, do not fare nearly as well under such intense competitive pressure. In fact, competition with lions has been directly linked to reductions in cheetah (e.g. Durant 1998, 2000; Laurenson 1995) and wild dog (e.g. Creel 2001; Creel and Creel 1996; Vucetich and Creel 1999) densities, both of which face local extinction where lion abundance, and the respective level of persecution, is high. Excessive lion densities may also result in population declines of ungulate prey (e.g. Wegge et al. 2009). It is vital to holistic conservation that wildlife managers can understand and deal with the level of impact that lions exert on other species; particularly those that

are elusive difficult to observe, and which face decline if not carefully monitored. To this end, a conservation research initiative in partnership with WildCRU was established on the Bubye Valley Conservancy in 2009, and research conducted on the Savé Valley Conservancy since 2007.

Based on the number of kills made (du Preez et al. in prep.) and the current value of the meat (K. Leathem, pers. comm.), the Bubye Valley Conservancy lion population consumes hundreds of thousands of dollars worth of prey each year. These lions are mainly tolerated because of their ability to generate the revenue that helps to offset this expense - although it is estimated that economically it is still not worth keeping the lions whose cost outweighs their value (Funston et al. 2013).

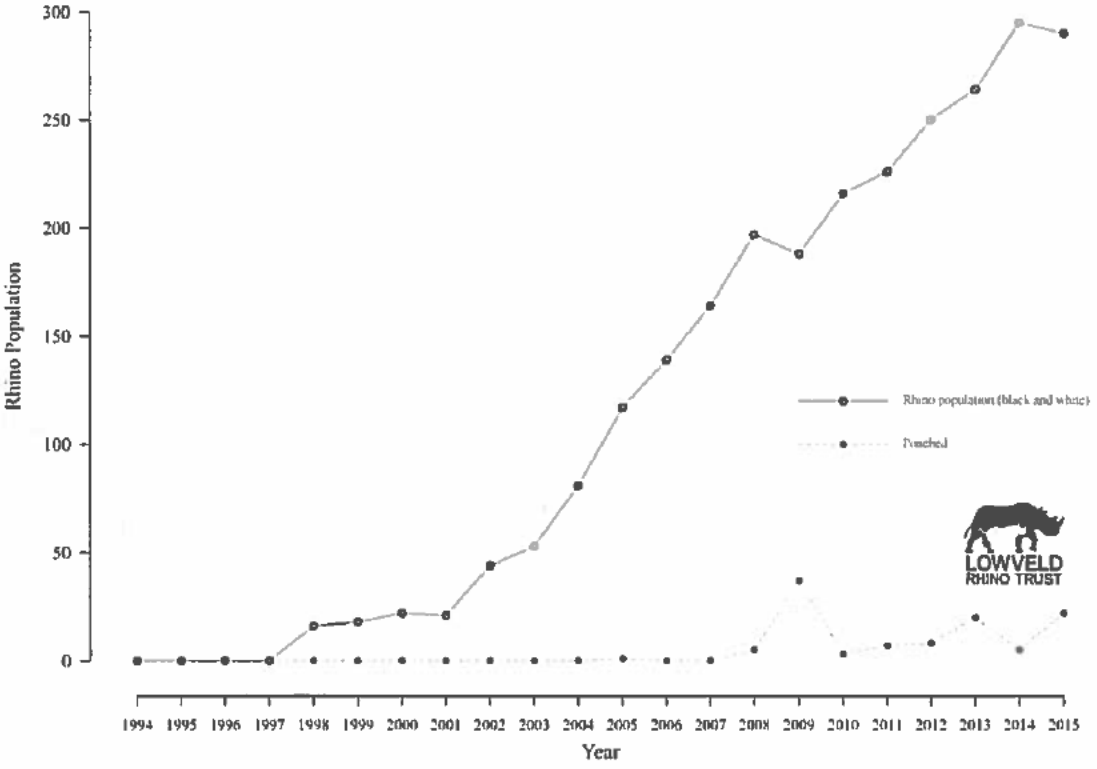

Figure 9: The Bubye Valley Conservancy black rhino population is rated as Key 1 by the African Rhino Specialist Group which means that the population is considered key to the overall survival of the species.

WHERE THE MONEY GOES: THE FINANCES OF LION SPORT-HUNTING AND REINVESTMENT IN THEIR CONSERVATION

Break-down of the finances involved in a typical lion hunt on the Bubye Valley Conservancy:

Lion Trophy fee: US$ 42,000
Lion Hunt Daily rate: US$ 2,950 day^{-1}
(Minimum lion hunt duration: 18 days [*total daily rate of US$ 53,100 lion hunt^{-1}*])

Additional costs include:
ZPWMA scout
Observers
Bait used
Other trophy species taken during the lion hunt, etc.
[*These additional costs average approximately US$ 6,500 lion hunt^{-1}*]

BUBYE VALLEY CONSERVANCY - LION SPORT-HUNTING REVENUE GENERATED (2015):

((18 days × 2,950 day^{-1}) + 42,000 trophy fee + 6,500 additional costs) × 12 lions
= **US$ 1,219,200**

Lion sport-hunting therefore represents approximately 33.9% of the Bubye Valley Conservancy's total annual revenue generation (which includes post-hunt meat and hide sales).

All of the revenue generated from lion sport-hunting on the Bubye Valley Conservancy has gone back into the running costs of the Conservancy, which is all part of conservation, and which includes: anti-poaching and fence monitoring and maintenance (approximately US$ 506,000 year^{-1}), research (approximately US$ 34,700 year^{-1} not including client and sponsor donations), and community support assistance (approximately US$ 210,000 year^{-1}).

[*No profit after costs has been declared, nor dividends taken by shareholders, since the Bubye Valley Conservancy was formed in 1994. All revenue generated to date has been spent on running costs, improvements and restocking.*]

DISCUSSION

Here we have shown that since their reintroduction after historical eradication, both the Bubye Valley and Savé Valley Conservancies' lion populations have increased exponentially - not despite sport-hunting, but because of sport-hunting and the incentive it provides for protection.

The success of the Bubye Valley and Savé Valley Conservancies, in terms of both of their hunted lion and non-hunted rhinoceros populations, may also provide the motivation for other areas in the country to sustainably manage their wildlife resource. A case in point is the Nuanetsi Ranch, a wildlife area that is also a legacy of failed cattle ranching, located almost directly between the Bubye Valley and Savé Valley Conservancies in Zimbabwe (Figure 3). At present there is a single lion on the Nuanetsi Ranch but management is not able to justify introducing more due to the current uncertainty over the future of lion hunting (B. Lees-May [Nuanetsi Ranch Conservator], pers. comm.). The Nuanetsi Ranch is a wildlife area of 1,489 km^2, and could conceivably sustainably hold between 201 and 278 lions (based on the most recently estimated lion densities of the Savé Valley [0.135 lions km^{-2}; Groom and Watermeyer 2015]; and Bubye Valley [0.187 lions km^{-2}; du Preez et al. 2015] Conservancies respectively). However, the Nuanetsi Ranch has invested in building up an abundant wildlife population, which is sport-hunted, and the management will not risk losing a significant amount of valuable game, that could otherwise be sold as trophies or meat, to a species from which it can not recuperate lost revenue, and instead that requires further investment in control measures (B. Lees-May [Nuanetsi Ranch Conservator], pers. comm.).

Between 2005 and 2015 the United States market has represented 70.4% of the total Zimbabwean lion sport-hunting industry (http://trade.cites.org/en/cites_trade/ [accessed 2015-01-19]), though in reality it constituted over 90% for both the Bubye Valley and Savé Valley Conservancies. If this market was effectively lost due an inability of prospective clients to import their trophies, based on the economics involved it would become unviable to continue managing the Bubye Valley Conservancy as a wildlife area in its current form, and lions would either have to be re-exterminated, or at least severely reduced via culling; or else what is the largest privately owned wildlife area in the world would be converted back into a cattle ranching area (K. Leathem, pers. comm.). This is the reality of any business, in that it needs to cover costs and pay staff and cannot run at a loss for luxury of conservation. Child (1993) states "*A refusal to treat wildlife in the same way as other resources and maintenance of centralised protectionist management prejudices its survival. Only by raising its commercial value will wildlife be able to compete for space on the scarce African landscape. Trade bans which detract from wildlife's commercial value prejudice its chances of survival in the long term*".

Although the USFWS understandably categorises lion conservation by country for simplicity, rather than individual properties, the Bubye Valley and Savé Valley Conservancies currently and deservedly hunt more than a third of the total Zimbabwean lion quota between them. Here we have shown that this sport-hunting does not negatively affect the lion population, which remains in positive growth despite off-take. In addition

to this, other areas, such as the Nuanetsi Ranch, could be incentivised to invest in lion conservation if the ability to sustainably utilise the lions as a resource was guaranteed.

The USFWS identified five primary factors that threaten lion survival in the wild, namely: habitat loss; loss of prey; retaliatory killing due to increased human-lion conflicts; inadequate regulatory mechanisms; and weak management of protected areas (http://www.fws.gov/endangered/what-we-do/lion.html [accessed 2015-01-19]). Each and every point on this list, which notably does not include sport-hunting, supports the fact that incentivising tolerance for lions through sustainable use would enhance the species' overall survival.

As responsible conservationists, we are not arguing against tight regulation of sport-hunting, especially with regard to sensitive species such as lions, and we support the need for transparency and accountability within the industry. However, this reform is a process being driven from within, as any indiscretion is an affront on all stakeholders. For example, long-term lion monitoring by WildCRU in Hwange National Park (HNP), Matabeleland North, Zimbabwe, documented a 'vacuum effect' and reduction in male lion density in the Park as a result of sport-hunting in the surrounding areas (Loveridge et al. 2007). A result of this research was the recommendation that ZPWMA implement a hunting moratorium in western Zimbabwe, which was accepted and enforced from 2005 to 2008 (Davidson 2009). Subsequent monitoring of the HNP lion population showed that the perturbation effects caused by sport-hunting were reversed during the moratorium, and sport-hunting was reinstated at a reduced, more sustainable quota (Davidson 2009). This example demonstrates both the relationship between independent researchers and ZP-WMA, and that the research assists ZP-WMA in robust decision making. This study has also shown that the lion population was able to recover quickly, and that a blanket-ban would have been as unnecessary as it would have been detrimental to overall lion conservation in the country.

In addition to the self-imposed hunting moratorium in the Matabeleland North district, Zimbabwe has voluntarily stopped sport-hunting of any lioness. The fixed-quota concept, in which hunting quotas had to be paid for upfront before the hunting season even began, and which was resultantly attributed to poor quality trophies and young animals being hunted, has also been abandoned. The adaptive quota management system for lion hunting based on the ages of lions hunted has been accepted and embraced by all stakeholders. This adaptive quota management system has not only led to a reduced national lion hunting quota, but has also resulted in a significant increase in the age of harvested lions to a level that is considered to have minimal ecological impact, being old individuals that are no longer contributing to the gene pool nor protecting cubs.

The IUCN Red List lion conservation status has remained unchanged for 20 years even in the face of Africa's ever-changing landscape. Despite fears that lion abundance is decreasing overall, in southern Africa it is in fact increasing (Bauer et al. 2015b).

CONCLUSION

Given the evidence presented, the arguments against sport-hunting would appear to be based more in emotion than logic and reality (e.g. Lindsey et al. 2015). Conservation, however, is not about individuals within populations, but the overall populations themselves. Sustainable sport-hunting of lions is just that: *sustainable* - and ironically, without it, the lions themselves become unsustainable. Conservation objectives need to be balanced with both social and economic factors if they are to be achieved.

The USFWS states "Well-managed conservation programs use trophy hunting revenues to sustain lion conservation, research and anti-poaching activitie" (http://www.fws.gov/endangered/what-we-do/lion.html [accessed 2015-01-19]). The Bubye Valley and Savé Valley Conservancies both fully meet each one of these conditions: clearly contributing to lion conservation in Zimbabwe; having long-term conservation research programs; and self-funded anti-poaching units.

The histories regarding the formation of both the Bubye Valley and Savé Valley Conservancies were both presented in this report, despite being remarkably similar; the point being that lion conservation in both areas, and many others, has the same fate either way. The Bubye Valley and Savé Valley Conservancies are both excellent examples of focussed and determined efforts to make wildlife based land use viable in an otherwise cattle dominated landscape. However, the fact remains that the cost of having lions, both ecologically and financially, is high. Simply increasing the abundance of one species at the expense of another cannot be considered a conservation success.

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BRIEFING PAPER
April 2016

Informing decisions on trophy hunting

A Briefing Paper for European Union Decision-makers regarding potential plans for restriction of imports of hunting trophies

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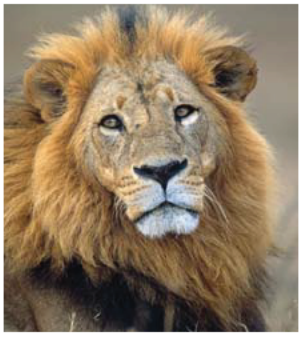

SUMMARY

Trophy hunting is currently the subject of intense debate, with moves at various levels to end or restrict it, including through bans on carriage or import of trophies. In the European Parliament, a group of Members have called for signing of a Written Declaration calling: "to examine the possibility of restricting all import of trophies into the EU, to ensure proper implementation of the rules by Member States, and to persuade countries that are issuing permits to trophy hunters without due consideration for the impacts of trophy hunting on conservation and animal welfare to discontinue this practice".

This paper seeks to inform discussions on this Declaration and other relevant discussions in the European Union on restriction of imports of hunting trophies.

Trophy hunting is hunting of animals with specific desired characteristics (such as large antlers), and overlaps with widely practiced hunting for meat. It is clear that there have been, and continue to be, cases of poorly conducted and poorly regulated hunting both beyond and within the European Union. While "Cecil the Lion" is perhaps the most highly publicised controversial case, there are examples of weak governance, corruption, lack of transparency, excessive quotas, illegal hunting, poor monitoring and other problems in a number of countries. This poor practice requires urgent action and reform.

However, legal, well regulated trophy hunting programmes can – and do – play an important role in delivering benefits for both wildlife conservation and for the livelihoods and wellbeing of indigenous and local communities living with wildlife.

RECOMMENDATIONS

To avoid significant negative impacts on species populations, habitat conservation, poaching levels, and the rights and livelihoods of indigenous and local communities, IUCN calls on the European Parliament, Council and Commission to ensure that any decisions that could restrict or end trophy hunting programmes:

i. are based on careful and sound analysis and understanding of the particular role that trophy hunting programmes are playing in relation to conservation efforts at all levels in source countries, including their contribution to livelihoods in specific affected communities;

ii. are based on meaningful and equitable consultation with affected range state governments and indigenous peoples and local communities and do not undermine local approaches to conservation;

iii. are taken only after exploration of other options to engage with relevant countries to change poor practice and promote improved standards of governance and management of hunting;

iv. are taken only after identification and implementation of feasible, fully funded and sustainable alternatives to hunting that respect indigenous and local community rights and livelihoods and deliver equal or greater incentives for conservation over the long term.

SUMMARY *continued*

Habitat loss and degradation is the primary driver of declines in populations of terrestrial species. Demographic change and corresponding demands for land for development are increasing in biodiversity-rich parts of the globe, exacerbating this pressure on wildlife and making the need for viable conservation incentives more urgent.

Well managed trophy hunting, which takes place in many parts of the world, can and does generate critically needed incentives and revenue for government, private and community landowners to maintain and restore wildlife as a land use and to carry out conservation actions (including anti-poaching interventions). It can return much needed income, jobs, and other important economic and social benefits to indigenous and local communities in places where these benefits are often scarce. In many parts of the world indigenous and local communities have chosen to use trophy hunting as a strategy for conservation of their wildlife and to improve sustainable livelihoods.

In many parts of the world indigenous and local communities have chosen to use trophy hunting as a strategy for conservation of their wildlife and to improve sustainable livelihoods

Time-limited, targeted conditional moratoria – particularly if accompanied by support for on-the ground management reform – may be useful tools in driving improvements in hunting practice. Such moratoria could focus on particular countries or species. But blanket bans or restrictions affect both good and bad hunting practices. They are a blunt instrument that risks undermining important benefits for both conservation and local livelihoods, thus exacerbating rather than addressing the prevailing major threats of habitat loss and poaching.

Rather than bans on trophy hunting, poor practices (within the EU or in other countries) could be improved by sustained engagement with and support for responsible national agencies to improve governance frameworks and on-the-ground management.

Or, if decisions to ban or restrict trophy hunting are taken, there is a need to identify and implement in advance viable alternative long-term sources of livelihood support and conservation incentives.

While tourism can be a one viable alternative in a limited number of cases, it requires access, infrastructure, guaranteed wildlife viewing opportunities and political stability – all conditions that are missing in many of the places where trophy hunting is working. But tourism and hunting can be complementary land uses in many areas, with both activities – when regulated by effective protocols – contributing to making wildlife a viable land use.

IUCN stands ready to assist European decision-makers in better understanding the role of trophy hunting in conservation and livelihoods and is actively pursuing a major research exercise to enable this.

BACKGROUND

What is at stake?

Trophy hunting is currently the subject of intense debate and polarised positions, with controversy and deep concern over the practice of trophy hunting, its ethical basis, and its impacts. It is clear that there have been, and continue to be, cases of poorly conducted and poorly regulated hunting, with Cecil the Lion perhaps the most highly publicised example of this.

Intense scrutiny of hunting due to these bad examples has been associated with many confusions (and sometimes misinformation) about the nature of hunting, including:

- trophy hunting is the same as “canned” hunting;
- trophy hunting is illegal;
- trophy hunting is driving declines of iconic species, particularly large African mammals like elephant, rhino and lion;
- trophy hunting could readily be replaced by photographic tourism.

None of these statements is correct.

Concerns over hunting, sometimes driven by these confusions, have sparked calls at various levels directed at ending or limiting trophy hunting, typically by restricting the national level licensing of hunting or the transport or import of hunting trophies.

In the European Union (EU), a group of Members of the European Parliament (MEPs) have called for the signing of a Declaration to ban import of trophies into the EU (European Parliament 2016). This paper seeks to inform discussions on this Declaration.

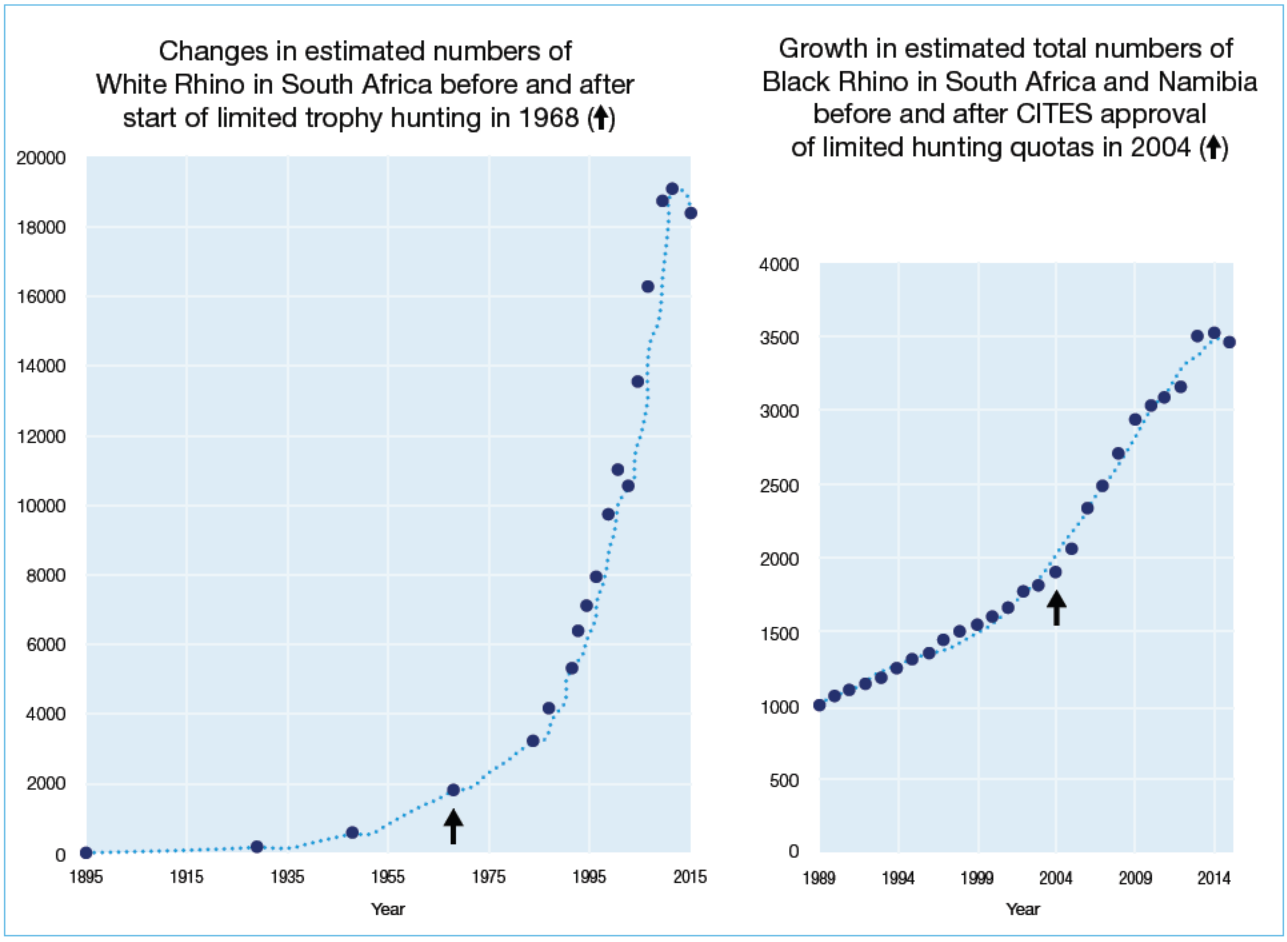

Figure 1 Trophy hunting programmes have contributed to the recovery of African White and Black Rhinos (see Annex 1: Case Study 1).

What is trophy hunting?

Trophy hunting generally involves the payment of a fee by a foreign or local hunter for a hunting experience, usually guided, for one or more individuals of a particular species with specific desired characteristics (such as large size or antlers). The trophy is usually retained by the hunter and taken home. Meat of hunted animals is usually used for food by local communities or the hunter. It may be a distinct activity or overlap with recreational or meat hunting. Many deer hunters, for example, may desire a trophy but also hunt for food or for the experience.

It takes place in most countries of Europe, the USA, Canada, Mexico, several countries in East, Central and South Asia, around half of the 54 countries in Africa (Booth and Chardonnet, 2015), several countries in Central and South America, and in Australia and New Zealand.

A wide variety of species are hunted, from abundant to threatened. Most are native, some are introduced. Hunting of introduced species is not further discussed here, as it constitutes a small proportion of hunting and raises quite different conservation issues.

Is trophy hunting "canned hunting"?

There is a tendency for the media and decision-makers to conflate canned hunting (hunting of animals in confined enclosures where they are unable to escape) with trophy hunting. Canned hunting represents a very small proportion of hunting, raises very different issues from trophy hunting of free-ranging animals, and is condemned by existing IUCN policy (IUCN Recommendation 3.093, "Application of the IUCN Sustainable Use Policy to sustainable consumptive use of wildlife and recreational hunting in southern Africa", 2004). It is not discussed further in this document.

Is it legal? And who decides?

Trophy hunting is often incorrectly conflated with the poaching for the organised international illegal wildlife trade (IWT) that is currently devastating many species including African elephant and African rhinos.

However, trophy hunting typically takes place as a legal, regulated activity under programmes implemented by government wildlife agencies, protected area managers, indigenous and local community bodies, private landowners, or conservation/development organisations. In a number of cases revenues from hunting are in fact funding law enforcement or providing community benefits that counter incentives to engage in IWT (see Case Studies 1,4,8,9; Figure 2).

In some contexts, all decisions on hunting quotas, species, and areas are made by government wildlife agencies. However, under many trophy hunting governance systems local landowners or community organizations participate alongside governments in deciding these questions and sometimes are the key decisionmakers (see Case Studies 2,4-7,10; Figure 2).

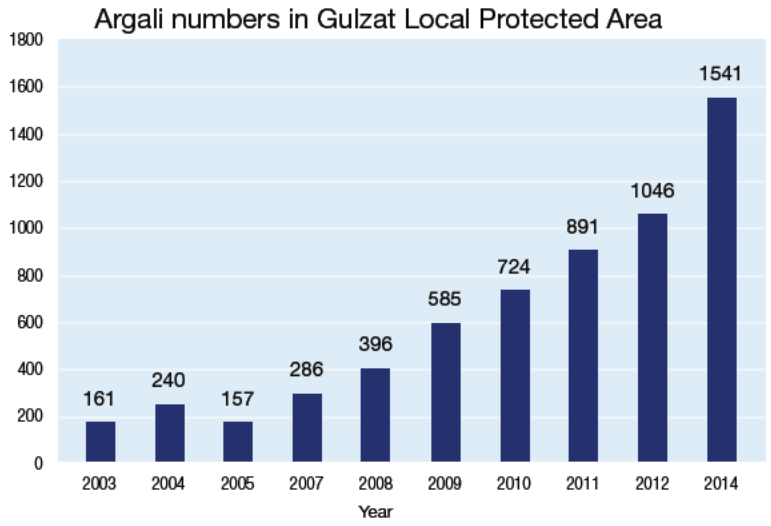

Figure 2 Local communities have developed a conservation approach for Argali in Mongolia using legal, regulated trophy hunting to pay guards and incentivise protection from poaching. Graph shows growth in population of Argali in Gulzat Local Protected Area. Trophy hunting was introduced in 2010 (see Annex 1; Case Study 2). Source: WWF Mongolia, unpublished data.

This is not to say that there is not a level of illegal practice taking place (both within and beyond the EU), as in most industries. There are regulatory weaknesses and illegal activities taking place in some countries, sometimes very serious. These include hunting in excess of quotas, in the wrong areas, taking of non-permitted species, and for African rhinos, problems with "pseudohunting" and sale of hunting trophies into black markets in consumer states.

Where does the money go?

Prices paid for hunts vary enormously, from hundreds to hundreds of thousands of (US) dollars, and globally involve a substantial revenue flow from developed to developing countries.

In developing countries, landowners/managers will often negotiate with "hunting operators" to decide who will get the hunting right or "concession" on their land, and on what terms. The operator, in turn, secures contracts with clients overseas and runs the hunting trips. The price paid by the hunter will generally include three things:

- the operator's costs (where applicable);
- payment to the local entity (community, private or state land owner/manager) with which the operator has the contract; and
- "official" government payments of various types which typically help finance wildlife management and conservation activities.

In developing countries generally 50-90% of the net revenues (excluding operator costs) are allocated to the local entity, with the remainder to the government authority. The local community benefit can be as high as 100% (Case Study 5). Meat from the hunts is also often contributed or sold to local community members and can be highly locally valued (Naidoo et al., 2016). In most of Europe and North America, a share of hunters' fees usually goes to governmental wildlife authorities to finance wildlife management and conservation activities.

How can trophy hunting be good for conservation?

Trophy hunting takes place in a great variety of governance, management, and ecological contexts, so its impacts on conservation vary enormously, from negative to neutral to positive. In many contexts good evidence is lacking or scanty, so it is currently impossible to evaluate precisely how widespread each outcome is.

Negative conservation impacts of poorly managed hunting can include overharvesting, artificial selection for rare or exaggerated features, genetic or phenotypic impacts due to hunting (such as reduced horn size), introduction of species or subspecies beyond their natural range (including into other countries), and predator removal.

With effective governance and management trophy hunting can and does have positive impacts

However, it is clear that with effective governance and management trophy hunting can and does have positive impacts (see Annex 1 for examples). Habitat loss and degradation, driven primarily by expansion of human economic activities, is the most important threat to terrestrial wildlife populations (Mace et al., 2005), along with other threats such as poaching for bushmeat and illegal wildlife trade and competition with livestock. Demographic change (population expansion) and demands for food, income and land for development are increasing in many biodiversity-rich parts of the globe, exacerbating these pressures on wildlife and making the need for viable conservation incentives more urgent.

In contrast, hunting can be a positive driver for conservation because it increases the value of wildlife and the habitats it depends on, providing critical benefit flows that can motivate and enable sustainable management approaches. Trophy hunting programmes can:

1. **generate incentives for landowners (government, private individuals or communities) to conserve or restore wildlife** on their land. Benefits to landowners from hunting can make wildlife an attractive land use option, encouraging them to maintain or restore wildlife habitat and populations, remove livestock, invest in monitoring and management, and carry out anti-poaching activities (see Case Studies 1,3-7 for examples). For example, policies enabling landowners to benefit from sustainable use of wildlife have led to the total or partial conversion of large areas of land from livestock and cropping *back* to wildlife in South Africa, Zimbabwe, Namibia, Pakistan, the United States and Mexico (see Case Studies 1, 3-6). Without such benefits, the future of these lands and the wildlife that inhabit them is highly uncertain.
2. **generate revenue for wildlife management and conservation, including anti-poaching activities**, for government, private and communal landholders (see Case Studies 1-7, 9 for examples). Government agencies in most regions depend at least in part on revenues from hunting to manage wildlife and protected areas. For example, state wildlife agencies in the USA are funded primarily by hunters (both trophy and broader recreational hunting) through various direct and indirect mechanisms including the sale/auction of trophy hunt permits (Heffelfinger, Geist and Wishart, 2013; Mahoney, 2013). The extent of the world's gazetted protected areas, many of which fall in IUCN categories IV and VI and include hunting areas, could significantly decline as these areas become inoperable. Private land-owners in South Africa and Zimbabwe and communal landowners in Namibia also use trophy-hunting revenues to pay guards and rangers, buy equipment, and otherwise manage and protect wildlife (Case Studies 1,4,5). Revenues from trophy hunting operations in Mongolia, Tajikistan and Pakistan are used to pay local guards to stop poaching and to improve habitat for game animals (Case Studies 2,6,7). Trophy hunting operators and the patrols they directly organize, finance and deploy can reduce poaching (Case Studies 4,6,9; Lindsey et al., 2007).
3. **increase tolerance for living with wildlife, reducing the effects of human-wildlife conflicts and reducing illegal killing**. Where wildlife imposes serious costs on local people, such as loss of crops and livestock or human injury and death, and there are no legal means for people to benefit from it, retaliatory killing and local poaching are common. This is particularly important in Africa where elephants and other species destroy crops and large cats kill humans and livestock (see Case Studies 4,5).

Is trophy hunting driving declines of large African mammals?

Concern is frequently expressed that trophy hunting is driving declines of iconic African large mammals such as elephants, rhinos and lions. While there is evidence for a small number of populations that unsustainable trophy hunting has contributed to local declines (e.g. Loveridge et al., 2007, Packer et al., 2009, 2011), it is not a significant threat to any of these species and is typically a negligible or minor threat to African wildlife populations (Lindsey, 2015).

The primary causes of population declines of the large mammals subject to trophy hunting, such as the African Elephant, African Buffalo, White Rhino, Black Rhino, African Wild Dog and Hartmann's Mountain Zebra are habitat loss and degradation, competition with livestock, illegal or uncontrolled poaching for meat and trade in animal products (ivory, horn, etc.), and retribution killing for human-wildlife conflict (Schipper et al., 2008). For Lions specifically, the most important causes of population declines are indiscriminate killing in defense of human life and livestock, habitat loss, and prey base depletion (usually from poaching) (Bauer et al., 2015).

For all of these species, as the case studies note, well-managed trophy hunting can indeed promote population recovery, protection, and maintenance of habitat (see Figure 3).

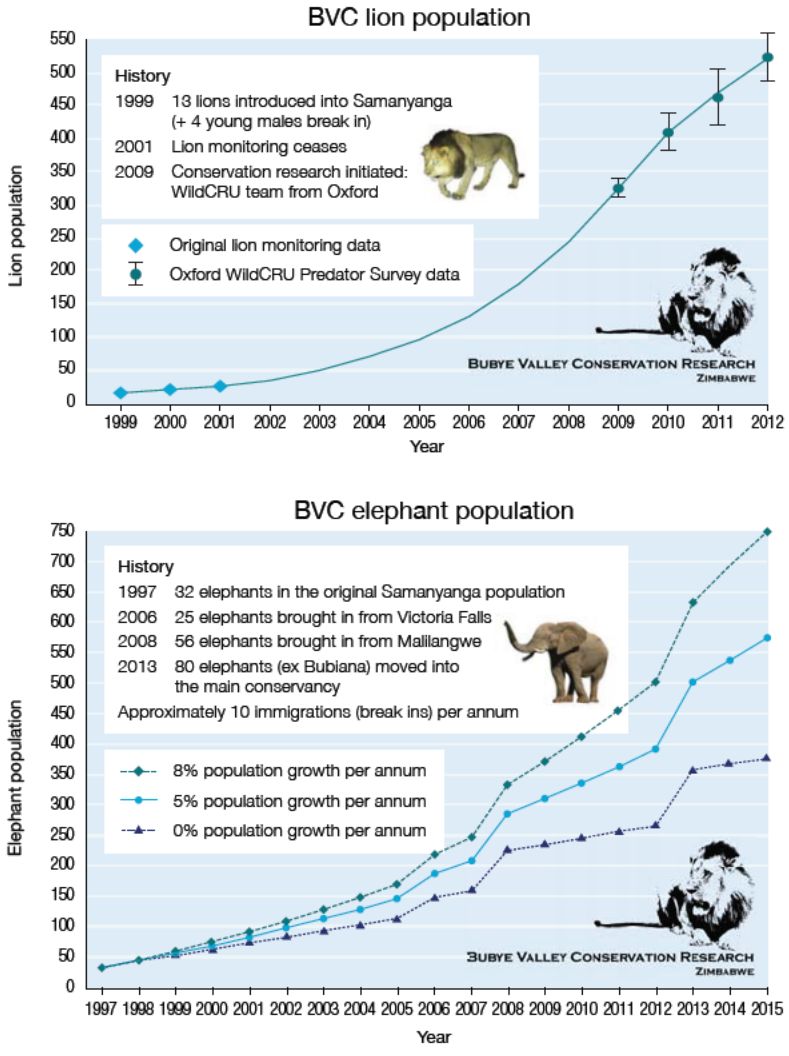

Figure 3 Bubye Valley Conservancy, a private conservancy in Zimbabwe on land previously used for farming, is dependent on limited trophy hunting to fund wildlife protection and conservation (see Annex 1; Case Study 4). Lion and African Elephant populations have grown steadily.

How does trophy hunting affect indigenous and local community rights and livelihoods?

This varies enormously across different contexts and different regions, and there are cases in which trophy hunting takes place without meaningful community participation in decision-making around wildlife management, without adequate respect for community rights and consent, and with insufficient or poorly functioning benefit-sharing mechanisms.

However, it is likewise clear that there are a significant number of trophy hunting programmes where indigenous or local communities have freely chosen to use trophy hunting as a tool to provide the incentives and revenue to help them conserve and manage their wildlife and/or improve their livelihoods (Case Studies 2,3,5–7,10). In many further cases communities have less decisionmaking power over trophy hunting, but nonetheless gain a share of hunting revenue (see Lindsey et al., 2013). Communities benefit from trophy hunting through hunting concession payments or other hunter investments, which typically support improved community services like water infrastructure, schools and health clinics; gaining jobs as guides, game guards, wildlife managers and other hunting-related employment; and gaining access to meat. These are typically poor rural communities with very few alternative sources of income and sometimes no other legal source of meat.

How would broad import restrictions, such as those raised by the Written Declaration on Trophy Hunting, affect conservation and livelihoods?

Trophy import restrictions by key importing entities such as the EU can make trophy hunting programmes economically unviable at local level, particularly where the restrictions affect "high value" iconic species (Case Study 5; Figure 4). Removing the incentives and revenue provided by hunting would be likely to cause serious declines of populations of a number of threatened or iconic species. For example, the recovery of some populations of African Elephant, Black Rhino, White Rhino, Hartmann's Mountain Zebra, Cheetah and Lion in Africa, of Markhor, Argali and Urial in Asia, and of Bighorn Sheep in North America could be stopped and reversed (Case Studies 1-8). Importantly, populations of threatened species that are not hunted could also be negatively impacted, including e.g. Snow Leopard and African Wild Dog (Case Study 8).

To avoid serious conservation impacts, any restrictions which would have this effect should be preceded by establishment of fully funded, feasible, long-term alternatives that generate conservation incentives and finance conservation actions.

Making the option of trophy hunting unviable through import restrictions would lead to some indigenous and local communities losing cash income from hunting concessions on their land, reduced access to meat, and loss of employment. For example, the indigenous Khwe San and the Mbukushu (around 5000 people) in Bwatwata National Park are some of Namibia's poorest people, but have earned around N$2.4 million (ca US$155,000) per year in hunting payments in recent years (R. Diggle, In litt.). Stopping trophy hunting would be an enormous setback, in terms not only of income but also meat – living in a National Park they cannot graze livestock or grow commercial crops. Likewise, if trophy hunting became unviable the thousands of rural Zimbabwean households that directly benefit from CAMPFIRE would lose approx. US$1.7 per annum (already reduced from US$2.2 million by US elephant trophy import bans) (C. Jonga (CAMPFIRE Association), In litt.). These are very substantial amounts in countries where the average income for rural residents is a few dollars a day or less.

Even more fundamentally, perhaps, unilateral trophy restrictions by importing states in these cases will take decision-making power away from already-marginalized rural communities as to how they can manage their land and wildlife in ways that respect their right to self-determination and that best meet their livelihood aspirations.

If and where import restrictions are pursued and where such owner/user rights and benefits exist, respect for equity, community rights and sustainable livelihoods require that they are based on consultation with such communities and establishment of feasible, sustainable, freely chosen alternative livelihood opportunities.

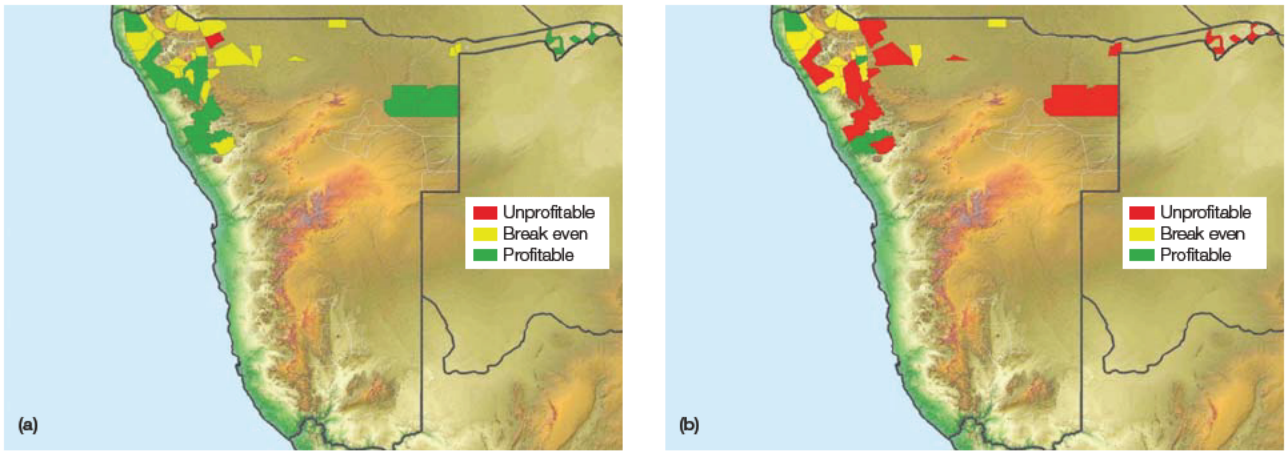

Figure 4 Trophy hunting provides critical revenue underpinning the success of the Namibian communal conservancy programme. Maps illustrate the economic viability of community conservancies in Namibia under (a) the status quo; and (b) a simulated trophy hunting ban (from Naidoo et al., 2016); see Annex 1; Case Study 5.





Images courtesy of Wildscreen Exchange, www.wildscreenexchange.org

Can't trophy hunting be replaced by photographic tourism?

Trophy hunting is not the only means to make wildlife valuable to people and to return local benefits. Photographic tourism can be a very valuable option in many places and has generated enormous benefits for conservation. However, it is viable over only a very limited percentage of the wildlife area currently managed for trophy hunting: it requires political stability, proximity to good transport links, minimal disease risks, high density wildlife populations to guarantee viewing, scenic landscapes, high capital investment, infrastructure (hotels, food and water supply, waste management), and local skills and capacity. Tourism and hunting are frequently highly complementary land uses when separated by time or space. Where tourism is feasible in areas currently used for hunting, it is typically already being employed alongside hunting (Case Studies 1,4,5). Like trophy hunting, if not carefully implemented it can have serious environmental impacts and can return a very low level of benefit to local communities, with most value captured offshore or by in-country elites (Sandbrook and Adams, 2012).

Are there other alternatives?

Effective alternative approaches to trophy hunting need to provide tangible and effective conservation incentives: they need to make wildlife valuable to people over the long term and should preferably empower local communities to exercise rights and responsibilities over wildlife conservation and management. For example, various forms of Payment for Ecological Services (PES schemes) offer considerable potential where they can effectively mobilise investments or voluntary contributions from governments, philanthropists and the private sector, and effectively motivate species and habitat conservation. The land leasing scheme carried out by Cottar's Safari Service with Maasai communities in Olderkesi, Kenya offers an example (IUCN SULi et al., 2015, p15), albeit limited by the difficulty of mobilising stable funding. The REDD+ approach (a form of PES scheme established through an intergovernmental process) can provide incentives and revenue flows to local communities in some areas, although with many caveats. All these options are challenging, with a critical challenge ensuring that revenue flows will be sustainable over the long term and not contingent on highly changeable donor priorities.

How could trophy hunting practices be improved?

Broad-scale restrictions and bans are not the only solution for addressing poor trophy hunting practice, outside or within the EU. Import restrictions are often attractive interventions as they are easy to implement and can be carried out at low cost to decision-making bodies. However, conservation success is rarely achieved by single decisions in distant capitals, but typically requires long term, sustained multi-stakeholder engagement in-country and on the ground. Trophy hunting is no exception.

As an alternative to blanket bans or other broad unilateral restrictions that would curtail trophy hunting programmes, EU decisionmakers may want to give more consideration to whether specific trophy hunting programmes both within the EU and beyond are meeting requirements for best practice, as elaborated in the IUCN SSC *Guiding Principles for Trophy Hunting as a Tool for Conservation Incentives* (IUCN SSC, 2012) and other publications including the *European Charter on Hunting and Biodiversity* adopted under the Bern Convention on the Conservation of European Wildlife and Natural Habitats (Brainerd, 2007). Where there are problems in governance and management of trophy hunting, as there are in many places, it will be most effective to actively engage with relevant countries to improve quality of governance and management, including increasing transparency in funding flows, community benefits, allocation of concessions and quota setting; strengthening of rights and responsibilities of indigenous peoples and local communities; and improving monitoring of populations and of hunts. There are important roles for many hunting stakeholders in improving standards, including importing countries, donors, national regulators and managers, community organisations, researchers, conservation organisations, and the hunting industry and hunter associations in reaching these standards.

Are there cases where trophy import bans might provide benefits?

Conditional, time-limited, targeted import moratoria aimed at addressing identified problems could help improve trophy hunting practice in certain instances. However, bans are unlikely to improve conservation outcomes unless there is a clear expectation that improved standards will lead to the ban being lifted, and the country has the capacity as well as the political will to address the problem. It is therefore critical to the impact of targeted moratoria that – at least in developing countries – they are accompanied by funding and technical support for on-the-ground management improvements, and the status of the initial problem is reviewed after a specified period.



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Annex

Case studies of trophy hunting having positive conservation and livelihood benefits

Case Study 1

Rhinos in South Africa and Namibia

Since trophy hunting programmes were introduced for these species, White Rhino increased in South Africa from 1,800 (in 1968) to around 18,400; and Black Rhino increased in South Africa and Namibia from around 2,520 (in 2004) to around 3,500 (see Figure 1). By end 2015, these two countries conserved 90% of Africa's rhinos, yet only 0.34% and 0.05% of their white and black rhino populations were hunted. Not only has rhino hunting clearly been sustainable, it has played an integral part in the recovery of these species through providing incentives for private and communal landholders to maintain the species on their land, generat ing income for conservation and protection, and/or helping manage populations to increase population recovery.

Limited sport hunting of rhinos along with live sales and tourism has provided the economic incentives to encourage over 300 South African private land owners to collectively build their herd to ~6140 white rhinos and 630 black rhinos on 49 private/communal land holdings – very important populations of these iconic species. This has added over 2,000 km^2 of conservation land – equivalent of another Kruger National Park! However, increasing security costs and risks due to escalating poaching and declining economic incentives have resulted in a worrying trend of private rhino owners and managers divesting their rhino, threatening future expansion of range and numbers. Import restrictions that threaten the viability of hunting would likely further reduce incentives and exacerbate this trend.

Many private reserves rely heavily on trophy hunting and that of white rhinos to cover operational expenses. For example, a South African reserve, known to the IUCN African Rhino Specialist Group, with identity concealed here for rhino security reasons, manages an increasing population of 195 white rhinos and many other species. Their conservation efforts are self-funded. Analysis of eight years' data revealed that only ~18% of the total reserve's operational expenditure was generated from tourism, while trophy hunting generated the bulk of income needed to fund operational expenditure (63%). Over the last eight years, only seven (or <1% of the population annually) white rhino have been hunted on the reserve, generating (inflation adjusted) US$617,000; with live sales of another 47 white rhino over the period bringing in an additional US$973,000. The reserve allocates all of the proceeds from rhino hunting towards rhino protection and conservation management costs. Average white rhino hunting revenue in the reserve over the last eight years translated to US$400 for each living white rhino in the reserve today/year; equivalent to 29%–33% of estimated current rhino protection and law enforcement costs/rhino/year in Kruger National Park and on Private Land of US$1,210–US$1,360/rhino/year, respectively. The Reserve Manager indicates that "the income from hunting in general and from the live sales of rhino, has sustained the management of the Reserve for decades" noting the recent ban on the import of lion trophies into the US has already had a negative impact on income to fund conservation with the cancellation of some hunts.

Rhino hunting has not been without its problems, with some 'pseudo-hunters' using the legal sport hunting route to access rhino horn for illegal sale in South East Asia. Increased regulation has seen the record high 231 rhino hunting applications in South Africa in 2011 plummet to normal levels of 62 white rhino and one black rhino hunted in 2015. In Namibia a further 3 white rhino and 1 black rhino were hunted in 2015. These numbers represent only 0.35% of the white and black rhinos conserved by these two countries, respectively, yet will have generated turnover close to US$4 million.

Case Study 2

Argali in Mongolia

As part of a plan to create community-based wildlife hunting management based on Altai Argali in the Gulzat Local Protected Area of northwest Mongolia, the Uvs Aimag Citizen's Meeting imposed a 4-year ban on Argali hunting to enable restoration of the population. Largely unmanaged, open-access hunting and increased competition for forage from goats were likely chief causes of the population decline.

With local herders now protecting the population, it grew from roughly 200 in the years immediately preceding the ban to an estimated 724 in 2010. After the ban was lifted in 2010, 12 Argali were harvested over the next 4 years generating around $123,000 at the local level. Meanwhile, the Argali population doubled again to more than 1,500 (WWF Mongolia, unpublished data) (Figure 2).

Case Study 3

Bighorn Sheep in North America

EuroAmerican settlement with the corresponding surge in livestock numbers and uncontrolled hunting led to a rapid decline in Bighorn Sheep in North America, from roughly 1 million in 1800 to fewer than 25,000 by 1950. Since then, based primarily on more than US$100 million contributed by trophy hunting groups through fees and donations, hundreds of thousands of hectares have been set aside for Bighorn Sheep and other wildlife and the bighorn population has more than tripled from its historic low to roughly 80,000 today (Damm and Franco, 2014; Hurley et al., 2015).

Restoration in Canada and the U.S. was largely based on hunters working with state/provincial wildlife agencies to support research, habitat acquisition and management. For example, in the state of Wyoming, auctions of Bighorn Sheep hunting tags yield approximately $350,000 annually, of which 70% goes to conserving Bighorn Sheep and 10% to other wildlife. These revenues and funds from Bighorn Sheep organizations were used to cover approximately one-third of the total cost of more than US$2 million paid to domestic sheep producers to voluntarily remove their sheep from 187,590 ha of public grazing lands. Other hunting, fishing, and wildlife groups covered the other two-thirds of the total cost because removing domestic sheep grazing from these areas benefitted a diversity of wildlife (K. Hurley (Wild Sheep Foundation), pers. comm.).

Indigenous-managed trophy hunting has driven recoveries in Mexico. In 1975, 20 Bighorn Sheep were reintroduced to Tiburon Island in the Sea of Cortez, an island owned and managed by Seri Indians. The original cause of the species' extinction on the island is unknown. The bighorn population quickly grew to around 500, probably the carrying capacity for the island. In 1995, a coalition of institutions initiated a programme to fund Bighorn Sheep research and conservation while providing needed income for the Seri through international auctioning of exclusive hunting permits on the island. Initially, permits often garnered 6-figure (US dollars) auction bids. From 1998 – 2007, the Seri Indians earned US$3.2 million from Bighorn Sheep hunting permits and sale of young for translocation, funds that were reinvested in Seri community projects, management of the Bighorn Sheep population, and maintenance of the island in an undisturbed state. Funding from trophy hunting for the island's conservation continues, with the Seri selling recent permits for US$80,000-90,000 each. The island has also been an important source population for reestablishing other Bighorn Sheep populations in the Sonoran Desert and elsewhere on the mainland. Because of the substantial revenues from trophy hunting of Bighorn Sheep and Mule Deer, many ranchers in the Sonoran Desert have greatly reduced or eliminated livestock to focus on wildlife (Valdez et al., 2006; Lee, 2008; Wilder et al., 2014; Hurley et al. 2015).

Case Study 4

Private wildlife lands in Zimbabwe

In Zimbabwe, the devolution of wildlife use rights to landholders in 1975 resulted in a transition from game ranching being a hobby practiced by a few dozen ranchers to some 1,000 landowners and 27,000 km^2 conserving wildlife by 2,000, with trophy hunting a primary driver of this change (Child, 2009; Lindsey et al., 2009). Although these numbers have declined significantly under the land reform programme, and despite the current challenging economic conditions in the country, some private conservancies continue to play a crucial role in conservation. The following all rely on trophy hunting as the primary source of revenue and they would all be unviable without it; photographic tourism has been tried and has not been a viable alternative.

The Savé Valley Conservancy (SVC), covering 344,000 ha, was created in the 1990s by livestock ranchers who agreed that wildlife management could be a better use of the land than livestock. Cattle ranching operations had eliminated all elephants, rhinos, buffalo and lions, among other species, in the area. Today, SVC has around 1,500 African Elephants, 117 Black Rhinos and 43 White Rhinos, 280 Lions and several packs of the Endangered African Wild Dog. Hunting on the Sango Ranch, SVC's largest property, yields around US$600,000 annually and employs 120 permanent workers who represent more than 1,000 family members (Lindsey et al., 2008; W. Pabst and D. Goosen, pers. comm.; SVC, n.d.; Sango Wildlife; n.d.).

The 323,000-ha Bubye Valley Conservancy (BVC) was converted from a cattle ranch 20 years ago and now has roughly 500 Lions, 700 African Elephants, 5,000 African Buffalo, 79 White Rhinos and, at 202, the third largest Black Rhino population in Africa (see Figure 3). Trophy fees in 2015 generated US$1,380,605. BVC employs approximately 400 people and invests US$200,000 annually in community development projects (BVC, n.d.; B. Leathem, pers. comm.).

The Cawston Game Ranch in Zimbabwe, at 12,600 ha, is much smaller than SVC and Bubye, and thus is more limited in terms of game species it can harbor. When the ranch was purchased a few native game species existed but Common Wildebeest, Plains Zebra, Giraffe, Tsessebe, Common Impala, Bushbuck, Red Hartebeest, Gemsbuck and Waterbuck had to be reintroduced. Approximately 4,500 game animals now inhabit the ranch. Large predators are limited to Leopards, Brown Hyaenas and an occasional Cheetah. Hunting contributes 68% of gross revenues, derived almost wholly from plains game, particularly Sable and Tsessebe. The ranch employs 41 people and its value to local communities is estimated at US$60,000/yr (V. Booth, unpublished data).



Image courtesy of Wildscreen Exchange, www.wildscreenexchange.org

Case Study 5

Communal conservancies in Namibia

In the early 1990s, many residents of Namibian communal lands viewed wildlife as a detriment to their livelihoods because animals destroyed crops and water installations and killed or injured livestock and people. Today, 82 communal conservancies covering 162,033 sq km and home to more than 184,000 people are engaged in community-based conservation, including indigenous and tribal communities.

Trophy hunting has underpinned Namibia's successes in community-based natural resource management. Recent analysis indicates that if revenues from trophy hunting were lost, **most** conservancies would be unable to cover their operating costs – they would become unviable, and both wildlife populations and local benefits would decline dramatically (Naidoo et al., 2016; see Figure 4). Overall, conservancies generate around half their benefits (including cash income to individuals or the community, meat, and social benefits like schools and health clinics) from photographic tourism and half from hunting. Note much of this is reinvested into managing and protecting wildlife. Around half the conservancies gain their benefits **solely** from hunting, with most of the rest deriving part of their income from hunting alongside tourism. Only 12% specialise in tourism (Naidoo et al., 2016). Revenues from trophy hunting of 29 wildlife species on conservancies totaled US$1,671,379 in 2013. Five CITES-listed species—Elephant, Common Hippopotamus, Hartmann's Mountain Zebra, Lion and Leopard—accounted for 63% of this total. For example, every time an elephant is harvested a community directly receives approximately US$20,000 in payment, plus approximately 3,000 kg of meat.

Wildlife populations have shown dramatic increases since the beginning of the communal conservancy programme in Namibia. On communal lands in northeast Namibia, from 1994-2011, the Sable population increased from 724 to 1,474 and the common impala from 439 to 9,374. In the conservancy region of northwest Namibia, from the early 1980s to 2011, the threatened Hartmann's Mountain Zebra population increased from less than 1,000 to an estimated 27,000, and the number of Black Rhino more than tripled, making it the largest free-roaming population in Africa (conservancies are unfenced). The growth of communal conservancies and protection offered by national parks has enabled elephants to increase their population from around 7,500 in 1995 to more than 20,000 today. The Kunene Conservancy's Lion population grew from roughly 25 lions in 1995 to 150 today, and Namibia now has a large free-roaming Lion population outside of national parks (NACSO, 2015; C. Weaver (WWF Namibia), pers. comm.).





Images courtesy of Wildscreen Exchange, www.wildscreenexchange.org

Case Study 6

Markhor and Urial in Pakistan

The Torghar Conservation Project in Pakistan was initiated by local Pathan tribal leaders in the mid-1980s concerned that uncontrolled illegal hunting for food had greatly reduced populations of both the Suleiman (straight-horned) Markhor (< 100 animals) and the Afghan Urial (around 200). After unsuccessfully petitioning the government to protect the populations, the local leaders developed the Torghar Conservation Project based on a simple concept: local Pathan tribesmen would give up hunting in exchange for being hired as game guards to prevent poaching, and the project would be financed by revenues derived from a limited trophy hunt of Markhor and Urial by foreign hunters. The area covers about 1,000 sq km inhabited by about 4,000 tribal people. Between 1986 and 2012, hunting of these two species generated US$486,400 for the provincial government and US$2,712,800 for the local community, the latter covering salaries of more than 80 game guards, funding various community projects including schools and healthcare facilities, and supporting actions to reduce grazing competition with livestock. Illegal hunting declined dramatically: as of 2012 the Markhor population had grown to an estimated 3,500, while a 2005 survey of Urial estimated 2,541 (Johnson, 1997; Woodford et al., 2004; Frisina and Tareen, 2009; Mallon, 2013).

Similar examples exist elsewhere in Pakistan. Community-based conservancies using trophy hunting in the regions Khyber-Pakhtunkhwa and Gilgit-Baltistan have led to the recovery and substantial increase of Markhor populations. These developments have contributed to the recent improvement of the conservation status of Markhor in the IUCN Red List, and it is no longer listed as threatened. Stable and increasing populations are limited to areas with sustainable hunting and protected areas (Michel and Rosen Michel, 2015).

Case Study 7

Markhor in Tajikistan

In the mid-90s fewer than 350 Tajik Markhor inhabited southern Tajikistan. Around 2004, several traditional local hunters, concerned that the Markhor population would go extinct due to widespread poaching, established small enterprises dedicated to Markhor conservation and future sustainable use. Trophy hunts yield ca. US$100,000 per Markhor. Today, based on revenues from trophy hunting, four community-based conservancies (run by three family enterprises and one community-based NGO) successfully lead the recovery of the Markhor, with local people employed as guards and various community development projects funded. A range-wide survey conducted in 2014 recorded 1,300 Markhor (Alidodov et al., 2014). This success is spawning the creation of more conservancies based on trophy hunting in the region (Michel and Rosen, in press; S. Michel, pers. comm.).

Case Study 8

Benefits to non-target threatened species

Revenues from trophy hunting are also important for conserving threatened species that are not hunted. Populations of Black Rhino and White Rhino and of the African Wild Dog on the Savé and Bubye Conservancies in Zimbabwe are not hunted, but proceeds from trophy hunting support their conservation. In the Pamirs in Tajikistan, trophy hunting concessions for Argali and ibex are showing higher densities of the threatened Snow Leopard than nearby areas without trophy hunting, likely due to higher prey densities and reduced poaching (Kachel, 2014). Likewise, high densities of Snow Leopard have been recorded in one Markhor conservancy (Rosen 2014). The threatened Grizzly Bear population of the Yellowstone National Park region in the United States has benefitted from the retirement of areas of land from livestock grazing—and thus reduced bear-livestock conflicts—partially paid for by Bighorn Sheep hunting revenues (K. Hurley (Wild Sheep Foundation), pers. comm.).

Case Study 9

Revenues for government wildlife agencies, including for anti-poaching

Even where there are clear and serious failures in hunting management, hunting may generate an important actual or potential revenue stream for conservation in the face of increasing threats of poaching and habitat loss. In Tanzania, for example, many commentators have highlighted serious weaknesses in hunting governance requiring deep reforms, including corruption in the distribution of revenues and other practices, unsustainable quotas, and poor law enforcementenforcement (Nelson, Lindsey and Balme, 2013). While this is not a "good practice" example, it clearly illustrates some of the complexity of the conservation costs and benefits of hunting in specific circumstances.

Financial Year (July/June)	Tourist Hunting	Photographic Tourism
2009/2010*	18,444,881.00	2,706,603.00
2010/2011*	23,536,347.00	2,863,287.24
2011/2012*	15,062,217.75	2,080,978.00
2012/2013*	15,917,430.93	3,904,808.35
2013/2014**	16,723,425.00	5,016,703.03
2014/2015**	16,277,373.00	4,736,187.00
2015/2016 (until January 2016)**	11,215,723.47	3,041,225.00

Table 1 Revenue from trophy hunting and photographic tourism accrued to the Wildlife Division in Tanzania from lands under its jurisdiction (in US$).
Source: *MNRT 2013; **figures provided by Tanzania Wildlife Division.

Tanzania has approximately 305,000 km^2 set aside as wildlife land managed as hunting blocks (including Game Reserves, Wildlife Management Areas, and other reserve types). Due to the fact that some hunting blocks are vacant, the area currently leased for hunting is estimated at 210,000 km^2 (V. Booth and M. Pani, *In litt*., based on analysis of official records provided by Tanzania Wildlife Division).

Hunting generates the bulk of the income raised in direct revenues by Tanzania's Wildlife Division from these lands, via a variety of fees (set out in the *Wildlife Conservation (Tourist Hunting) Regulations 2015)* (see Table 1). Revenue from hunting constituted approximately 16,277,373.00 USD in 2014/2015 (US$80/km^2 in the leased area). While most of these revenues are returned to central Treasury, 25% is directed into the Tanzania Wildlife Protection Fund (TWPF, 2016), established by statute to carry out wildlife protection and conservation activities including anti-poaching. According to the official TWPF website, these hunting revenues generate around three-quarters of its funding for these activities (TWPF, 2016).

If these revenues were not replaced by alternative means, expenditures on anti-poaching and other critical management activities would presumably sharply decrease.

Selous Game Reserve illustrates a special case. It has, over the last decade, suffered devastating levels of organised commercial elephant poaching for the illegal ivory trade, associated with serious allegations of official corruption and complicity and suggestions from some quarters of involvement of elements of the hunting industry. However, the Selous retention scheme (recently re-established) provides for the re-investment of 50% of revenues raised from hunting in the Reserve into conservation and anti-poaching activities to protect the Reserve's wildlife. Benson Kibonde, chief warden in Tanzania's Selous Game Reserve during 1994-2008 and 2012–2015, and responsible for leading two major anti-poaching initiatives, recently expressed serious concerns about the impacts of import bans on hunted ivory trophies on field level anti-poaching activities. He saw these as problematic not only because of heavy practical involvement of hunting companies in anti-poaching activities, but because "85% of the Selous retention scheme funds come from hunting. If any amount of the hunting revenue is compromised, the registered success in anti-poaching efforts could be seriously jeopardized" (Kibonde, 2015; p. 45).

Note that the revenues raised for conservation from hunting can be likewise important in developed countries (see Case Study 3). For instance, they form the bulk of wildlife management agencies' budgets in the USA and Canada (Heffelfinger et al., 2013; Mahoney, 2013).

Case Study 10

Polar Bears in Canada

Several hundred Polar Bears are harvested annually in northern Canada, the large majority for subsistence and the remainder for trophy hunts (with meat used for subsistence). The largest harvest of Polar Bears occurs in the territory of Nunavut, which harbors 50–60% of the world's population. At least nine Nunavut indigenous communities offer Polar Bear trophy hunts. Inuit have constitutionally protected rights under land claim agreements to co-manage wildlife. Most communities number a few hundred inhabitants. Income levels are generally low and unemployment rates very high. The Polar Bear harvest is based on quotas that are updated annually through a co-management system that integrates the best available scientific and traditional ecological knowledge. Community members decide how to allocate the quota between subsistence hunts and trophy hunts, with all meat from either used locally (Freeman and Wenzel, 2006; Shadbolt et al., 2012).

Communities work with hunting outfitters to attract hunters, usually from Canada or the United States. All trophy hunters are accompanied at all times by Inuit guides, with all transport and hunting conducted in the traditional method with a dogsled. Depending on the length of the hunt and other factors, hunting clients pay around US$20,000 – $50,000 to the outfitters, of which roughly half, US$10,000–$25,000, enters the northern communities. Almost all of the fees paid by the trophy hunter go to the Inuit outfitter, guide and assistants for their services and to maintain equipment used for both trophy and subsistence hunting. In accordance with the clan-sharing culture of Inuit society, community members recognize that these same people are the best providers of fresh food. In the community of Clyde River on Baffin Island, for example, each trophy-hunting guide harvested an average of ten times more food that was shared with community members than was harvested by hunters who were not guides (Foote and Wenzel, 2009; Shadbolt et al., 2012).

Inuit communities in Nunavut are already feeling the livelihood impacts of import bans, which nonetheless have had no effect on harvest levels. Approximately 400–500 Polar Bears were harvested annually in Nunavut during 2000–2012. In 2008, the United States listed the Polar Bear as endangered and banned the import of Polar Bear trophies. Before 2008, the U.S. accounted for the large majority of trophy hunters; after 2008 they accounted for none to a few annually. The U.S. ban had no obvious effect on the total harvested, but the proportion of the total taken by trophy hunters dropped from an average of 91 from 2003/4–2007/8 to 35 from 2008/9–2010/11, and the subsistence harvest increased accordingly (Shadbolt et al., 2012; Weber et al., 2015). Using a conservative value of $15,000 per trophy-hunted bear, this represents a reduction of at least $840,000 annually from trophy hunting for these Nunavut communities (excluding gratuities).



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IUCN SSC Guiding Principles on Trophy Hunting as a Tool for Creating Conservation Incentives

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Section I. Introduction

IUCN has long recognized that the wise and sustainable use of wildlife can be consistent with and contribute to conservation, because the social and economic benefits derived from use of species can provide incentives for people to conserve them and their habitats. This document builds on existing IUCN policies by setting forth SSC guiding principles on the use of "trophy hunting", as defined in Section II, as a tool for creating incentives for the conservation of species and their habitats and for the equitable sharing of the benefits of use of natural resources.

Trophy hunting is often a contentious activity, with people supporting or opposing it on a variety of biological, economic, ideological or cultural bases. This document is focused solely on the relevance of trophy hunting for conservation and associated local livelihoods. Nothing in this document is intended to support or condone trophy hunting activities that are unsustainable; adversely affect habitats; increase extinction risks; undermine the rights of local communities to manage, steward, and benefit from their wildlife resources; or foster corruption or poor governance.

Section II. Scope of this guidance

The term "trophy hunting" is here used to refer to hunting that is:

- Managed as part of a programme administered by a government, community-based organization, NGO, or other legitimate body;
- Characterized by hunters paying a high fee to hunt an animal with specific "trophy" characteristics (recognizing that hunters each have individual motivations);
- Characterized by low off-take volume;
- Usually (but not necessarily) undertaken by hunters from outside the local area (often from countries other than where the hunt occurs).

These elements differentiate the hunting at issue here from a broad array of other hunting activities, although it is recognized that what is here defined as trophy hunting may be given a different name in some countries. Thus these guiding principles are not intended to apply to subsistence hunting, to legal hunting of relatively common species, or to management activities undertaken by wildlife management agencies, although some elements of them may be relevant to these activities. Such hunting activities may also generate incentives for conservation, but are beyond the scope of this guidance.

These guiding principles apply specifically to trophy hunting programmes oriented to terrestrial wild animals in their native geographic ranges. Existing IUCN policy does not support moving species outside their native ranges for the primary purpose of trophy hunting[1]. In keeping with existing IUCN policy (IUCN Recommendation 3.093, adopted by the IUCN Congress at its 3rd Session in Bangkok, Thailand, 17-25 November 2004, which condemned "the killing of animals in enclosures or where they do not exist as free-ranging"), the IUCN SSC does not support trophy hunting of animals in enclosures where they cannot be considered "free-ranging" and cannot use their natural abilities to escape.

Section III: The policy context

IUCN's formal recognition that the ethical and sustainable use of wildlife can form an integral

[1] See: IUCN Position Statement on Translocation of Living Organisms (http://www.iucnsscrsg.org/download/IUCNPositionStatement.pdf) and IUCN Guidelines for the Prevention of Biodiversity Loss Caused by Alien Invasive Species (http://intranet.iucn.org/webfiles/doc/SSC/SSCwebsite/Policy_statements/IUCN_Guidelines_for_the_Prevention_of_Biodiversity_Loss_caused_by_Alien_Invasive_Species.pdf)

and legitimate component of conservation programs dates back to the World Conservation Strategy in 1980, and was affirmed in Recommendation 18.24 at the 1990 IUCN General Assembly in Perth. IUCN's "Policy Statement on Sustainable Use of Wild Living Resources", adopted as Resolution 2.29 at the IUCN World Conservation Congress in Amman in October 2000, affirms that use of wildlife, if sustainable, can be consistent with and contribute to biodiversity conservation. IUCN recognizes that where an economic value can be attached to a wild living resource, perverse incentives removed, and costs and benefits internalized, favourable conditions can be created for investment in the conservation and the sustainable use of the resource, thus reducing the risk of resource degradation, depletion, and habitat conversion. In managing such use to enhance sustainability, the Policy Statement draws attention to the following key considerations:

- the need for adaptive management, incorporating monitoring and the ability to modify management to take account of risk and uncertainty;
- the supply of biological products and ecological services available for use is limited by intrinsic biological characteristics of both species and ecosystems, including productivity, resilience, and stability, which themselves are subject to extrinsic environmental change;
- institutional structures of management and control require both positive incentives and negative sanctions, good governance, and implementation at an appropriate scale. Such structures should include participation of relevant stake-holders and take account of land tenure, access rights, regulatory systems, traditional knowledge, and customary law.

More specifically, and with particular reference to southern Africa, IUCN has recognized that recreational hunting can contribute to biodiversity conservation. The IUCN at the 2004 WCC adopted Recommendation 3.093 stating that it "Supports the philosophy and practice that on state, communal and privately-owned land in southern Africa the sustainable and well-managed consumptive use of wildlife makes a contribution to biodiversity conservation" and further, that it "accepts that well-managed recreational hunting has a role in the managed sustainable consumptive use of wildlife populations".

Further, the IUCN SSC Caprinae Specialist Group adopted a formal position statement in December, 2000, recognizing that hunting, and in particular trophy hunting, can form a major component in conservation programmes for wild sheep and goats. This statement noted that "Trophy hunting usually generates substantial funds that could be used for conservation activities such as habitat protection, population monitoring, law enforcement, research, or management programs. Equally importantly, the revenues from trophy hunting can provide a strong incentive for conservation or habitat protection…"

The Convention on Biological Diversity has developed several statements of principles relevant for the management of trophy hunting. Most importantly, the 7th Conference of Parties to the CBD (Kuala Lumpur, February 2004) adopted the Addis Ababa Principles and Guidelines for the Sustainable Use of Biodiversity (AAPG), and IUCN members party to the CBD were urged to honour these commitments by Resolution 3.074 of the 3rd IUCN World Conservation Congress (Bangkok, October 2004). The AAPG are based on the assumption that it is possible to use biodiversity in a manner in which ecological processes, species, and genetic variability remain above the thresholds needed for long term viability, and that all resource managers and users have the responsibility to ensure that such use does not exceed these. Some key relevant principles from the Addis Ababa Principles and Guidance include:

- Recognizing the need for a governing framework consistent with international/national laws, local users of biodiversity components should be sufficiently empowered and supported by rights to be responsible and accountable for use of the resources concerned (Principle 2);
- Adaptive management should be practiced, based on:

    - Science and traditional and local knowledge;
    - Iterative, timely and transparent feedback derived from monitoring the use, environmental and socio-economic impacts, and the status of the resource being used; and
    - Adjusting management based on timely feedback from the monitoring procedures (Principle 4)
- Sustainable use management goals and practices should avoid or minimize adverse impacts on ecosystem services, structure, and functions as well as other components of ecosystems (Principle 5);
- An interdisciplinary, participatory approach should be applied at the appropriate levels of management and governance related to the use (Principle 9);
- Users of biodiversity should seek to minimize waste and adverse environmental impact, and optimize benefits from uses (Principle 11);
  The costs of management and conservation of biological diversity should be internalized within the area of management and reflected in the distribution of the benefits from the use (Principle 13).

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) provides for the authorization of trade of trophies in certain specimens of Appendix I-listed taxa for personal use (Res. Conf. 2.11 (rev. CoP 9). CITES has adopted a series of Resolutions for certain Appendix I-listed species subject to trophy hunting (Res. Conf 10.14 (rev. CoP 14) on Leopard *Panthera pardus*; Res. Conf 10.15 (rev. CoP 14) on Markhor *Capra falconeri;* and Res. Conf 13.5 (rev. CoP 14) on Black Rhinoceros *Diceros bicornis*), which set out quotas and conditions for such trade.

The European Charter on Hunting and Biodiversity (ECHB), adopted under the European Bern Convention, provides specific guidance on hunting and conservation. In Resolution 4.026, adopted at the 4th World Conservation Congress Barcelona, October 2008), IUCN requested that its members promote the ECHB in the implementation of IUCN's policies and Programme for 2009-2012. While the ECHB explicitly addresses sustainable hunting in Europe, its principles and guidelines are relevant and pertinent in a wider geographic context. Key principles of the ECHB include:

- ensuring that harvest is ecologically sustainable (Principle 3);
- maintaining wild populations of indigenous species with adaptive gene pools (Principle 4);
- maintaining environments that support healthy and robust populations of harvestable species (Principle 5);
- encouraging use to provide economic incentives for conservation (Principle 6); and
- empowering local stakeholders and holding them accountable (Principle 9).

Section IV. Trophy hunting and conservation

Trophy hunting is a form of wildlife use that, when well managed, may assist in furthering conservation objectives by creating the revenue and economic incentives for the management and conservation of the target species and its habitat, as well as supporting local livelihoods. However, if poorly managed, it can fail to deliver these benefits. Although a wide variety of species (many of which are both common and secure) are hunted for trophies, some species that are rare or threatened may be included in trophy hunting as part of site-specific conservation strategies. Examples include Cheetah *Acinonyx jubatus* and Black Rhinoceros in southern Africa, and Straight-Horned Markhor *Capra falconeri megaceros* in the Torghar Valley of Pakistan, all of which are species listed on Appendix I of CITES.

Trophy hunting takes place in both North America and Europe, and in developing countries where wildlife management infrastructure is often less fully developed. These hunts are usually conducted by persons willing and able to pay substantial amounts of money for the opportunity. They typically involve taking small numbers of individual animals and require limited development infrastructure. They are thus high in value but low in impact. In some cases, trophy hunting forms an important component of Community-Based Conservation/Community-Based Natural Resource Management, which aim to devolve responsibility for the sustainable use and management of wildlife resources from distant bureaucracies to more local levels.

Understanding the context within which trophy hunting occurs is critical to understanding its potential to benefit conservation. In many parts of the world, much wildlife exists outside of protected areas. Wildlife shares landscapes with people, and typically competes for space and environmental resources with other forms of economically productive land uses, such as agriculture and pastoralism, upon which the livelihoods of local people depend. Wildlife can impose serious costs on local people, including physical harm, damaging crops, and competing with livestock for forage. Where wildlife provides few benefits to local people and/or imposes substantial costs, it is often killed (legally or illegally) for food, various commercially valuable wildlife products, or as problem animals, and its habitats are degraded or lost to other forms of land use. In some circumstances trophy hunting can address this problem by effectively making wildlife more valuable than, and/or complementary to, other forms of land use. It can return benefits to local people (preferably through effective co-management), encouraging their support for wildlife, and motivating investment at community, private, and government levels for research, monitoring, habitat protection, and enforcement against illegal use (see Annex 1 for examples). Trophy hunting, if well managed, is often a higher value, lower impact land use than alternatives such as agriculture or tourism.

However, where poorly managed, trophy hunting can have negative ecological impacts including altered age/sex structures, social disruption, deleterious genetic effects, and in extreme cases, population declines. It can also be difficult to ensure that benefits from hunting accrue to those in the best position to help conservation.

Section V: The Guiding Principles

The IUCN SSC considers that trophy hunting, as described in Section II above, is likely to contribute to conservation and to the equitable sharing of the benefits of use of natural resources when programmes incorporate the following five components: Biological Sustainability; Net Conservation Benefit; Socio-Economic-Cultural Benefit; Adaptive Management: Planning, Monitoring, and Reporting; and Accountable and Effective Governance

Biological Sustainability

Trophy hunting as described in Section II, can serve as a conservation tool when it:

1. Does not contribute to long-term population declines of the hunted species or of other species sharing its habitat, noting that a sustainably harvested population may be smaller than an unharvested one;
2. Does not substantially alter processes of natural selection and ecosystem function; that is, it maintains "wild populations of indigenous species with adaptive gene pools.[2]" This generally requires that hunting offtake produces only minor alterations to naturally occurring demographic structure. It also requires avoidance of breeding or culling to deliberately enhance population-genetic characteristics of species subject to hunting that are inconsistent with natural selection;
3. Does not inadvertently facilitate poaching or illegal trade of wildlife;

[2] Direct quote from Principle 4 of the European Charter on Hunting and Biodiversity.

4. Does not artificially and/or substantially manipulate ecosystems or their component elements in ways that are incompatible with the objective of supporting the full range of native biodiversity.

Net Conservation Benefit

Trophy hunting can serve as a conservation tool when it:

1. Is linked to identifiable and specific parcels of land where habitat for wildlife is a priority (albeit not necessarily the sole priority or only legitimate use); and on which the "costs of management and conservation of biological diversity [are] internalized within the area of management and reflected in the distribution of the benefits from the use[3]";
2. Produces income, employment, and/or other benefits that generate incentives for reduction in pressures on populations of target species, and/or help justify retention, enhancement, or rehabilitation of habitats in which native biodiversity is prioritized. Benefits may create incentives for local residents to co-exist with such problematic species as large carnivores, herbivores competing for grazing, or animals considered to be dangerous or a threat to the welfare of humans and their personal property;
3. Is part of a legally recognized governance system that supports conservation adequately and of a system of implementation and enforcement capable of achieving these governance objectives.

Socio-Economic-Cultural Benefit

Trophy hunting can serve as a conservation tool when it:

1. Respects local cultural values and practices (where "local" is defined as sharing living space with the focal wildlife species), and is accepted by (and preferably, co-managed and actively supported by) most members of the local community on whose land it occurs;
2. Involves and benefits local residents in an equitable manner, and in ways that meet their priorities;
3. Adopts business practices that promote long-term economic sustainability.

Adaptive Management: Planning, Monitoring, and Reporting

Trophy hunting can serve as a conservation tool when it:

1. Is premised on appropriate resource assessments and/or monitoring of hunting indices, upon which specific quotas and hunting plans can be established through a collaborative process. Optimally, such a process should (where relevant) include local communities and draw on local/indigenous knowledge. Such resource assessments (examples might include counts or indices of population performance such as sighting frequencies, spoor counts) or hunting indices (examples might include trophy size, animal age, hunting success rates and catch per hunting effort) are objective, well documented, and use the best science and technology feasible and appropriate given the circumstances and available resources;
2. Involves adaptive management of hunting quotas and plans in line with results of resource assessments and/or monitoring of indices, ensuring quotas are adjusted in line with changes in the resource base (caused by ecological changes, weather patterns, or anthropogenic impacts, including hunting offtake);
3. Is based on laws, regulations, and quotas (preferably established with local input) that are transparent and clear, and are periodically reviewed and updated;
4. Monitors hunting activities to verify that quotas and sex/age restrictions of harvested animals are being met;

[3] Direct quote from Practical Principle 13 of the Addis Ababa Principles and Guidelines on Sustainable Use of Biodiversity.

5. Produces reliable and periodic documentation of its biological sustainability and conservation benefits (if this is not already produced by existing reporting mechanisms).

Accountable and Effective Governance

A trophy hunting programme can serve as a conservation tool when it:

1. Is subject to a governance structure that clearly allocates management responsibilities;
2. Accounts for revenues in a transparent manner and distributes net revenues to conservation and community beneficiaries according to properly agreed decisions;
3. Takes all necessary steps to eliminate corruption; and
4. Ensures compliance with all relevant national and international requirements and regulations by relevant bodies such as administrators, regulators and hunters.

Section VI: Appropriate use of these guiding principles

SSC's intention is that these guiding principles may serve to assist authorities responsible for national and subnational policy, law and planning; managers responsible at the site level; and local communities in designing and implementing trophy hunting programs where biodiversity conservation and equitable sharing of natural resources are objectives.

These guiding principles should not be interpreted as in any way dismissing the values – whether they are biological, social, cultural or economic – of hunting programs that may be truly sustainable, but that do not produce incentives for conservation and associated conservation benefits.

Although IUCN and SSC are not currently engaged in endorsing or certifying trophy hunting programmes, they consider that for any such endorsement or certification to be credible, it should be conducted by a recognized independent body. Nothing in this document is intended to be interpreted in any way as a specific endorsement or criticism of a particular trophy hunting programme.

Annex 1. Examples of trophy hunting as part of a conservation strategy

Note: *Due to the varied potential conservation impacts of trophy hunting it is useful to provide a small set of illustrative case studies highlighting both positive and negative conservation impacts. We have here included two illustrations of generally positive conservation impacts. We would welcome suggestions for further examples, both positive and negative, noting that in the case of negative examples we are sensitive to not casting blame or criticizing member groups and member states.*

Case study 1: Trophy hunting in Namibian communal Conservancies

Namibia's communal Conservancy programme is widely viewed as a conservation and rural development success story, and trophy hunting plays a central role in this success. Innovative legislative reforms in the mid-1990s devolved conditional rights to use and manage wildlife on communal lands to communities, if they organized to form a Conservancy. The intent of this approach was to devolve rights and benefits from wildlife to communities – people often viewed by colonial conservationists as "poachers" - to create incentives for communities to live with, value, and benefit from wildlife. Forming a Conservancy requires that the community defines its membership, borders, and management committee; develops a Constitution; agrees a method for equitable distribution of benefits; and develops a sustainable game management and utilization plan. Conservancies can use wildlife consumptively in various ways, including trophy hunting, own-use hunting game cropping, and live sales; and organize nonconsumptive use through tourism. Conservancies retain all the revenue gained from utilization and management.

The spread of the conservancy movement has been rapid, and conservation impacts extensive and widespread. Today there are 71 registered communal Conservancies covering 14.98 million ha (with another 20 conservancies under development) and include around 240 000 members. Current communal Conservancies alone mean that 18.2% of Namibia's land surface is under conservation management. This is a contrast from the previous status of these areas as subject to long-term human-wildlife conflict, uncontrolled poaching, and low levels of wildlife.

Sustainable use of wildlife has been a strong catalyst to the recovery of wildlife in communal areas. Prior to the introduction of conservancies, wildlife in Namibia's communal areas had been decimated and was at historic lows in many instances. Wildlife was perceived by communities mainly as a threat to livelihoods, with its best use being illegal poaching for meat for the pot. The advent of Conservancies drastically altered this attitude. Wildlife is now increasingly seen as a valued asset, with growing wildlife populations meaning more income for conservancies, more jobs for conservancy members, more game meat at the household level, and more funds to support rural development. As a result, poaching has become socially unacceptable and game numbers have staged remarkable recoveries in most areas where Conservancies have operated for a period of time. For instance, on communal lands in northeast Namibia, from 1994 to 2011, elephant have increased from 12,908 to an estimated 16,993; sable from 724 to an estimated 1,474; and common impala from 439 to 9,374. In northwest Namibia[4], from the early 1980s to today, desert elephants have increased from approx. 150 to approx. 750; Hartmann's Mountain Zebra from est. <1,000 to > 27,000; and black rhino have more than tripled, making it the biggest free-roaming population of rhino in the world. From 1995, the population of lion in this area has increased from an est. 20 to an est. 130, with exponential range expansion. Game populations have been re-established in Conservancies that have low densities of specific species or species that have gone locally extinct. This support has allowed for the re-establishment of a large number of species, including giraffe, red hartebeest, black faced impala and black rhino. Further, Conservancies, a large proportion of which are located adjacent or

[4] Game guard programs, precursors of the current model, were introduced in this area in the early 1980s.

close to protected areas, strengthen Namibia's protected area system by ensuring wildlife friendly environments adjacent to protected areas and through the creation of movement corridors between them.

Trophy hunting has been a central driver of this transformation. It is by far the largest generator of benefits from sustainable consumptive wildlife use, with 41 Conservancies hosting 40 trophy hunting concessions during 2011. Since registration of the first four communal conservancies in 1998, a total of 97 948 km^2 have been opened to trophy hunting concessions under community management. Benefits from consumptive use of wildlife (cash, employment, and in-kind [largely meat]) received by Conservancies and their members from 1998-2009 amounted to N$76.5 million (US$10.17 million) (NACSO Database, 2011). As the benefits from consumptive use have driven recovery of wildlife populations through reduction of poaching, these recoveries have in turn paved the way for non-consumptive tourism, more than doubling the returns from wildlife to communities. In 2011 more than 30 joint venture tourism lodges and 24 community campsites were functioning in communal Conservancies, generating Conservancy benefits (including cash, employment and in-kind benefits) of N$102.8 million (US$13.64 million) from 1998-2009. Tourism enterprises have proven to be strong, complementary additions to consumptive use options, with consumptive use (primarily trophy hunting) generating the majority of cash income to Conservancies (which can be put toward wildlife management activities and community development purposes), and tourism operations providing the greater individual employment benefits to Conservancy members. Benefits from consumptive use are critical because these can start to flow when wildlife populations are initially too low to support tourism, stimulating recoveries of wildlife to levels at which photographic tourism can become viable.

Community development activities paid for by benefit streams from sustainable use, among others, include improvements to schools or school facilities and equipment; improvements to rural health clinics; support to pensioners; scholarship funds; transport for the sick or injured; mitigation of human / wildlife conflict; and sponsoring of community sports teams. Finally, the hunting operations provide meat to community members (many very marginalized): meat provided from trophy hunting and own-use harvesting was valued at N$17,413,120 (US$2.29 million) between 1998 and 2009[5] (NACSO, 2010).

A number of cutting edge tools and practices have been developed by the Namibia CBNRM Programme to ensure sustainable hunting is playing a key conservation role, including:

- annual quota setting procedures for sustainable harvest offtake rates: jointly carried out by the MET, NGOs, and the Conservancies, and based upon annual game counts, hunting operator reports, and local knowledge of conservancy/MET/NGO staff;
- trophy hunting tender procedures for Conservancy hunting concessions: these aim to attain market values for game in a transparent manner, and strengthen relationships between the Conservancy committee and the hunting operator;
- trophy hunting contracts: through the Conservancy movement communities have been empowered to become meaningful partners in the development and support of hunting activities, although many remain on a steep learning curve; and
- Conservancy management plans and practices: **f**unds generated from wildlife use are used by conservancies to employ community game guards and implement game management and monitoring systems, allowing communities to proactively counter poaching threats and mitigate increasing incidents of human/wildlife conflict.

Sources:

[5] The value of distributed meat is calculated by using market values and average meat yields of game animals from which the meat was distributed, as recorded by conservancies in the Event Book.

NACSO. 2010. Namibia's communal conservancies: a review of progress 2009. NACSO, Windhoek, Namibia

Naidoo, R., Weaver, L. C., Stuart-Hill, G. & Tagg, J. (2011). Effect of biodiversity on economic benefits from communal lands in Namibia. *Journal of Applied Ecology* 48: 310-316.

Weaver, C., Hamunyela, E., Diggle, R., Matongo, G. & Pietersen T. (2011). The catalytic role and contributions of sustainable wildlife use to the Namibia CBNRM programme. In: Abensperg-Traun, M., Roe, D. & O'Criodain, C. eds. (2011). *CITES and CBNRM*.
Proceedings of an international symposium on "The relevance of CBNRM to the conservation and sustainable use of CITES-listed species in exporting countries", Vienna, Austria, 18-20 May 2011. IUCN and London, Gland, Switzerland & IIED, UK. Pp. 59-70

Case study 2: Conservation and trophy hunting in the Torghar Valley, Pakistan

Torghar (black mountains/hills in Pushtoo) is in the province of Balochistan in Pakistan. In the early 1980s, wild Straight-horned Markhor *Capra falconeri megaceros* and Afghan Urial *Ovis orientalis* were close to being extirpated from this region due to uncontrolled hunting and competition for grazing with domestic herds. Enforcement efforts against hunting were poor due to weak institutional capacity and lack of political will. In the mid-1980s, a tribal decree banning hunting was issued by a local leader, but could not be enforced. Local Jazalai (a Pathan tribe) leaders, with support from the United States Fish and Wildlife Service (USFWS), launched a community-based conservation programme in 1986, the Torghar Conservation Project (later managed by STEP, the Society for Torghar Environmental Protection). This project used limited and monitored trophy hunting, initially of Urial only and later also of Markhor, to provide revenue to fund the employment of local people as game guards and to provide community benefits. The hypothesis was that development of local livelihoods based on trophy hunting would change the attitude of local people toward wildlife, demonstrating that conservation could be an economically viable land use, and providing incentives for enforcement. In line with its commitment to conservation, the trophy hunting has been conservative, with 1-2 Markhor and 1-4 Urial taken per year.

After careful consideration, tribesmen accepted a ban on their traditional hunting in return for the economic benefits of the conservation programme. Illegal hunting virtually ceased. While exact population numbers cannot be ascertained in the difficult terrain, use of repeated standardized survey protocols have found that the Torghar populations of Markhor and Urial have steadily increased since the project started. Surveys at Torghar by USFWS-sponsored biologists found the estimated population of Markhor grew from less than 100 in 1990 to 2,541 in 2005, with estimated Urial populations increasing from 1173 in 1994 to 3,146 in 2005.

Over this period, the programme has continually faced a lack of regulatory support, including government reluctance to recognize local involvement in conservation, bans on hunting imposed by the national Conservation Council, and the listing of Markhor on Appendix I of CITES, making export of trophies to major market countries such as the United States problematic. Despite these obstacles the programme has grown, attracting further support from the United Nations Development Programme, WWF-Pakistan, the Global Environment Facility and others. While other means of raising revenue such as ecotourism based on photography have been considered, the region is remote and attracts few visitors.

TCP/STEP has also generated considerable benefits for the approx. 400 families of the local area. Revenues raised by trophy hunting and donor grants pay salaries for ca. 82 game guards, and have been used for community needs such as construction of water tanks, dams and irrigation channels (to provide water during droughts), supply of young fruit trees, a medical camp and emergency drought relief.

Sources:

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Barry, Anna <anna_barry@fws.gov>

Additional document for tomorrow's lion discussion

1 message

Vannorman, Tim <tim_vannorman@fws.gov> Wed, May 4, 2016 at 1:41 PM
To: FWHQ DMA-BOP-BIO'S <fwhq_dma_bop_bio@fws.gov>

All,

Here is an additional document you might want to scan before tomorrow's discussion on lion enhancement. The IUCN SSC Guiding Principles on Trophy Hunting was referenced in the lion listing final rule and provides a good overview of what we would be looking for when making an enhancement finding.

Tim

--
Timothy J. Van Norman, Chief
Branch of Permits
Division of Management Authority
U.S. Fish and Wildlife Service
(703) 358-2350

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iucn_ssc_guiding_principles_on_trophy_hunting_ver1_09aug2012.pdf
66K

Barry, Anna <anna_barry@fws.gov>

Facing Drought, Zimbabwe Says It Is Selling Off Wild Animals

2 messages

Kohn, Frank <frank_kohn@fws.gov> Thu, May 5, 2016 at 7:25 AM
To: FWHQ AIA-STAFF <fwhq_arl_aia-staff@fws.gov>

HTTP://WWW.NPR.ORG/SECTIONS/THETWO-WAY/2016/05/04/476749207/FACING-DROUGHT-ZIMBABWE-SAYS-IT-IS-SELLING-OFF-WILD-ANIMALS

Moore, Kathleen <kathleen_moore@fws.gov> Thu, May 5, 2016 at 9:06 AM
To: "Kohn, Frank" <frank_kohn@fws.gov>
Cc: FWHQ AIA-STAFF <fwhq_arl_aia-staff@fws.gov>

The apparent fall-out from Swaziland saying they have the same it would seem!

On Thu, May 5, 2016 at 7:25 AM, Kohn, Frank <frank_kohn@fws.gov> wrote:

> HTTP://WWW.NPR.ORG/SECTIONS/THETWO-WAY/2016/05/04/476749207/FACING-DROUGHT-ZIMBABWE-SAYS-IT-IS-SELLING-OFF-WILD-ANIMALS

--
Kathleen Moore
USFWS/Division of Management Authority
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5275 Leesburg Pike
Falls Church, VA 22041-3803
1-800-358-2104 (Phone)

Check out the new CITES species database at **www.speciesplus.net** to find out more information about how species are listed and protected under the Convention.

Barry, Anna <anna_barry@fws.gov>

Fwd: African Indaba April 2016, Volume 14-2

1 message

Vannorman, Tim <tim_vannorman@fws.gov> Thu, May 12, 2016 at 8:47 AM
To: FWHQ DMA-BOP-BIO'S <fwhq_dma_bop_bio@fws.gov>

I have not read this yet, but may be some information that would be useful for lions.

Tim

---------- Forwarded message ----------
From: **African Indaba** <indaba@cic-wildlife.org>
Date: Tue, Apr 19, 2016 at 2:47 AM
Subject: African Indaba April 2016, Volume 14-2
To: tim_vannorman@fws.gov

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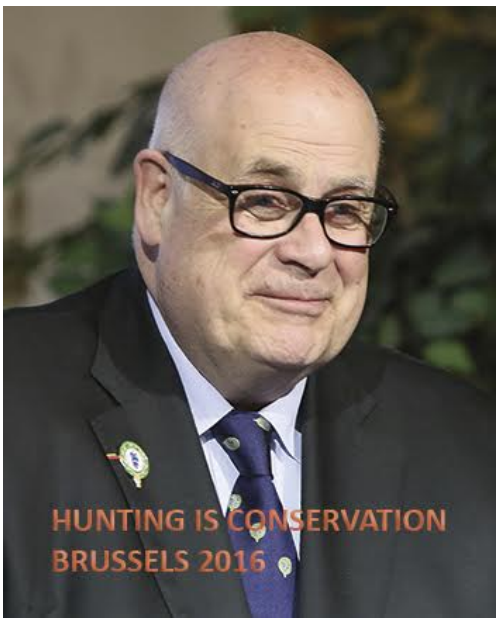

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TROPHY HUNTING: informing responsible decision-making

On April 12th 2016 IUCN released a Briefing Paper aimed at informing discussions in the EU around import restrictions on hunting trophies. Trophy hunting is currently the subject of intense debate globally, with moves at various levels to end or restrict it. In the European Parliament, a group of Members have called for signing of a Declaration raising the possibility of restricting all import of trophies into the EU. This paper draws on a set of case studies to highlight that while there is considerable poor practice in trophy hunting and a strong need for reform, well managed trophy hunting can - and does -positively contribute to conservation and local livelihoods in the face of intense competing pressures on wildlife habitat and widespread poaching. You can download the **Trophy Hunting Briefing Paper** at the African Indaba Website or at the IUCN Website (subpage of the IUCN Sustainable Use and Livelihoods Specialist Group - a global expert network formed by IUCN as a joint initiative of the Species Survival Commission SSC and the Commission on Environmental, Economic and Social Policy CEESP).

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5. An Anti-Hunting Ideologue on a Flight of Fancy >>
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7. Zimbabwe Traditional Chiefs and EU Ambassador Van Damme in Wildlife Talks >>
8. Namibia: Significant Income Stream from Trophy Hunting Projected >>
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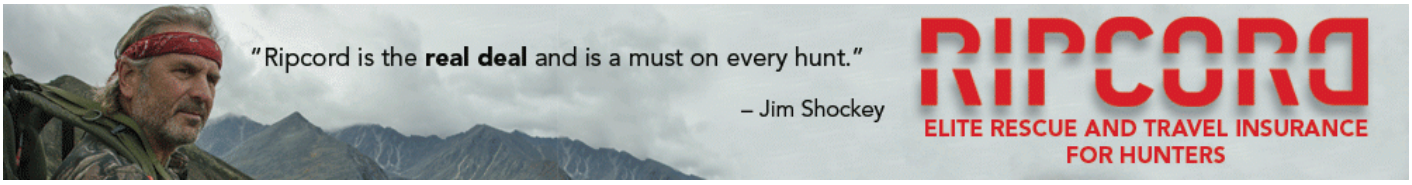

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Barry, Anna <anna_barry@fws.gov>

Conservation Status of African Lion in Zimbabwe

1 message

Barry, Anna <anna_barry@fws.gov> Thu, Jun 30, 2016 at 10:24 AM
To: snyasha@zimparks.co.zw
Cc: Tim Vannorman <tim_vannorman@fws.gov>

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Thank you for all assistance in this matter.

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Branch of Permits, MS: IA
5275 Leesburg Pike
Falls Church, VA 22041-3803
1-800-358-2104, ext. 1976 or 703-358-1976
Fax: 703-358-2281
E-mail: Anna_Barry@fws.gov

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Conservation Status of African Lion in Zimbabwe

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Study of the contribution of sustainable trophy hunting to the management and conservation of lion in Zimbabwe

Background

On the 23rd December 2015, the U.S. Fish and Wildlife Service (USFWLS), determined that the status of the lion subspecies from West Africa (*Panthera leo leo*) is endangered while the southern and eastern African subspecies (*P. l. melanochaita*) is threatened in terms of the Endangered Species Act of 1973, as amended (ESA)[1]. Consequently, the USFWLS published a rule under section 4(d) of the ESA that provides for conservation measures for *P. l. melanochaita*. This rule is effective from January 22, 2016 and is available on the Internet at http://www.regulations.gov.

In 2011, the USFWLS received a petition from several international animal welfare organisations requesting that the African lion subspecies be listed as endangered under the ESA. In 2012 the USFWLS published a ''positive'' 90-day finding confirming that it would initiate a status review of the African lion. In October 2014, the results of this review were published in the Federal Register concluding that the listing of the subspecies *Panthera leo leo* as a threatened species was warranted. Moreover, USFWLS proposed a rule under section 4(d) of the ESA to provide conservation measures for the African lion.

Following this announcement, USFWLS received additional comments from the public and peer reviewers that were taken into consideration to determine the final listing status of lion. This final rule incorporates changes based on the comments that were received as well as newly available scientific and commercial information that became available after the close of the comment period. In particular, USFWLS took into consideration additional information on the practices of trophy hunting that experts identified as undermining the sustainability of trophy hunting of lion populations. This prompted USFWLS to expand its assessment of the level of threat that trophy hunting presents to the species that resulted in further factors been take into consideration when making an enhancement finding for importation of sport-hunted trophies of *P. l. melanochaita.*

Information required to support Non-Detrimental Findings (NDF) under the 4(d) Rule for *Panthera leo melanochaita*

The purpose of the ESA is to provide a means whereby the ecosystems upon which endangered and/or threatened species depend may be conserved, to provide a programme for the conservation of such endangered and/or threatened species, and to take such steps as may be appropriate to achieve the purposes of the treaties and conventions set forth in the ESA. As a result, an import permit is now required under 50 CFR 17.32 for the

[1] The Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 *et seq.*), is a law that was passed in the USA to prevent extinction of species by providing measures to help alleviate the loss of species and their habitats. Before a plant or animal species can receive the protection provided by the Act, it must first be added to the Federal List of Endangered and Threatened Wildlife or the Federal List of Endangered and Threatened Plants in part 17 of title 50 of the Code of Federal Regulations (CFR). Section 4 of the Act and its implementing regulations at 50 CFR part 424 set forth the procedures for adding species to these lists.

importation of all *P. l. melanochaita* specimens. Therefore, through the promulgation of the 4(d) rule, all otherwise prohibited activities, including all imports of *P. l. melanochaita* specimens, require prior authorization or permits in terms of the ESA.

The regulations are covered under 50 CFR 17.32 which authorises the permit holder to carry out an otherwise prohibited activity for: scientific purposes, the enhancement of propagation or survival of the species, economic hardship, zoological exhibitions, educational purposes, or special purposes consistent with the purposes of the ESA. Applications for these activities are available from either *http://www.fws.gov/forms/3-200-20.pdf* or *http://www.fws.gov/forms/3-200-37.pdf.*

After extensively reviewing the available data regarding the biology and ecology of lion in Africa, and taking into consideration the benefits from sustainable hunting as well as the threats to continued survival of lion population in southern Africa, the USFWLS has identified the following factors that need to be provided in terms of the permitting regulations at 50 CFR 17.32. Specifically, the issuance criteria for threatened species permits are provided under 50 CFR 17.32(a)(2)), but do not specify what would constitute the enhancement of propagation or survival with regard to authorizing the import of parts or products of *P. l. melanochaita,* including sport-hunted trophies.

Therefore, when making a determination USFWLS will examine:

- The overall conservation and management of the subspecies in the country where the specimen originated;
- Whether that management of the subspecies addresses the threats to the subspecies (i.e., that it is based on sound scientific principles and that the management programme is actively addressing the current and longer term threats to the subspecies).
- Evaluate whether the import contributes to the overall conservation of the species by considering whether the biological, social, and economic aspects of a programme from which the specimen was obtained provide a net benefit to the subspecies and its ecosystem.

The Service will evaluate any application received that involves *P. l. melanochaita* in the context of enhancement of propagation or survival in accordance with its threatened species permitting regulations at 50 CFR 17.32, and issuance criteria for threatened species permits (50 CFR 17.32(a)(2)). These include, in addition to the general permitting criteria in 50 CFR 13.21(b):

(i) Whether the purpose for which the permit is required is adequate to justify removing from the wild or otherwise changing the status of the wildlife sought to be covered by the permit;
(ii) The probable direct and indirect effect that issuing the permit would have on the wild populations of the wildlife sought to be covered by the permit;
(iii) Whether the permit, if issued, would in any way, directly or indirectly, conflict with any known programme intended to enhance the survival probabilities of the population from which the wildlife sought to be covered by the permit was or would be removed;
(iv) Whether the purpose for which the permit is required would be likely to reduce the threat of extinction facing the species of wildlife sought to be covered by the permit;

(v) The opinions or views of scientists or other persons or organizations having expertise concerning the wildlife or other matters germane to the application; and
(vi) Whether the expertise, facilities, or other resources available to the applicant appear adequate to successfully accomplish the objectives stated in the application.

In addition to these factors, particularly in relation to sport hunting, USFWLS will take into consideration the *IUCN Species Survival Commission (SSC) Guiding Principles on Trophy Hunting as a Tool for Creating Conservation Incentives, Ver. 1.0* (IUCN SSC 2012), to assist them when making an enhancement finding for importation of sport-hunted trophies of *P. l. melanochaita.* This document sets out guidance on the use of trophy hunting as a tool for "*creating incentives for the conservation of species and their habitats and for the equitable sharing of the benefits of use of natural resources*" (IUCN SSC 2012, p. 2) and recognizes that recreational hunting, particularly trophy hunting, can contribute to biodiversity conservation and more specifically, the conservation of the hunted species.

The SSC document lays out five guiding principles that, considered in conjunction with the USFWLS threatened species issuance criteria, will aid the Service when making an enhancement finding for importation of sport-hunted trophies of *P. l. melanochaita.* These are:

(a) *Biological sustainability:* The hunting programme cannot contribute to the long-term decline of the hunted species. It should not alter natural selection and ecological function of the hunted species or any other species that share the habitat. The programme should not inadvertently facilitate poaching or illegal trade in wildlife by acting as a cover for such illegal activities. The hunting programme should also not manipulate the ecosystem or its component elements in a way that alters the native biodiversity.

(b) *Net Conservation Benefit:* The biologically sustainable hunting programme should be based on laws, regulations, and scientifically based quotas, established with local input, that are transparent and periodically reviewed. The programme should produce income, employment, and other benefits to create incentives for reducing the pressure on the target species. The programme should create benefits for local residents to co-exist with the target species and other species. It is also imperative that the programme is part of a legally recognized governance system that supports conservation.

(c) *Socio-Economic-Cultural Benefit:* A well-managed hunting programme can serve as a conservation tool when it respects the local cultural values and practices. It should be accepted by most members of the community, involving and benefiting local residents in an equitable manner. The programme should also adopt business practices that promote long-term economic sustainability.

(d) *Adaptive Management: Planning, Monitoring, and Reporting:* Hunting can enhance the species when it is based on appropriate resource assessments and monitoring (*e.g.*, population counts, trend data), upon which specific science-based quotas and hunting programmes can be established. Resource assessments should be objective, well documented, and use the best science available. Adaptive management of quotas and programmes based on the results of resource assessments and monitoring is essential. The programme should monitor hunting activities to ensure that quotas and sex/age restrictions of harvested animals are met. The

programme should also generate reliable documentation of its biological sustainability and conservation benefits.

(e) *Accountable and Effective Governance:* A biologically sustainable trophy-hunting programme should be subject to a governance structure that clearly allocates management responsibilities. The programme should account for revenues in a transparent manner and distribute net revenues to conservation and community beneficiaries according to properly agreed decisions. All necessary steps to eliminate corruption should be taken and to ensure compliance with all relevant national and international requirements and regulations by relevant bodies such as administrators, regulators and hunters.

The Service's approach to enhancement findings for the importation of sport-hunted trophies of *P. l. melanochaita* is consistent with the purpose and intent of the Endangered Species Act. Before it will authorize the importation of a sport-hunted trophy, it must determine that the trophy hunting programme is managed to ensure the long-term survival of the species. In particular, the hunting programme should demonstrate that communities who share the same habitat and compete with humans living in these areas for space and resources benefit from the presence of wildlife.

Thus, when evaluating whether the importation of a trophy of *P. l melanochaita* would be authorized pursuant to 50 CFR 17.32, in accordance with the threatened species issuance criteria, USFWLS will examine how a country's management programme for lions addresses the following three main threats: Habitat loss, loss of prey base, and human-lion conflict.

Some of the factors taken into consideration include:

- Whether the programme is based on sound scientific information and identifies mechanisms that would arrest the loss of habitat or increase available habitat (i.e., by establishing protected areas and ensuring adequate protection from human encroachment).
- Whether the management programme actively address the loss of the lion's prey base by addressing poaching or unsustainable offtake within the country.
- A component of a management plan from which trophy imports would meet the issuance criteria would be whether there are government incentives in place that encourage habitat protection by private landowners and communities and incentives to local communities to reduce the incursion of livestock into protected areas or to actively manage livestock to reduce conflicts with lions.
- Examine if the hunting component of the management programme supports all of these efforts by looking at whether hunting concessions/tracts are managed to ensure the long-term survival of the lion, its prey base, and habitat.
- Examine if the trophy hunting provides financial assistance to the wildlife department to carry out elements of the management programme and if there is a compensation scheme or other incentives to benefit local communities that may be impacted by lion predation.
- Consider how a U.S. hunter's participation in the hunting programme contributes to the overall management of lions within a country.
- Management programmes for *P. l. melanochaita* would be expected to address, but are not limited to,
    - evaluating population levels and trends;
    - the biological needs of the species;

- quotas; management practices;
- legal protection;
- local community involvement; and
- use of hunting fees for conservation.

In evaluating these factors, USFWLS will work closely with the range country and interested parties to obtain the information. By allowing entry into the United States of *P. l. melanochaita* trophies from range countries that have science-based management programmes, it is anticipated that other range countries would be encouraged to adopt and financially support the sustainable management of lions that benefits both the species and local communities. In addition to addressing the biological needs of the subspecies, a scientifically based management programme would provide economic incentives for local communities to protect and expand *P. l. melanochaita* habitat.

Under this 4(d) rule any person wishing to conduct an otherwise prohibited activity, including all imports of *P. l. melanochaita* specimens, must first obtain a permit under 50 CFR 17.32. The onus is on individual requesting the import permit to provide all the information in their application showing that the activity meets the requirements for issuance criteria under 50 CFR 17.32.

Where it is not possible for the applicant to provide all of the necessary information needed by the USFWLS to make a positive determination under the ESA to authorize the activity, the Service will typically consult with the range country to the extent practicable and other interested parties to obtain necessary information.

The Service has the discretion to make the required findings on sport-hunted trophy imports of *P. l. melanochaita* on a country-wide basis, although individual import permits will be evaluated and issued or denied for each applicant. While the Service may make enhancement findings for sport-hunted trophy imports of *P. l. melanochaita* on a country-wide basis, the Service encourages the submission of information from individual applicants.

Steps taken to address the requirements of the 4(d) Rule for *Panthera leo melanochaita*

In 2006, the Zimbabwe Parks and Wildlife Management Authority (ZPWMA), with the help of IUCN, prepared the "**Conservation Strategy and Action Plan for the Lion (*Panthera leo*) in Zimbabwe".** Since then a number of detailed research programmes have been conducted in the Hwange National Park and surrounding protected areas as well as on private conservancies (Malilangwe, Bubye and Save). It has also introduced criteria to monitor the age of trophy hunted lions which in turn is used to assist with quota allocations using a points system.

More recently (2015) the ZPWMA prepared an initial report on the "**Conservation Status of the African Lion (*Panthera leo*) in Zimbabwe".** This report was submitted to the European Union and later to the USFWLS.

Scope of work

In conjunction with the Zimbabwe Parks and Wildlife Authority, Safari Operators Association (SOAZ), Zimbabwe Professional Hunters and Guides Association (ZPHGA) and the

CAMPFIRE Association, the consultant is expected to assess the requirements to fulfil the criteria called for under the 4(d) Ruling issued by the United Stated Fish and Wildlife Services. This will include, but is not limited to the following:

- Assess the overall legal and regulatory framework of the sport hunting sector, and indicate where these might be improved or better enforced.
- Assess the opportunities for improving the governance and transparency in the management of the lion hunting industry.
- Assess the opportunities in the non-government sector that could contribute to improving governance and management of wildlife and protected areas, with a special focus on community participation.
- Assess the reliability of data from the conservation and wildlife sector and indicate activities that may improve data collection for monitoring purposes.
- Assess the suitability of some of the policies and management practices developed in other countries in the region, and indicate opportunities for adapting these for the Zimbabwe setting.
- Identify the knowledge gaps required to complete the Zimbabwe NDF for lion in terms of the 50 CFR 17.32 Permit requirements
- Assist the ZPWMA to prepare the national NDF for lion in accordance with the requirements listed above.

Methodology

The assignment will be a combination of literature studies and limited field work. The consultant will work closely with the ZPWMA and ZPHGA to gather and analyse data related to the administration and management of lion conservation in the country. The consultant will liaise with relevant institutions on the government and non-government side, with selected researchers in national and international research entities with special expertise on the wildlife and conservation sector in Zimbabwe. Special attention is to be given to extracting key economic data from the safari hunting industry that clearly demonstrates its contribution to the conservation of lion in Zimbabwe. If necessary, the consultant will conduct a short field visit to at least one safari area, one CAMPFIRE Area and to a conservancy.

Time frame and reporting

The assignment will take place from 4th April till 27th May, 2016. The consultant will develop a draft report in conjunction with the ZPWMA and conduct a half-day workshop for the relevant stakeholders. The report will be in English, and will be of a maximum of 50 pages plus relevant annexes. The draft report should be submitted by 30th April, and a final report should be submitted one week after receiving written comments from the ZPHGA and ZPWMA.

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Aging traits and sustainable trophy hunting of African lions

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Sustainable harvest

ABSTRACT

Trophy hunting plays a significant role in wildlife conservation in some contexts in various parts of the world. Yet excessive hunting is contributing to species declines, especially for large carnivores. Simulation models suggest that sustainable hunting of African lions may be achieved by restricting offtakes to males old enough to have reared a cohort of offspring. We tested and expanded criteria for an age based approach for sustainably regulat ing lion hunting. Using photos of 228 known age males from ten sites across Africa, we measured change in ten phenotypic traits with age and found four age classes with distinct characteristics: 1 2.9 years, 3 4.9 years, 5 6.9 years, and ≥7 years. We tested the aging accuracy of professional hunters and inexperienced observers before and after training on aging. Before training, hunters accurately aged more lion photos (63%) than inexperienced observers (48%); after training, both groups improved (67 69%). Hunters overestimated 22% of lions <5 years as 5 6.9 years (unsustainable) but only 4% of lions <5 years as ≥7 years (sustainable). Due to the lower aging error for males ≥7 years, we recommend 7 years as a practical minimum age for hunting male lions. Results indicate that age based hunting is feasible for sustainably managing threatened and economically significant species such as the lion, but must be guided by rigorous training, strict monitoring of compliance and error, and conser vative quotas. Our study furthermore demonstrates methods for identifying traits to age individuals, information that is critical for estimating demographic parameters underlying management and conservation of age struc tured species.

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1. Introduction

Trophy hunting can play a significant role in wildlife conservation by incentivising the conservation of animals and land in exchange for rec reational use. In Africa, hunting motivates the retention of vast blocks of state property for wildlife, generates over US$200 million annually across >20 countries, and encourages wildlife based land uses on large areas of community and private lands (Di Minin et al., 2015; Lindsey et al., 2007; Naidoo et al., 2016). However, poorly managed hunting can negatively affect animal populations by reducing genetic variation, increasing stress levels, changing animal behavior, and driv ing species decline (Aryal et al., 2015; Burke et al., 2008; Keehner et al., 2015; Packer et al., 2009; Rodríguez Muñoz et al., 2015). Excessive

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trophy hunting has recently led to localized unsustainable exploitation of ecologically and economically important species, including elephants (Selier et al., 2014), leopards (Pitman et al., 2015), and lions (Bauer et al., 2015). The negative impacts of hunting in some areas contributed to 'Cecil gate' in 2015, prompting global public outcry and scrutiny over the use of trophy hunting as a management tool (Di Minin et al., 2015; Lindsey et al., 2016). In light of this recent media spotlight and increasing anthropogenic threats to species, science based techniques are urgently needed to guide the sustainable management of harvests if trophy hunting is to continue.

Most harvested species, particularly long lived large mammals, exhibit age and sex specific rates of survival and reproduction (Milner Gulland et al., 2007). Thus, age is a common metric used to guide the sustainable harvest and management of wildlife, including large carnivores, ungulates, and fish (Balme et al., 2012; Bender et al., 1994; Berkeley et al., 2004; Garel et al., 2006; Gipson et al., 2000; Hiller, 2014; Hoefs and Konig, 1984; Lundervold and Langvatn, 2003). Age based hunting addresses the age structured nature of populations by harvesting animals at certain age thresholds, which, in combination with conservative quotas, can help reduce negative demographic impacts (Whitman et al., 2004). The success of age based hunting depends on hunters' abilities to accurately age individuals, and requires traits that indicate relevant age thresholds and are easily discernible in the field. These indicators of age would be equally useful to enforcement authorities for ensuring that trophies meet permitted age thresholds. Because age structure is critical to understanding the dynamics of wildlife populations, determining precise indicators of age at biologically important life stages is also useful for wildlife research, management and conservation (Delahay et al., 2011; Van Horn et al., 2003). Here we investigate age determination and aging accuracy for African lions in an effort to test the feasibility of using age based trophy hunting regulations to manage and conserve threatened and economically significant species.

Lions are one of the most highly desired big game trophy species, and ensuring ecological and economic sustainability of lion hunting has been recently prioritised at national and international levels (Lindsey et al., 2013). Lion hunts attract some of the highest mean prices of all trophy species (US$24,000–125,000 per hunt) and produce 5–17% of national gross trophy hunting income in countries where lion hunting is allowed (Lindsey et al., 2012, 2007). Yet lion numbers are declining rapidly: the global population has decreased by as much as 42% over the past 21 years (3 generations) to 20,000–35,000 individuals (Bauer et al., 2015; Riggio et al., 2012). In many areas, excessive trophy harvests have contributed to declines in the southern and eastern African subspecies (Groom et al., 2014; Loveridge et al., 2007; Packer et al., 2011, 2009; Rosenblatt et al., 2014). Concerns over lion population decline led Australia and France in 2015–2016 to ban lion trophy imports and resulted in the United States uplisting some lion subspecies to 'Endangered' on the Endangered Species Act (Milman, 2015; U.S. Fish and Wildlife Service, 2015; Vaughan, 2015).

Modelling studies that have assessed the impact of age based trophy hunting on lion demography indicate that sustainable trophy hunting may be achieved by restricting offtakes to males old enough to have reared their first cohort of offspring, or ≥5 years of age (note that harvesting females is not sustainable; Edwards et al., 2014; Packer et al., 2009; Whitman et al., 2007, 2004). Following these guidelines, Tanzania, Zimbabwe and Niassa National Reserve in Mozambique began implementing age based hunting restrictions in 2007–2013. In these ongoing programmes, age restrictions are paired with quotas revised annually based on compliance with age limits, whereby operators that harvest males equal or older than 5–6 years are 'rewarded' the following year with an equal or higher quota, and operators harvesting males <4–5 years are 'punished' with reduced quotas (age limits vary between countries; Begg and Begg, 2012; Mandisodza et al., 2009; Wildlife Division, 2012). The implementation of age restrictions has resulted in reduced lion quotas and harvests in all three countries in which they have been implemented. Reduced harvests may be due to greater selectivity on the part of hunters, and/or due to the relatively low number of old male lions in hunted populations. Some professional hunters, safari operators, and conservationists have resisted the implementation of age restrictions, citing insufficient scientific evidence for which physical traits are the most reliable indicators of lion age, and disputing the practicality of accurately aging lions in the field.

Age based hunting systems require simple methods for aging quarry *pre mortem* in the field with high precision. In the case of lions, the harvest of younger males (<5 years) has a particularly significant impact due to the removal of individuals before they have raised a litter of cubs to independence and the associated risk of infanticide following the removal of pride males (Whitman et al., 2004). In the countries where age restrictions on lions are in place, lion ages are assessed *post mortem* based on teeth size, wear, and development (often using dental radiographs) and skull ossification (using weight and cranial sutures; Ferreira and Funston, 2010a; Smuts et al., 1978; Wildlife Division, 2012). The utility of various potential aging cues *pre mortem* is currently less clear. Only one trait has been suggested as a reliable *pre mortem* indicator of age: nose pigmentation, which grows darker as lions age (Whitman et al., 2004). However, the correlation between nose pigmentation and age has only been studied in the Serengeti population of lions and doubt has been raised as to whether the relationship holds across Africa (Lindsey et al., 2013). Furthermore, nose darkness can be challenging to assess in the field under varying light and visibility, especially from a distance.

A more practical and effective strategy for aging lions *pre mortem* would be to identify a suite of traits that that can be collectively referenced to accurately estimate a lion's age, as has been recently done for leopards (Balme et al., 2012). Because professional hunters often use camera trap photographs to identify animals suitable for trophy hunting, and wildlife managers and researchers use photographs to study individuals and monitor populations, characteristics that are easily identifiable from photographs would be especially useful in aging individuals. Previous studies have identified several candidate traits (Ferreira and Funston, 2010a). Males' manes grow with age, however length can be influenced by injury, testosterone, and nutrition (Smuts, 1980; West and Packer, 2002). Mane colour typically darkens with age but can vary with ambient temperature (West and Packer, 2002; West et al., 2006). Facial scarring and slack jowl also increase with age, with older individuals appearing pockmarked and loose jowled (Schaller, 1972; Smuts, 1980; West et al., 2006). In order for these traits to be used as reliable indicators of age, the relationship with age should ideally show low variation between individuals and across regions to establish consistent aging guidelines. Furthermore, practitioners should be able to easily grasp associations between traits and age to achieve high aging accuracy.

We aimed to identify distinct phenotypic traits for determining *pre mortem* age and to test the utility of these traits for accurately aging male lions. Using an extensive photo dataset of known age male lions from ten long term study sites across eastern and southern Africa, we examined associations between physical characteristics and age in a suite of traits between individual lions and across regions. Finally, we tested how accurately practitioners could age lions with varying levels of hunting experience as well as before and after training. We discuss the applicability of our results for use in the conservation and management of harvested large carnivores and their broader implications for the future conservation of lions and other threatened and economically significant species.

2. Methods

We collected 601 high resolution photographs (≥150 dpi) of 228 known age male lions (1–16 photos per individual and 92 individuals with >1 photo) from ten long term study sites across eastern and

southern Africa: the Okavango Delta region (n = 17) in Botswana; Kgalagadi Transfrontier Park (n = 3) in Botswana and South Africa; the Amboseli Tsavo ecosystem (n = 17) and Laikipia (n = 2) in Kenya; Niassa National Reserve (n = 14) in Mozambique; Etosha National Park (n = 3) in Namibia; Kruger National Park (n = 29) in South Africa; Serengeti National Park (n = 48), Selous Game Reserve (n = 11), and Ngorongoro Conservation Area (n = 21) in Tanzania; South Luangwa Valley (n = 19) in Zambia; and Hwange National Park (n = 44 individuals) in Zimbabwe. These sites represent a broad range in elevation (340 1820 m) and climate (arid, warm temperate, and equatorial zones; Fig. 1). Lion populations at these sites have been intensively studied for extended periods. Cubs were typically first seen at 3 8 weeks of age and subsequently identified from natural markings (e.g., whisker spots, ear notches, scars; Packer and Pusey, 1993) and/or through radio collaring. Dates of parturition were estimated from the mother's denning behavior and lactation stains and from physical development in comparison to other cubs of known birthdates (Pusey and Packer, 1994). Only photographs of individuals first viewed at <3 months of age were included to enable high precision in aging.

2.1. Aging traits

For each photo, author JRBM used sliding scales to score the characteristics of ten phenotypic traits (Table 1): mane development; mane colouration of the chest, neck, shoulder, and forehead; teeth colour and wear; facial scarring; slack jowl; and nose darkness. These traits were known indicators of age in different lion populations (Ferreira and Funston, 2010a; Smuts et al., 1978; West et al., 2006; Whitman and Packer, 2007). Traits were scored in a photo only when they were clearly visible (e.g. teeth traits were scored only in photos of yawning lions). Mane development and colour were assessed using single or paired photos that clearly displayed all upper body parts of the individual.

To test the repeatability of scoring, two naïve observers (graduate students unfamiliar with the study) scored a random subset of 14 50 photos per trait (Balme et al., 2012; Loehr et al., 2008). We compared scores given by students and JRBM using a repeated measures ANOVA with an error term of 'photo/observer' to test for differences between scores in each photo. Student scores were comparable to those given by JRBM, indicating high repeatability (mane development: $F_{2,64}$ =

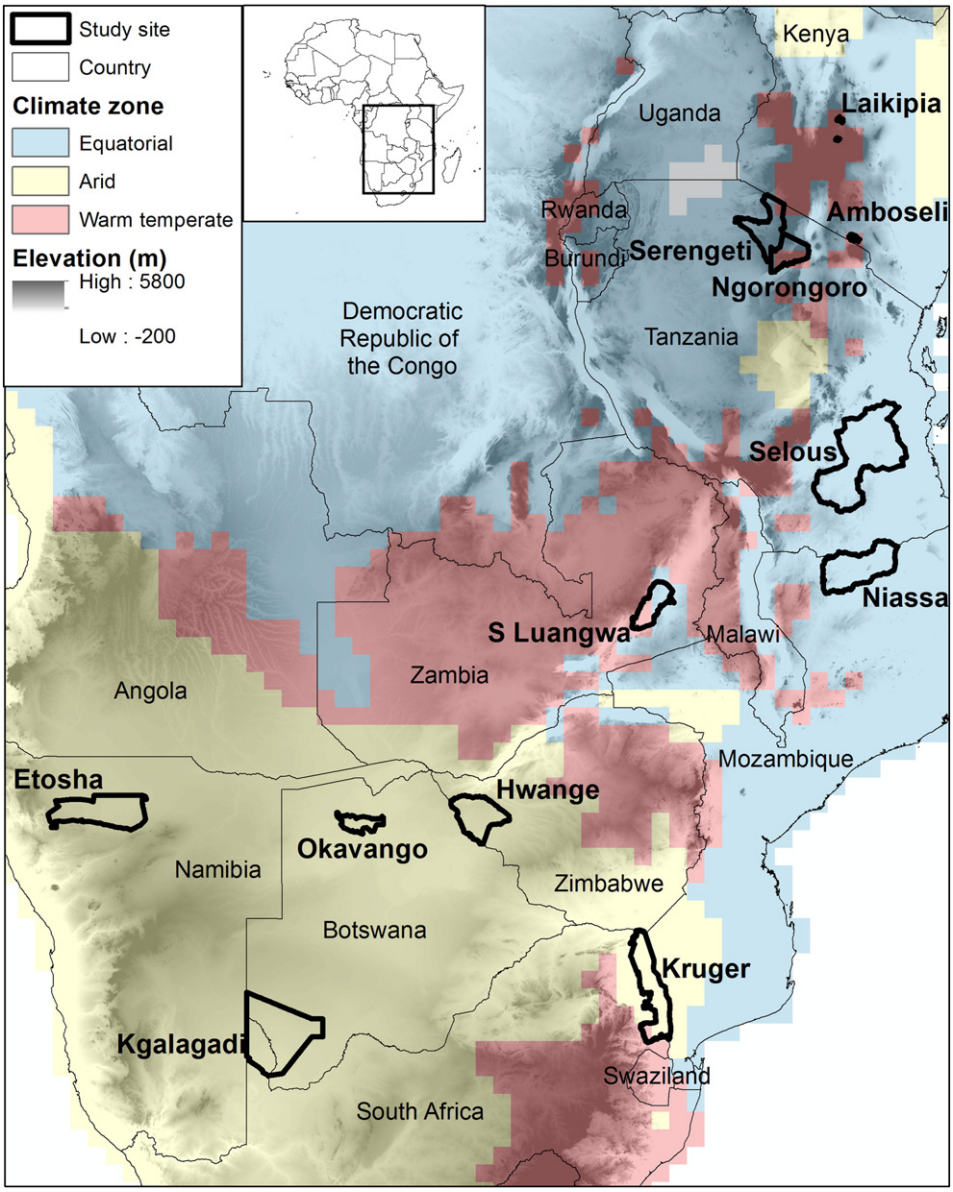

Fig. 1. Map of study sites in Africa with respect to climate zones and elevation.

Table 1
Score descriptions for the phenotypic traits assessed in known-age male lions.

Trait	Scoring code	Characteristics
Mane development	1	No or very short hair around face and on chest and neck
	2	Short hair around face and on chest and neck; Mohawk not visible
	3	Short Mohawk visible; bare patches between Mohawk and ears
	4	Long Mohawk with bare patches between Mohawk and ears; full around face and chest; incomplete on shoulder
	5	Fully developed, with forehead section fully filled between ears; some growth but mostly incomplete on shoulder
	6	Fully developed, with forehead section fully filled between ears; shoulders filled in
	7	Fully developed but thinning; the end of the hair looks fuzzy or frayed and/or the mane may thin or fall out in sections
Chest, neck, shoulder and forehead mane darkness (independent score for each)	1	Blonde
	2	Light brown
	3	Dark brown
	4	Black
Teeth colour	1	White
	2	Light yellow
	3	Dark yellow
Teeth wear	1	No wear (sharp)
	2	Slightly worn or chipped
	3	Heavily worn, very flat and very chipped
Facial scarring	1	Unscarred
	2	Lightly scarred or pocked
	3	Heavily scarred or pocked
Slack jowl	1	Absent: lower and upper lips tightly meet when mouth closed (not drooping)
	2	Present: lower lip obviously droops apart from top lip and downward when mouth closed
Nose darkness	0%	No black, all pink
	10%	Between 0 and 10% black
	20%	Between 10 and 20% black
	30%	Between 20 and 30% black
	40%	Between 30 and 40% black
	50%	Between 40 and 50% black
	60%	Between 50 and 60% black
	70%	Between 60 and 70% black
	80%	Between 70 and 80% black
	90%	Between 80 and 90% black
	100%	All black, no pink

2.352, $P = 0.103$; chest mane colour: $F_{2,64} = 0.267$, $P = 0.767$; neck mane colour: $F_{2,64} = 2.596$, $P = 0.082$; shoulder mane colour: $F_{2,64} = 0.195$, $P = 0.823$; forehead mane colour: $F_{2,64} = 0.209$, $P = 0.812$; slack jowl: $F_{2,60} = 1.000$, $P = 0.374$; teeth colour: $F_{2,26} = 1.560$, $P = 0.229$; teeth wear: $F_{2,26} = 1.368$, $P = 0.272$; facial scarring: $F_{2,56} = 1.314$, $P = 0.277$; nose darkness: $F_{2,96} = 2.731$, $P = 0.070$).

A previous study had found a correlation between nose darkness and age by digitally quantifying the proportion of black pigmentation pixels in the nose (Whitman et al. 2004). To test whether digital assessment differed from human scoring by eye, we additionally measured nose darkness with a similar digital method. Using Adobe Photoshop CS6 v.13.0.6, we clipped the fleshy part of the nose in each photo and set the colour value threshold to differentiate between the 'black' versus 'not black' (pink) portions of the nose. We then used the histogram tool to calculate the percentage of black nose pixels. To determine whether nose darkness differed by age between measurements made 'by eye' and digitally, we ran a Pearson correlation and tested whether values were comparable for each photo using a repeated measures ANOVA.

We examined the age associated with scores for each trait using ANOVA with Tukey post hoc tests to see which scores significantly differed by age range. To identify which characteristics within a trait could be used to determine age, we grouped together adjacent score categories when doing so produced significantly different age classes. For example, we initially measured nose darkness with 11 categories (0%, 10%, …90%, 100% black) but some of these categories (e.g. 0% and 10%) did not differ significantly in age. In these cases, non-significance indicated natural variation in the trait within an age and we grouped the adjacent score categories into a single group for analysis (e.g. 0–10%). To test how well each trait predicted age, we used linear mixed effects models to model 'age' by 'trait score' (fixed effect) with a random intercept effect of 'site' and 'individual' within each site ('site/individual' in the model) to account for pseudo-replication due to the availability of multiple photographs for some individuals and for the clustering of individuals with sites. We assessed model fit using the conditional R^2, a standard metric which describes the proportion of variance explained by both the fixed and random factors (Johnson, 2014). We additionally investigated how mane colouration changed with age by body part. We did this by running ANOVA tests on scores by age, with age grouped into 1-year age classes, and compared colouration scores by body part. All traits data were normally distributed.

We also explored whether trait development varied for lions in different geographical regions and climates. In particular, mane development and colour have been suggested to vary regionally and with temperature and humidity (West and Packer, 2002). We therefore tested how traits varied with elevation (data from the CGIAR-CSI SRTM; Jarvis et al., 2008) and climate zone (Koppen-Geiger Climate Classification, major zone; Kottek et al., 2006). Regional variable values were calculated as the mean of pixels within each study site boundary (data from The World Database on Protected Areas; IUCN and UNEP-WCMC, 2015) using zonal statistics in ArcGIS (Table A1). We added the interaction term 'trait score' * 'regional variable' to the previous linear mixed effects models and ran Chi-square tests to determine whether the regional variable significantly improved the model. Effects of regional variation were tested for all traits except slack jowl and facial scarring due to uneven sample sizes across regions. All statistical tests were run in R v.3.1.3 (R Development Core Team 2008).

2.2. Aging accuracy

A subset of known-age male lion photos was used to measure the effectiveness of training with phenotypic traits on improving accuracy in aging lions. We tested accuracy levels before and after training using a survey consisting of three sections: (1) a "pre-test", where participants aged individuals in 32 photos based on their baseline knowledge of lions; (2) a training, where participants reviewed brief educational materials on the traits for recognising lion age (based on the traits analysis); and (3) a "post-test", where participants aged individuals in 32 different photos. Participants were asked to assign the lions in photos to one of four age classes: (1) 1–2.9 years, (2) 3–4.9 years, (3) 5–6.9 years, and (4) ≥7 years. Because participants' ability to distinguish between the middle two age classes (3–4.9 years and 5–6.9 years) have the greatest implications for sustainable trophy hunting, to reduce variance we included in each section ten photos for each of the middle age classes and six photos for each the youngest and oldest age classes. Most traits were visible in all photos except for teeth colour and wear, which were not included in the survey assessment or training because photos with these traits excluded most other traits (e.g. featured only the mouth).

We conducted the anonymous survey online with two groups: professional hunters, who are responsible for determining which individual lions are suitable for clients to harvest, and inexperienced observers (college students), who offered a baseline for comparison against

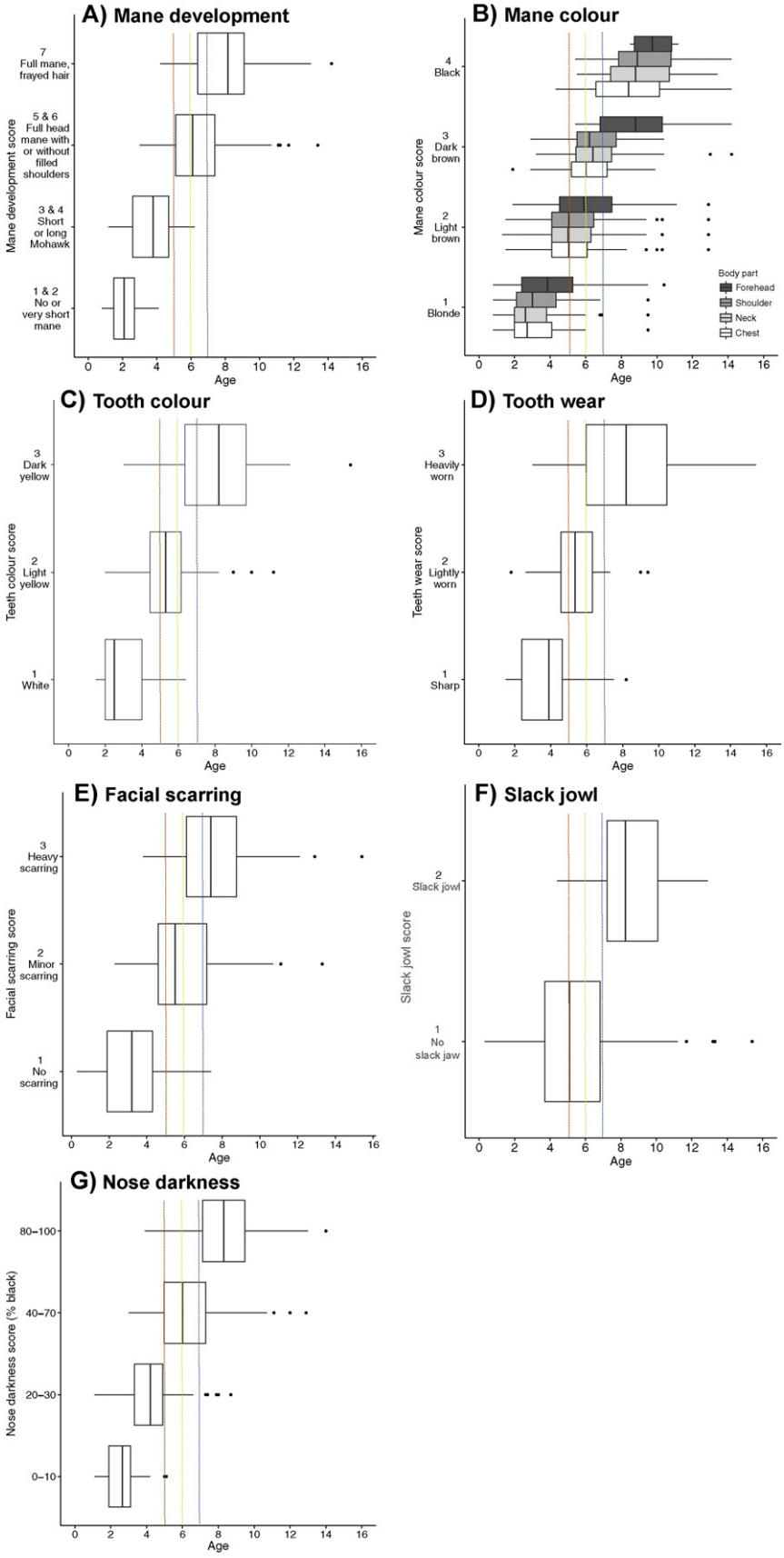

Fig. 2. Relationship between phenotypic traits and age in male lions in study sites across Africa for (A) mane development, (B) mane colour, (C) teeth colour, (D) teeth wear, (E) facial scarring, (F) slack jowl, and (G) nose darkness. Boxes indicate the lower, median and upper quartiles; horizontal lines represent the sample minimum and maximum; dots represent outliers. Vertical lines mark traits at 5 (orange), 6 (yellow), and 7 (blue) years of age. Data represents photographs of individual lions (see Methods for details). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

hunters. To explore how experience influenced participants' accuracy in aging, we asked both students and hunters how many hunts (any species) they had participated in and whether they had previously received education on aging lions. We additionally asked hunters how many years they had worked as professional hunters, how many lion hunts they had attended, and whether they had previously participated in a lion hunt that followed age restrictions. We included these data as predictor variables in multivariate linear regressions with a response variable of aging accuracy score for each participant group before and after training. We calculated each participant's aging accuracy score for the pre and post test sections as the percentage of correctly aged photos. We compared scores between sections and participants using unpaired and paired t tests with equal variances, respectively. We also examined which lion ages were most often categorised accurately by calculating the mean percentage of photos assigned to each of the four age classes and used ANOVA to compare differences by age class.

3. Results

3.1. Aging traits

For all ten phenotypic traits, age was strongly predicted by score (statistics below) and varied across scores (Fig. 2; mane development: $F_{6,210} = 37.17$, $P < 0.001$; chest mane colour: $F_{3,213} = 68.30$, $P < 0.001$; neck mane colour: $F_{3,213} = 55.19$, $P < 0.001$; shoulder mane colour: $F_{3,213} = 65.77$, $P < 0.001$; forehead mane colour: $F_{3,213} = 44.45$, $P < 0.001$; teeth colour: $F_{2,90} = 33.82$, $P < 0.001$; teeth wear: $F_{2,90} = 36.72$, $P < 0.001$; facial scarring: $F_{2,189} = 59.47$, $P < 0.001$; slack jowl: $F_{1,208} = 22.21$, $P < 0.001$; nose darkness [by eye]: $F_{10,306} = 41.17$, $P < 0.001$). Traits showed overlap in the ages associated with some scores, especially for mane development and nose darkness. Post hoc analyses revealed that compiling mane and nose darkness scores each into four categories of characteristics produced significantly distinct age classes between scores ($P < 0.006$ and $P < 0.0002$, respectively; Fig. 2A, Fig. 2G); all other traits showed significant differences in age between scores without grouping ($P < 0.01$; except mane forehead colour between dark brown and black, $P = 0.858$). Four age classes could be distinguished based on the revised grouping of trait characteristics: 1–2.9 years, 3–4.9 years, 5–6.9 years, and ≥7 years.

By age class, the majority of males (≥50%) 1–2.9 years of age were characterised by a smooth face (no facial scarring), tight jowl (no slack jowl), no mane or a small Mohawk, blonde hair colour on the chest, neck, shoulder, and forehead, sharp white teeth, and nose darkness of 0–30% black (Fig. 2). Most males 3–4.9 years showed a smooth face or light facial scarring, tight jowl, large Mohawk or full mane, blonde or light brown hair colour on the chest, neck, shoulder, and forehead, sharp or lightly worn light yellow teeth, and nose darkness of 20–60% black. Males 5–6.9 years predominantly showed light facial scarring, tight jowl, full mane, light or dark brown mane colour on the chest, neck, shoulder, and forehead, lightly or heavily worn light yellow teeth, and nose darkness of 40–70% black. Most males ≥7 years showed light or heavy facial scarring, full mane with or without fraying hair, black mane colour on the chest, neck, shoulder and forehead, lightly or heavily worn dark yellow teeth, nose darkness of 40–100% black, and a tight jowl. Jowl slackness was a unique identifying characteristic for the oldest age class: though only 24% of lions ≥7 years old showed slack jowls, 73% of individuals with slack jowls were ≥7 years old (Table A2).

Trait score, but not elevation or climate zone, was a significant predictor of ages associated with mane development (score: $t_{196} = 14.338$, $P < 0.001$, $R^2 = 0.73$; $P > 0.4$ for all Chi square tests with regional variables) and colour (chest: $t_{214} = 13.963$, $P < 0.001$, $R^2 = 0.74$; neck: $t_{216} = 12.386$, $P < 0.001$, $R^2 = 0.70$; shoulder: $t_{216} = 13.747$, $P < 0.001$, $R^2 = 0.73$; forehead: $t_{216} = 9.865$, $P < 0.001$, $R^2 = 0.55$; $P > 0.3$ for all Chi square tests), nose darkness ($t_{306} = 18.704$, $P < 0.001$, $R^2 = 0.78$; $P > 0.20$ for all Chi square tests), and teeth colour ($t_{76} = 7.749$, $P < 0.001$, $R^2 = 0.62$; $P > 0.07$ for all Chi square tests) and wear ($t_{77} = 7.765$, $P < 0.001$, $R^2 = 0.60$; $P > 0.4$ for all Chi square tests). Assessments of nose darkness made by eye and digital methods were statistically correlated ($r = 0.825$, $t_{315} = 25.938$, $P < 0.001$) and numerically equivalent ($F_{1,316} = 0.367$, $P = 0.545$; Fig. 3). Though not statistically significant, we observed differences in mane development by climate. Lion manes appear to grow more slowly and sparsely at sites in the equatorial climate zone (Selous and Niassa) than in warm temperate or arid climates, causing these individuals to resemble lions 2–3 years younger than same aged individuals in other sites (Fig. S1).

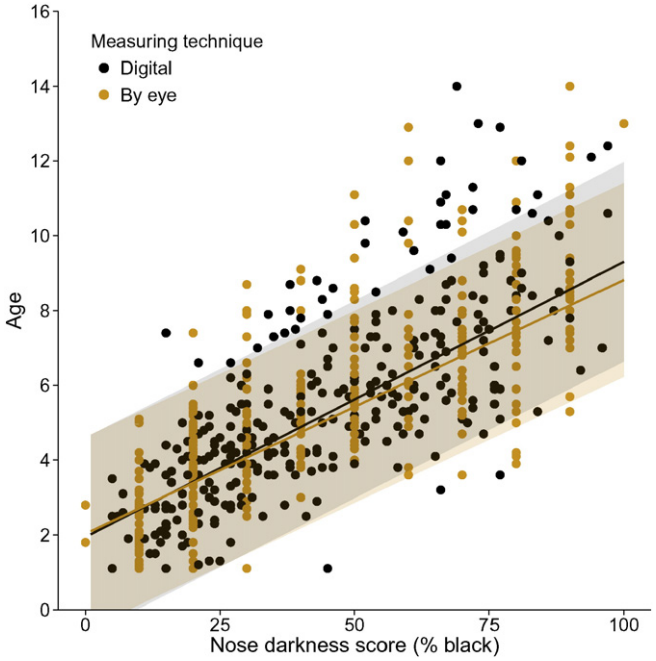

Fig. 3. Differences in nose darkness with age by measuring technique. Each point represents a different photograph of an individual lion; in some cases (64 out of n = 138 individuals), the same individual was measured at multiple ages. Lines represent linear mixed model predictions; shaded ribbons represent 95% prediction intervals (orange = by eye; grey = digital).

3.2. Aging accuracy

Fifty three professional hunters and 52 students completed the survey. Hunter participants averaged 16 years of professional hunting experience (range of 1–40 years) in numerous African countries, primarily Tanzania (45%), Zimbabwe (45%), South Africa (30%), Namibia (21%), Zambia (19%) and/or Mozambique (17%; note that most hunters worked in more than one country). Nearly all hunters (92%) had previously participated in a lion hunt, with 42% having attended >20 lion hunts, and 62% had attended lion hunts with age restrictions on harvested individuals. However, less than half (43%) had previously received education (participated in a training or read educational materials) on aging lions. The majority of students had never participated in a wildlife hunt (65%) and had never received education on aging lions (90%).

Professional hunters scored significantly higher than students before training (mean percent of correctly aged photos for hunters = 63 ± 2% [standard error], range of 38–78%; students = 48 ± 2%, range 22–78%; $t_{103} = -5.897$, $P < 0.001$) and similarly to students after training (hunters: 69 ± 1%, range 44–84%; students: 67 ± 2%, range 38–88%; $t_{103} = -0.783$, $P = 0.435$). Paired t tests revealed that both hunters and students scored higher after training ($t_{52} = -3.274$, $P = 0.002$ and $t_{51} = -8.129$, $P < 0.001$, respectively). Students improved significantly more than hunters ($t_{103} = 4.350$, $P < 0.001$), increasing their accuracy by an average of 19 ± 2 percentage points compared to 6 ± 2 for

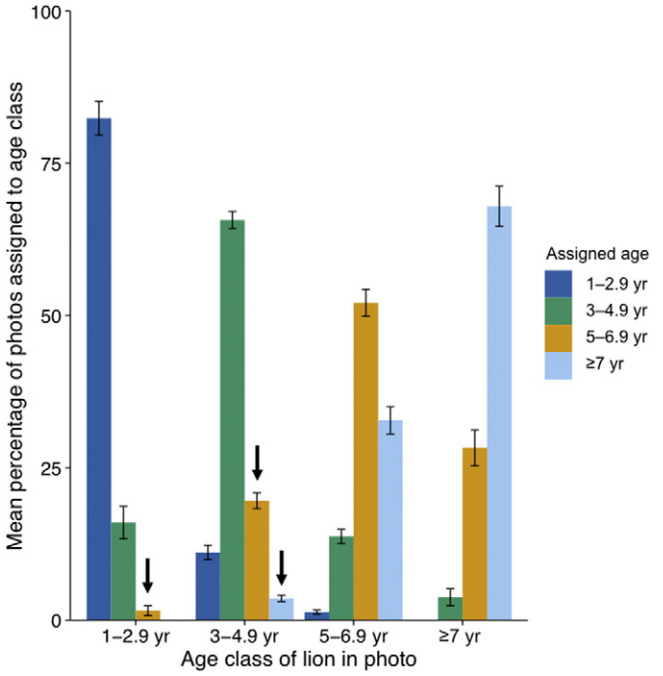

Fig. 4. Mean percentage of male lion photos assigned to different age classes by professional hunters compared to the actual age of the lion photo. Correctly aged lion photos are indicated where the assigned age (colour) matches the age class of the lion photo (x-axis). Arrows indicate lions <5 years that were overestimated as ≥5 years (unsustainable harvest). Bars indicate standard error (n = 53 participants).

hunters. Linear regression found no associations between aging accuracy and experience variables for either hunters or students before ($F_{8,44} = 1.282$, adjusted $R^2 = 0.042$, $P = 0.278$; $F_{4,47} = 3.197$, adjusted $R^2 = 0.147$, $P = 0.021$, respectively) or after training ($F_{8,44} = 1.539$, adjusted $R^2 = 0.077$, $P = 0.172$; $F_{4,47} = 2.532$, adjusted $R^2 = 0.107$, $P = 0.527$, respectively).

The percentage of lions accurately aged assigned by hunters after training significantly differed among all age classes except 3–4.9 years and ≥7 years ($F_{3,208} = 24.350$, $P < 0.001$; Tukey post hoc $P = 0.920$, $P < 0.001$ for all other pairs). Hunters most accurately aged 1–2.9 year old lions (82% correct) and least accurately aged 5–6.9 year old lions (52%); 3–4.9 year olds and ≥7 year olds were aged with 67% and 68% accuracy, respectively (Fig. 4). Hunters overestimated the age of 20% of 3–4.9 year olds and 2% of 1–2.9 year olds by miscategorising photos as 5–6.9 years, and 4% of 3–4.9 year olds as ≥7 years. Hunters underestimated the age of 15% of 5–6.9 year olds and 4% of ≥7 year olds by miscategorising photos as <5 years old.

4. Discussion

The ability to age individual animals in wildlife populations is necessary for informed wildlife management and conservation as well as sustainable, age-selective hunting of threatened, high-valued species. Our study revealed a suite of phenotypic traits in African lions that conspicuously change with age at biologically meaningful intervals. Most of these traits are consistent across regions, and can be used *pre mortem* to categorise individuals by age class with a moderate to high degree of accuracy. Most importantly, these traits do help in distinguishing the minimum age threshold of ≥5 years recommended for sustainable harvest of lions (Whitman et al., 2004). However, our results revealed that a large proportion (22%) of 'underage' lions (<5 years) were mistakenly overestimated to be 5–6.9 year olds, or suitable for hunting according to current age-based hunting systems in several African countries. This high error rate in critical age classes should be further investigated and suggests that an older minimum age threshold (e.g. ≥7 years) may be a more practical threshold for achieving sustainable harvests.

We found that that no single trait can be relied upon exclusively to precisely age lions; rather, multiple traits must be examined in combination to cross-validate an individual's age. For example, our findings corroborate previous evidence that nose darkness can be used for aging following the "50% rule" (lions with noses ≥50% black are on average ≥5 years; Whitman et al., 2004) by the human eye (in addition to digital measurement). Yet nose darkness showed such high variation around this age threshold (25% of lions with noses ≥50% black were <5 years old and 10% were <4 years old) such that nose darkness should not be used as alone to estimate age. Referring to nose darkness as well as mane development, facial scarring, and teeth colour and wear will account for age variation within each trait and improve the accuracy of age assessment. An exception is slack jowl, which was a strong indicator of older lions when present, although only one-third of lions ≥7 years old showed slack jowls. Due to large overlap in mane colour among ages, we did not find this trait to be useful for precisely determining age.

Based on synchronised development across the suite of phenotypic traits, we were able to categorise lions into four age classes that also corresponded to important biological stages of development: 1–2.9 years (dependent and non-reproductive), 3–4.9 years (independent and beginning to reproduce), 5–6.9 years (prime reproductive age), ≥7 years (final reproductive years and past prime, non-reproductive). For carnivores and lions in particular, precisely estimating an animal's age is necessary for assessing population demographic parameters, such as survival and reproduction, to manage and conserve species. Thus, in addition to assisting hunters, these classes may be especially informative to wildlife researchers and managers for assessing individual behavior and population structure.

Surprisingly, we did not find statistically significant regional variation in mane development or colour by age. This contrasts with previous studies that have documented shorter length, lower density, and slower growth rates as well as blonder colour in the manes of lions living at warmer and more humid climates (Kays and Patterson, 2002; Patterson et al., 2006; West and Packer, 2002; Fig. A1). We attribute this result to our small sample size of mane photos from sites in the equatorial climate zone (n = 6 compared to n = 103 from arid and n = 108 from warm temperate zones). If our sample size for this climate zone had been larger, we suspect that our results would have mirrored the findings of previous studies. Consequently, in sites where manes are short and sparse, such as Selous and Niassa, we recommend that other traits in addition to mane development be used for aging lions.

Accuracy survey results suggest that, with rigorous training, people with varying levels of experience can use phenotypic traits to accurately age lions. Both inexperienced observers and hunters improved their accuracy scores after training, with inexperienced observers scoring on par with hunters. The fact that both hunters and inexperienced observers scored similarly after training suggests a proficiency threshold, after which more intense training is necessary to improve; however, this threshold is likely test-specific (e.g. dependent on the number and quality of photos). Hunters improved only 6% after training, emphasizing a need for a more rigorous training than our survey provided. Considering that the online training was self-administered, computer-based, and brief (10 min), participants would likely further improve their accuracy through a more comprehensive, interactive, and field-based training. The need for adequate training cannot be stressed enough, as the success of age-based hunting is fundamentally dependent on hunters' abilities to accurately age. Until a rigorous training program which raises hunters' aging accuracy to acceptable levels (which must also be determined by management authorities) can be developed, quotas and minimum age thresholds must account for large margins of error. Our finding that previous experience with hunting or aging did not improve participants' lion aging abilities aligns with previous findings from a similar aging assessment of African leopards (Balme et al., 2012).

Hunters were least successful in aging lions in the 5 6.9 year age class, the most important age threshold for sustainable lion offtake. Hunters mis categorised and overestimated 24% of 3 4.9 year old lions to be of suitable hunting age (≥5 years), which in the field would have resulted in unsustainable harvest. Notably, hunters also underestimated 15% of photos of 5 6.9 year olds and 4% of ≥7 year olds as ages unsuitable for sustainable hunting, which could benefit lion conservation by allowing these males in their prime reproductive stage to sire additional offspring. The effects of such aging errors on lion demography and conservation have not been well studied (Whitman et al., 2007). Government agencies may wish to consider raising the minimum age threshold to ≥7 years as a more assured way of achieving sustainability by accounting for aging error. The traits that characterise ≥7 year old lions are more unique and distinct than those associated with younger age classes, and although some 5 6.9 year old lions were mis categorised as ≥7 year old and vice versa, very few 'underage' lions (<5 years) were mis categorised as ≥7 years (4%). This suggests that setting a minimum age threshold of 7 years would be more likely to achieve sustainable rates of hunting because individuals that are inaccurately aged would be mistaken as ≥5 years, the minimum age for sustainable offtake assuming no effect of aging error (Whitman et al., 2004). Lions ≥7 years old are also more likely to have successfully reproduced and raised at least one litter to maturity, thus reducing the impacts of infanticide (Bertram, 1975; Packer, 2001). Fi nally, this threshold is in line with emerging evidence that ≥7 years is a more sustainable minimum harvest age for lions in some parts of Afri ca (Creel et al., 2016). If 7 years were legally set as a minimum thresh old, a simple rule could be to restrict harvest to lions with slack jowls or to lions with majority black noses (>60% black), heavy facial scarring, and dark yellow and heavily worn teeth (an appearance which could also potentially be more desirable to hunters).

In the age based quota systems of Mozambique, Tanzania, and Zimbabwe, punishments and rewards based on trophy ages are decided through age validation using *post mortem* assessment con ducted by wildlife government authorities. Many of these assess ments are made based on photographs of the trophy head and side body that are required to be submitted with hunt return forms. The trait characteristics identified in our study (with the exception of slack jowl) could assist authorities in more precisely estimating ages and regulating harvests.

Our results indicate the importance of education and outreach for improving the aging skills of wildlife professionals. We recommend that hunting operators and authorities prioritise and consider requir ing trainings for professional hunters. Lion aging techniques could be included more widely in the curricula and final examination of hunting courses as a prerequisite for licensing, as is the case in Zimbabwe with lions, in the United States with mountain lions (http://cpw.state.co.us/thingstodo/Pages/LionExam.aspx, accessed February 2016), and is being developed in South Africa for leopards. Several lion aging guides have already been produced (Whitman and Packer, 2007; Whitman, 2010), and we reiterate the need for simple, user friendly resources and consistent messaging to improve the aging ability of wildlife profes sionals. The results of this study have been developed into hardcopy and digital resources which are freely accessible online (http://AgingTheAfricanLion.org) and are being actively shared with hunting operators and wildlife managers, researchers, and conservation practitioners.

The tractability of age based hunting systems has ramifications for international policy level decision making about lion conservation and the economic markets tied to the hunting industry. Age restrictions and adaptive quota systems that are transparent and properly imple mented may offer more realistic and attainable metrics for sustainability than wildlife population assessments (Creel et al., 2016; Whitman et al., 2004). We recommend that agency authorities in market countries, such as the U.S. Fish and Wildlife Service, consider the use of age restric tions and adaptive quota systems for making decisions about trophy imports. Until alternatives to trophy hunting can be found to support conservation (Lindsey et al., 2016), we recommend that these agencies work with range countries to develop and monitor age based hunting quotas that are adequately conservative to achieve desired conservation goals for each lion population.

The implications of our study also extend beyond hunting and lions. Age determination is a critical component of accurately estimating the demographic parameters (recruitment, survival, dis persal, population size) of wildlife populations for successful conser vation and management (Becker et al., 2013; Ferreira and Funston, 2010b; Skalski et al., 2005). Because tracking individual animals is rarely logistically or monetarily feasible, the ability to accurately and non invasively age from physical appearance may help to inter pret social interactions as well as population dynamics. The aging traits identified in our study could be used in numerous applications, including aging individuals involved in research (e.g. animals collared for telemetry or photographed in camera trap surveys), human wildlife conflict (e.g. captured problem animals), tourism and nature education (e.g. animals seen on safari or in documen taries), and in populations where close monitoring is required due to intense poaching or other pressures. Several of the lion aging traits identified by our study have been relevant for other species, such as African leopards (Balme et al., 2012), European badgers (Delahay et al., 2011), grey wolves (Gipson et al., 2000), and spotted hyenas (Van Horn et al., 2003), and we hope that our methodology will serve as a model for age determination in other species.

The recent illegal killing of 'Cecil the lion' placed an international spotlight on African trophy hunting that questioned the integrity of hunting practices and the future value of hunting for funding conserva tion (Di Minin et al., 2015; Lindsey et al., 2016). If lion trophy hunting is to continue, practices must at least adhere to science based regulations and achieve population sustainability. We present practical criteria to support an age based hunting system for lions that would reduce over harvest and that could potentially halt the decline of the species in hunted populations. This could benefit hunting operators and profes sional hunters at multiple scales by assisting compliance with recent in ternational regulations requiring hunting to have a net positive impact on lion populations, by securing the financial stability of trophy hunting (Lindsey et al., 2012) and by improving trophy quality (Whitman et al., 2004). Zimbabwe and Niassa National Reserve in Mozambique, which began implementing age based lion trophy hunting over the past few years, are reporting successes in the management of lion hunting that include increasing lion trophy age, hunt success, and population size. In demonstrating a reliable toolset for aging, we hope that this study fa cilitates continued and increasing positive outcomes in these countries as well as others that choose to sustainably manage wildlife for the long term.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at http://dx.doi.org/10.1016/j.biocon.2016.07.003.

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Assessing the sustainability of African lion trophy hunting, with recommendations for policy.

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ABSTRACT: While trophy hunting provides revenue for conservation, it must be carefully managed to avoid negative population impacts, particularly for long-lived species with low natural mortality rates. Trophy hunting has had negative effects on lion populations throughout Africa, and the species serves as an important case study to consider the balance of costs and benefits, and to consider the effectiveness of alternative strategies to conserve exploited species. Age-restricted harvesting is widely recommended to mitigate negative effects of lion hunting, but this recommendation was based on a population model parameterized with data from a well-protected and growing lion population. Here, we used demographic data from lions subject to more typical conditions, including source-sink dynamics between a protected National Park and adjacent hunting areas in Zambia's Luangwa Valley, to develop a stochastic population projection model and evaluate alternative harvest scenarios. Hunting resulted in population declines over a 25-year period for all continuous harvest strategies, with large declines for quotas greater than 1 lion/concession (~0.5 lion/1000 km^2) and hunting of males younger than 7 years. A strategy that combined periods of recovery, an age limit of ≥ 7 years and a maximum quota of ~0.5 lions shot per 1000 km^2 yielded a risk of extirpation < 10%. Our analysis incorporated the effects of human encroachment, poaching and prey depletion on survival, but assumed that these problems will not increase, which is unlikely. These results suggest conservative management of lion trophy hunting with a combination of regulations. To implement sustainable trophy hunting while maintaining revenue for conservation of hunting areas, our results suggest that hunting fees must increase as a consequence of diminished supply. These findings are broadly applicable to hunted lion populations throughout Africa, and to inform global efforts to conserve exploited carnivore populations.

Keywords: trophy hunting, extinction risk, population dynamics, carnivore, *Panthera leo*

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Large carnivores are declining globally (Estes et al. 2011), with important consequences for ecosystem structure and function (Pace et al. 1999; Scheffer et al. 2001; Terborgh & Estes 2013). These declines are well-exemplified by the lion (*Panthera leo*), Africa's largest carnivore, for which suitable habitat has declined by approximately 75% in recent decades (Riggio et al. 2013). Lion numbers have decreased in parallel with their habitat, and only 10 'stronghold' populations – stable, protected populations of more than 500 individuals – currently persist (Bauer & Van Der Merwe 2004; Packer et al. 2013; Riggio et al. 2013; Bauer et al. 2015; Riggio et al. 2016). As with many other apex carnivores, most large, free-ranging lion populations are limited by a combination of habitat loss, prey depletion, direct conflict and retaliatory killing, wire-snare poaching and trophy hunting (Yamazaki 1996; Ogada et al. 2003; Bauer & Van Der Merwe 2004; Loveridge et al. 2007; Packer et al. 2009; Packer et al. 2011; Becker et al. 2013; Becker et al. 2013; Rosenblatt et al. 2014).

For lions and all other exploited species, trophy hunting is unique because it is intentional and legal, and thus more easily controlled than other limiting factors (Creel et al. 2015). In 2015, the US Fish and Wildlife Service listed lions in Western and Central Africa as endangered and those in Eastern and Southern Africa as threatened under the Endangered Species Act. This listing decision found evidence for "practices that experts have identified as undermining the sustainability of trophy hunting" and included an explicit rule that body parts from lions killed in trophy hunts can only be imported from nations with "a scientifically sound management program that benefits the subspecies in the wild" (U.S.Fish and Wildlife Service 2015). Due to concern over population decline, poor recruitment and a decrease in the age of lions being shot in Game Management Areas adjacent to South Luangwa National Park, the Zambia Wildlife Authority implemented a moratorium on lion hunting for 2013-2015 (Rosenblatt et al. 2014). It

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is unusual that a limiting factor can be switched off so directly (Rutledge et al. 2010; Creel et al. 2015), but hunting is also unusual because it provides revenue that can contribute to conservation, and from this economic perspective, lions are one the most important of Africa's hunted species (Creel & Creel 1997; Packer et al. 2011; Lindsey et al. 2013; U.S.Fish and Wildlife Service 2015). Well-regulated hunting has the potential to contribute to lion conservation, but data show that overharvesting has contributed to their current decline (Packer et al. 2011; Lindsey et al. 2013; Rosenblatt et al. 2014), and the ecological, cultural and economic importance of lions mandates careful attention to these issues (Creel et al. 2015).

Empirical Studies of Trophy Hunting Effects on Lions

Lions, like most large carnivores, have low adult mortality rates in the absence of human effects, making it unlikely that hunting simply substitutes for other causes of death (Rosenblatt et al. 2014; Creel et al. 2015), and data confirm that some lion populations are affected by overhunting. Loveridge et al. (2007) examined lions in Hwange National Park (Zimbabwe) in an area of 7129 km^2, of which 83% was within the National Park where hunting is not allowed, and 17% was within adjacent communal lands, safari areas and hunting concessions. Of 62 individuals marked on this site, trophy hunting accounted for 63% of 38 individuals who died or disappeared. The proportion of the population comprised of adults males declined from 26.3% to 13.7% during a period of 4 years over which the offtake of males doubled. Of marked, territorial males in this population, 72% were killed by trophy hunters, at a mean distance of 1.5 km from the park boundary. Thus in the Hwange region, sport hunting is largely based on source-sink harvesting of lions from the national park, and not on sustainable offtake of lions residing within the hunting areas themselves (a phenomenon that Loveridge termed the 'vacuum effect').

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Rosenblatt et al (2014) found similar results for lions on a 2775 km^2 study site centered on the Luangwa River (Zambia), including portions of South Luangwa National Park (SLNP, which does not allow hunting) and the adjacent Lupande and Lumimba Game Management Areas (GMAs, which allow hunting). Lupanda and Lumimba are considered 'prime' hunting areas by the Department of National Parks and Wildlife. This classification is currently applied to a small number of GMAs, all adjacent to the large, protected lion populations of SLNP and Kafue National Park. Using mark-recapture models fit to data from intensive monitoring of 210 individual lions in 18 prides and 14 male coalitions over 5 years, they found that trophy hunting was the most common cause of death, with 46 males harvested from a population showing indications of overharvest that included population decline, low recruitment, low sub-adult and adult male survival, depletion of adult males (prime-aged and old adult males never exceeded 6% of the population) and a senescing adult female population. The median age of harvested males was 4.86 years old, substantially below the minimum age of 6 suggested by Whitman et al (2004), and annual harvest rates ranged from 1.86 to 2.56 lions/1000 km^2, much higher than the baseline recommendation of 0.5 lions/1000 km^2 (Packer et al. 2011) and well above the higher value of 1 lion/1000 km^2 recently suggested for Tanzania's Selous Game Reserve (Packer et al. 2011). As in Hwange, harvest was heavily concentrated along the national park boundary (Rosenblatt et al. 2014) (see Results, Fig. 1).

In Tanzania's Selous Game Reserve, which holds the largest lion population on the continent (Creel & Creel 1997; Bauer & Van Der Merwe 2004; Creel et al. 2013), lions attained densities between 8 and 13 per 100 km^2, and on a focal study area of 2,600 km^2 in the Northern Sector of Selous, lions were killed at a rate of 2·7–4·3% of adult males annually between 1989 and 1994. This mortality was thought to be sustainable, while noting that lion quotas were substantially

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higher, equal to 10—16% of the adult male population. Offtake of the full quota was thought to be unsustainable, and the percentage of quotas filled (both in Selous and nationwide) began declining in 1988 as quotas increased (Creel & Creel 1997). Packer et al. (2011) analyzed harvest records for all of Tanzania's hunting blocks, which cover more than 300,000 km^2 (approximately 100,000 km^2 in Game Reserves and 200,000 km^2 in less-protected Game Controlled Areas) and found that lion harvests declined by 50% between 1996 and 2008, with the greatest declines in the areas of heaviest harvest. Thus in Tanzania, estimated catch-per-unit-effort has been declining for several decades (Creel & Creel 1997; Packer et al. 2011).

In Zimbabwe's Gonarezhou National Park and Tuli Safari area, lion densities (as estimated from call-up surveys) were between 0% and 16% of those predicted on the basis of prey biomass, a pattern that was not observed for other large carnivores (Groom et al. 2014). Data on offtake of lions by trophy hunting and other potential limiting factors suggested that population collapse was due to direct human effects including "unsustainably high trophy hunting quotas" in conjunction high levels of legal control killing and illegal killing (Groom et al. 2014).

In the Bénoué Complex of Cameroon, track surveys conducted in three national parks and three hunting zones suggested that lion densities in hunting zones were only 31% of those in national parks (Croes et al. 2011). Lions attained only 27% of their estimated carrying capacity (based on prey density) in hunted areas, compared to 53% in national parks. In contrast, densities of leopards (*Panthera pardus*) and spotted hyenas (*Crocuta crocuta*) did not detectably differ between hunted areas and national parks. Relating these patterns to data on the number of lions shot and permits issued, Croes et al. (2011) concluded that in addition to other problems, "lions living in the hunting zones are strongly impacted through excessive trophy off-takes".

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In summary, empirical studies have detected low lion density and population declines associated with excessive trophy hunting, using a broad range of methods, at sites widely distributed across the lion's range.

Modelling Trophy Hunting Effects on Lions

A population model applied to data from lions in Serengeti National Park suggested that "hunting can be sustained simply by hunting males above a minimum age threshold" (Whitman et al. 2004; Whitman et al. 2007). Following this suggestion, age-limited harvesting has been implemented in several nations (e.g. Tanzania, Zambia and Mozambique) in an effort to make lion hunting more sustainable. Also based on this model, a minimum permitted age of 6 years has been widely adopted. When considering the generality of this strategy, one must recognize that the model was parameterized with data from a well-protected population experiencing strong, sustained growth as its prey base increased (Hanby et al. 1995; Packer et al. 1988): this limitation was carefully acknowledged by the original authors (Whitman et al. 2004). In contrast to patterns in Serengeti for the period modelled, the ungulate prey base supporting lions and other large carnivores is declining in most ecosystems (Bolger et al. 2008; Caro & Kerley 2008; Western et al. 2009), and many lion populations are thought to be declining as a result of prey depletion and related problems (Bauer et al. 2015; Riggio et al. 2016). Moreover, the structure of the underlying population model (Quadling & Starfield 2002; Whitman et al. 2004) was highly complex and process-based, requiring detailed data such as the likelihood of death in territorial disputes between males of specific ages and resident/nomad status, the likelihood of females locating open territories as a function of distance, and differences in the likelihood that dispersing males will join single males, groups of nomads or pride-holding males. The lack of such data has limited application since the model's development (by Starfield more than 30 years

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ago) to a single population in Serengeti National Park (Whitman et al. 2004), with some important parameters roughly estimated even in that application (for examples, see the supplementary data of Whitman et al. 2004). To address uncertainty about the sustainability of current lion hunting policies and to evaluate age restrictions in areas more representative of harvested lion populations, we developed a simpler model to assess the sustainability of lion hunting, using Leslie matrix projection. We then applied the model to data typical of current conditions for many lion populations, with exposure to effects of human encroachment, snaring and prey depletion, and source-sink dynamics in which lions moving from a fully protected area are regularly exposed to mortality from hunting (Loveridge et al. 2007; Becker et al. 2013; Watson et al. 2013; Rosenblatt et al. 2014; Watson et al. 2015). We used population and harvest projections over 25 years to examine the sustainability of a range of potential policies including age-restricted harvest, quotas and recovery periods, separately and in combination. Our results strongly suggest that a combination of all of these strategies will be needed to avoid population declines due to overharvest, with appreciable risk of local extirpation.

A similar model parameterized with data from Serengeti was recently used to examine regulation of hunting with data only on the number of days required to kill a lion (Edwards et al. 2014). As Edwards et al. (2014) note, the value of this approach is that it can be applied even if data on population size, structure and growth rate are limited. On the other hand, indirect approaches depend on a strong and constant relationship between population size and the indirect measure of choice. In this case, the model assumed that the number of days required to shoot a lion (μ) relates inversely to population size in a constant manner, $\mu = {}^{1}/_{cN}$, where N is population size and c is a constant describing hunting effort and effectiveness. Thus, the model's results depend on an assumption that hunting effort and methods do not change as the targeted population

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decreases, which we do not consider realistic for lions. Even if constant effort and methods could be mandated and enforced, this approach relies on the additional assumption that μ has a strong relationship with population density, which to our knowledge is not supported by data from lions (see Results, Fig. 2), perhaps because a 'day of hunting' can mean many different things. For example, the use of baits (ungulate carcasses) to attract lions is still common practice. If multiple baits are dragged and hung in areas of known use (for example, watering points with good stalking cover), the likelihood of attracting a lion is likely to be decoupled from changes in population size until they become extreme. Similar concerns arise for the regulation of hunting with most large carnivores, for which population monitoring is generally difficult, limiting direct data on population size and trends.

METHODS

We modelled lion dynamics without harvest and with a range of harvest scenarios. The online supplement describes the model's structure, parameterization and validation in detail. Our basic approach was to begin with a population of defined size (180 individuals), with a sex ratio and age-distribution based on SLNP and the adjacent Lupande and Lumimba GMAs. These starting conditions are typical of many of Africa's most important lion hunting areas, with a single population that occupies a National Park in which lions cannot be hunted and adjacent areas in which hunting is allowed (see Results, Fig. 1). Recent population trends for lions in SLNP have included a decrease in population size and age-sex trends indicative of excessive trophy hunting (Rosenblatt et al. 2014). Many lion populations now show trends and constraints comparable to those of Luangwa valley lions. With these starting conditions, we projected population dynamics 25 years into the future, without hunting and with a range of hunting scenarios described just below. For all cases, we used stochastic Leslie matrix projection, with linear

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density dependence and separate projection matrices for males and females (because they differ in patterns of age-specific survival and reproduction).

Effects of Trophy Hunting

We modelled the effects of three methods that are currently proposed or used to regulate lion hunting, separately and in combination: (a) block quotas, (b) age-restriction, and (c) recovery periods with no hunting. SLNP is bordered by four hunting blocks (Upper and Lower Lupande GMA, Lumimba GMA and Nyampala GMA), ranging in size from 1,296 km^2 to 4,392 km^2. Recent and proposed regulations allow either one or two males to be harvested in each of these blocks, so we modelled block quotas of one or two. SLNP is the primary source for lions shot in Upper and Lower Lupande and Lumimba (see Results, Fig. 1), but the ranging patterns of lions shot in Nyampala have not been described. Lions shot in Nyampala are likely to originate from SLNP, but if they do not, then results midway between those shown for block quotas of 1 and 2 would best represent block quotas of 2 for the other three blocks (see Results, Figs. 3 & 4). Current or proposed policies in Zambia, Tanzania, Mozambique and elsewhere incorporate a minimum age for males that can be shot, though there is currently little direct guidance about the appropriate age threshold for a population facing the conditions typical for most lions. Simulations based on data from the well-protected and growing lion population in Serengeti N.P. suggested a threshold of six years, but applicability of this threshold to other populations has not been tested. Thus, we modelled scenarios that varied the minimum allowable age from 4 to 8 years. Finally, the Zambian government recently closed trophy hunting for three years to allow a period of recovery in both population size and age structure. Thus, we modelled scenarios with continuous harvest, with 2 year recovery periods between hunted periods of 4 years ('4 on/2 off') and with alternating 3 year periods of hunting and population recovery ('3 on/3 off'). We

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present results for combinations of block quota (one or two), recovery periods (continuous harvest, 4 on/2 off, 3 on/3 off) and minimum age (4 – 8 years).

Direct hunting mortality. We incorporated direct mortality of males due to trophy hunting by checking within each group at each time step for males above the minimum allowable age, and removing them until the quota was filled. For scenarios other than continuous harvest, no males were removed by hunting in years designated for recovery.

Super-additive effects of hunting mortality on recruitment of cubs. The social disruption created by increased mortality due to hunting often reduces reproduction in social carnivores (Whitman et al. 2007; Rutledge et al. 2010; Creel et al. 2015). For lions, an increase in male turnover increases the frequency of infanticide by males that inherit prides, reducing recruitment (Whitman et al. 2004; Whitman et al. 2007). To incorporate super-additive effects on recruitment in a simple manner that is amenable to comparison with empirical data, we assumed that effects on recruitment will be stronger when the minimum age of males that can be shot is lower, because increased social disruption should increase the frequency of turnover. We then defined the reduction in fecundity due to hunting within the age classes exposed to this effect. As described in detail in the online supplemental materials, we examined three cases: one with no effect on fecundity due to male losses, one with strong effects on fecundity (reduction of 32% - 55% with stronger effects when a wider age range is hunted) and one intermediate case. These cases span the plausible range for the strength of super-additive effects in lions (Fig. S4), and we show results for all three cases for each harvest regulation scenario that we modelled.

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Model Outputs

For each scenario, we ran 500 stochastic simulations over 25 years, from which we report mean population size, the proportion of populations that were extirpated, and the total number of lions taken by trophy hunters. These data allow comparison of risks for different scenarios, and allow comparison of risks to financial benefit from license sales in a manner that could readily be used to adjust license fees.

RESULTS AND DISCUSSION

Lions are often hunted in areas adjacent to a fully-protected source population (Loveridge et al. 2007; Rosenblatt et al. 2014), so a population model parameterized with data from such conditions if of general interest. From 2008 to 2012 in the Luangwa valley, 22 kill sites recorded by the Department of National Parks and Wildlife show that lions were killed a median of 997 meters (SE = 463 meters) from SLNP, well within the normal ranges of lions that occupy the primary photo-tourism area of SLNP along the Luangwa River (Fig. 1, lion locations from Rosenblatt et al. 2014). The observed distribution of distances between kill sites and the National Park boundary did not overlap with a distribution of random locations within the GMA ($P < 0.001$, bootstrap randomization test). In short, the Luangwa valley holds a single lion population with individuals regularly moving between SLNP (where they are fully protected and support photo-tourism) and the adjacent GMAs where they are exposed to hunting.

We did not model the sustainability of hunting regulations based on indirect measures such as the number of days required to kill a lion. Data from the Luangwa valley (2003 - 2012) show that these indirect measures provide a weak signal-to-noise ratio (Fig. 2). Neither the number of days hunted nor reported measures of trophy quality showed any tendency to decline over a

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period for which capture-recapture estimates of population size revealed a significant decline, which (together with changes in age-structure) was deemed serious enough to provoke a complete hunting closure in 2013 (Rosenblatt et al. 2014). More specifically, a GLM (family = poisson, link = log) relating the number of days required to kill a lion to time had a slope indistinguishable from zero ($b = 0.005 \pm 0.018$ SE, $z = 0.28$, $P = 0.78$).

The baseline model (a scenario with no hunting and other limiting effects at 2008-2012 levels), yielded a deterministic growth rate (λ) of 1.022, stable stochastic dynamics and no risk of extirpation over 25 years (Fig. S3). Because the initial conditions were for a population well below carrying capacity with $\lambda > 1$, populations in the baseline model increased over roughly 6-7 until reaching equilibrium. All scenarios with hunting produced some degree of population decline and local extirpation probabilities greater than zero, though some combinations of strategies yielded relatively stable dynamics and low probability of extirpation over 25 years.

Age-Restricted Harvesting

Our results (Fig. 3) strongly support the prior inference that restricting harvest to males above a certain age increases the sustainability of lion hunting (Whitman et al. 2004; Whitman et al. 2007a; Whitman and Packer 2007). However, our results do not support the suggestion that restriction of hunting to males of age six or older will reliably yield sustainable offtake in the absence of other restrictions, with the conditions typified by Luangwa valley lions. As Figure 3 shows, with age restriction and no other limits on offtake, the probability of extirpation was essentially certain if males as young as 4 years were allowed to be hunted (as has recently been the case in SLNP, where the median age of 12 known individuals shot by hunters between 2008 and 2012 was 4.86 years) (Rosenblatt et al. 2014). The probability of extirpation dropped

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monotonically as the minimum age was raised, but fell consistently below 50% only with a minimum age of 7, and remained at 5% - 11% with a minimum age of 8. The results suggest that: (*a*) age-restriction is an important element of sustainable hunting for lions, (*b*) a minimum age of 7-8 is necessary to yield a reasonably low risk of extirpation even in the near future, and (*c*) age-restrictions must be combined with other regulations to assure sustainability. Like the baseline model (Fig. S3), all of the scenarios with hunting simulated an initial population well below carrying capacity with $\lambda = 1.022$, which allowed population growth for the first few years of simulation (Fig. 3), but this transient period of growth would not be expected with less favorable starting conditions for the simulation.

Lions can be aged using characteristics such as nose pigmentation, mane development and tooth condition (Whitman et al. 2007), but even careful application of these methods will yield some errors in age estimates. Our results can be used to examine the consequences of errors in aging, by recognizing that true age is being modelled. For example, if errors in age estimation cause half of the lions shot to be 5, even though regulations stipulate a minimum age of 6, then results intermediate to those for ages 5 and 6 would describe the predicted effect on population dynamics. We note that errors in aging are likely to be reduced by application of a minimum age of 7 or 8, because age-specific variation is greater at younger ages, when traits are changing more rapidly (Whitman and Packer 2007).

Block Quotas and Recovery Periods

Given the relatively high risk of extirpation from age restricted harvesting, particularly with the commonly-used threshold of six years, we examined scenarios with two restrictions applied in conjunction with age limits: maximum block quotas and recovery periods. A block quota of 2

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examines a situation in which total harvest (maximum of 8 individuals killed/year) is slightly lower than reported harvests ($\bar{\bar{X}} = 8.8$ individuals killed/year) from 2008-2012 and a block quota of 1 examines the consequences of halving this rate. Recent observations suggest that South Luangwa lion dynamics have responded to a moratorium on hunting that began in 2013, so we also modelled recovery periods of 2 or 3 years out of each 6 year period. Results for these scenarios (Figs. 4 & 5) show that block quotas and recovery periods both considerably increased the sustainability of hunting, and that combining a block quota of one with a recovery period was the only scenario that consistently yielded a risk of extirpation below 20%. This scenario yields maximum annual mortality due to hunting of substantially less than 0.5 lions/1000 km^2 (see 'Number of Males Shot', below), which has been proposed as a reasonable threshold for sustainability (Packer et al. 2011). The value of 0.5 lions/1000 km^2 is a valuable general guideline, but it was based on estimates of population growth rates taken from coarse estimates of population size, which is notoriously difficult to estimate for lions without intensive monitoring (Creel et al. 2013; Rosenblatt et al. 2014; Riggio et al. 2016).

As expected, scenarios that included recovery periods and block quotas were less sensitive to effects of minimum hunted age than more liberal scenarios (Figs. 4 & 5). This result provides potentially useful guidance by identifying regulations that are expected to be sustainable in the face of uncertainty in the aging of lions or difficulty in enforcing age restrictions. Strategies that incorporate recovery periods and block quotas can promote sustainability despite problems with accurate aging or enforcement of age restriction. This combination of strategies is also inherently safer than harvesting solely on the basis of age with a 'points system' that reduces quotas if under-aged lions are shot, because such systems adjust quotas after the effects of killing under-aged males have already occurred.

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Finally, because very few males reach old age classes under most harvest scenarios (as in empirical data for SLNP), differences in outcomes for age thresholds of 7 and 8 years were somewhat unpredictable unless aggregated across a very large number of model iterations. This result is logically realistic: a change in policy that affects a small number of individuals in a stochastic process will have rather stochastic outcomes.

Number of Males Shot

Figure 6 shows the number of males legally shot in each year for each of the harvest scenarios described above. These data reinforce the conclusion that a combination of strategies is needed to promote sustainability, because a clear decline over time in the number of harvestable males is apparent for most scenarios. This decrease in the availability of prime-aged males is minimized by the combination of a block quota of one, a 3 on/3 off cycle of hunting and recovery, and a minimum hunted age of 7 or 8 years. While this scenario yields the lowest risk of extirpation, even this combination is predicted to produce a decline in harvestable males with the baseline conditions of this model, even with no super-additive effects on reproduction. Moreover, the survival rates in our base simulations include effects from poaching and human encroachment at their current levels, and then assume that these problems will not worsen, which is not necessarily correct (Becker et al. 2013; Watson et al. 2013; Rosenblatt et al. 2014; Watson et al. 2015). If other negative effects on lions are not controlled, it is unlikely that trophy hunting at any level will be sustainable.

Implications for Sustainable License Fees

Figure 7 shows the mean number of males killed by trophy hunters over 25 years for each of the policy scenarios discussed above. The number of harvested males ranged from a maximum of

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37 to a minimum of 7. As Figure 7 shows, many scenarios yield similar total offtake over a span of 25 years, parallel to results above showing that many scenarios yield similar risks of extirpation. This result is important because it implies that, among alternatives with similar expected outcomes, the one that is most easily and effectively enforced should be favored. Figure 7 can also be used to assess what changes might reasonably be made to lion hunting fees to promote sustainability, while maintaining current revenue for conservation. Forty-four males, or a mean of 8.8 males/year, were taken from this population by trophy hunters between 2008 and 2012, which yielded population decline, poor recruitment, a population with few old males, and a decrease in the age of harvested males (Rosenblatt et al. 2014). Figure 7 suggests that scenarios yielding sustainable offtake would require offtake to decline by roughly an order of magnitude. Thus, a clear policy recommendation is that the fee for lion hunting should be increased comparably, if it is expected to yield ecologically and economically sustainable trophy hunting. Such changes might usefully be paired with longer leases on hunting concessions (so that hunting operators could plan for required periods of recovery) and staged fees so that the full amount is only charged if a lion is shot.

The economics of supply and demand imply that any scarce and declining resource will become more expensive. If treated simply as a commodity (an approach that is questionable on many fronts), lions have declined dramatically over recent decades (Bauer & Van Der Merwe 2004; Packer et al. 2011; Riggio et al. 2013). Declines have been larger in the areas with heavier hunting, and hunting was the strongest predictor of population declines for lions in Tanzanian protected areas (Packer et al. 2011). Our results strongly suggest that lion hunting fees have been too low to promote truly sustainable hunting. Throughout their range, the conservation of free-ranging lion populations has been demonstrably constrained by budgets that do not provide

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sufficient protection (Packer et al. 2011; Creel et al. 2013). Thus, any policy change that reduced funding for necessary conservation actions such as patrolling and snare removal would be expected to have negative effects on lion populations, by exacerbating widespread and accelerating problems such as wildlife depletion due to snaring and encroachment by local people (Watson et al. 2013; Watson et al. 2015). At the same time, substantial recent data demonstrate that trophy hunting at unsustainable levels has contributed to lion population declines (Loveridge et al. 2007; Packer et al. 2009, 2011; Rosenblatt et al. 2014). Collectively, these results suggest the following:

1. For trophy hunting to be sustainable under the conditions that most lions now experience, modifications to policy must reduce total mortality.

2. Age-restricted harvesting is effective to increase the sustainability of trophy hunting, but is probably not sufficient to yield sustainability by itself. The widely-suggested minimum huntable age of 6 years (Whitman et al. 2004; Whitman et al. 2007) was based on data from a growing lion population in Serengeti, with more favorable conditions for lions than now exist for most populations that support trophy hunting. Our results suggest that a minimum age of 7 - 8 is substantially more effective for the conditions typified by Luangwa lions, and should be combined with other policies to limit total mortality.

3. The acceptable risk of local extirpation will have to be confronted. Our results show that a risk of extirpation that might be considered acceptable (e.g. <10%) is likely to be accomplished only with a combination of methods. This inference is generalizable to other exploited species.

4. Policies that combine age-restriction, conservative block quotas and recovery periods are more likely to promote sustainable harvest, particularly with uncertainty about field estimates of age or

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difficulties with enforcement of regulations. A general lesson from this result is that policies that incorporate a combination of strategies to limit negative effects of hunting on population dynamics provide a margin of safety.

5. As lion populations (and particularly prime aged males) decrease, the price of licenses must increase to halt declines linked to overharvesting, to accurately reflect a decrease of supply (in the economic sense), and to ensure that hunting contributes to effective conservation of areas in which hunting is allowed. The values of lions that are not directly linked to short-term economics (e.g. ecological and cultural importance as well as value to non-consumptive tourism) should not be ignored and where lion are hunted in protected area complexes, efforts should focus on restoring and increasing lion populations and habitat for GMAs now classified as secondary or understocked, rather than finding means to increase offtake on prime hunting blocks. More broadly, low hunting license fees for carnivores promote aggressive offtake of these rare and ecologically important species (Creel et al. 2015: *e.g.*, a wolf license for out-of-state hunters in Idaho costs only $32, with individuals allowed to take up to five, while licenses for deer and elk, which outnumber wolves by several orders of magnitude, cost $302 and $417).

6. The data used to parameterize our model includes impacts on survival from poaching and human encroachment at their current levels, thus assuming these activities will not worsen, which is unlikely given burgeoning human pressures across Africa's remaining lion populations. If the current acceleration of other negative effects on lions is not addressed and controlled, then it is unlikely that trophy hunting at any level will be sustainable. These conclusions are likely to generalize to other African large carnivores, particularly the leopard.

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SUPPORTING INFORMATION

Supplemental online material includes a detailed description of the lion population model's structure, parameterization and validation.

DATA AVAILABILITY

Data associated with this paper have been deposited in Dryad: http://dx.doi.org/10.5061/dryad.mc2p8.

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FIGURE LEGENDS

Figure 1. Ranging patterns of lions in the Luangwa Valley from 2008 to 2012 and the reported locations of 21 lions shot by trophy hunters in the same years. One recorded kill site (not shown) in the western portion South Luangwa National Park was probably recorded incorrectly. No location was reported for 22 of 44 lions shot in this period. Lion kill sites are from Department of National Parks and Wildlife records, and lion ranging patterns are shown by radio-locations of resident females (Rosenblatt et al. 2014).

Figure 2. Indirect measures of population status showed high variability and no tendency to decline over a period of 10 years for which direct data revealed population decline, depletion of males in prime age-classes, poor recruitment and a decrease in the median age of harvested males to less than 5 years (Rosenblatt et al. 2014). Data are from Department of National Parks

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and Wildlife records; recorded measurements that are not plausible were not deleted, because our intention was to evaluate the signal-to-noise ratio of such data. Error bands show 95% confidence intervals.

Figure 3. With harvesting in every year, (***top***) population size is expected to decline appreciably, so that (***bottom***) the probability of local extinction within 25 years is also appreciable. For each minimum permitted age, the three curves show models with no effect on cub recruitment, moderate effects, and strong effects.

Figure 4. Mean population size for population projections over 25 years with variation in the minimum male age permitted for hunting. For each minimum age, population means are shown for three scenarios: no effect of male loss on reproduction, moderate effects and strong effects. (***Left***) Maximum block quota of one male shot per year. (***Right***) Maximum block quota of 2 males shot per year. (***Top***) Hunting cycle of 4 years on and 2 years off. (***Bottom***) Hunting cycle of 3 years on and 3 years off.

Figure 5. The proportion of simulated populations that went to local extinction over 25 years with variation in the minimum male age permitted for hunting. For each minimum age, extinction probabilities are shown three scenarios: no effect of male loss on reproduction, moderate effects and strong effects. (***Left***) Maximum block quota of one male shot per year. (***Right***) Maximum block quota of 2 males shot per year. (***Top***) Hunting cycle of 4 years on and 2 years off. (***Bottom***) Hunting cycle of 3 years on and 3 years off.

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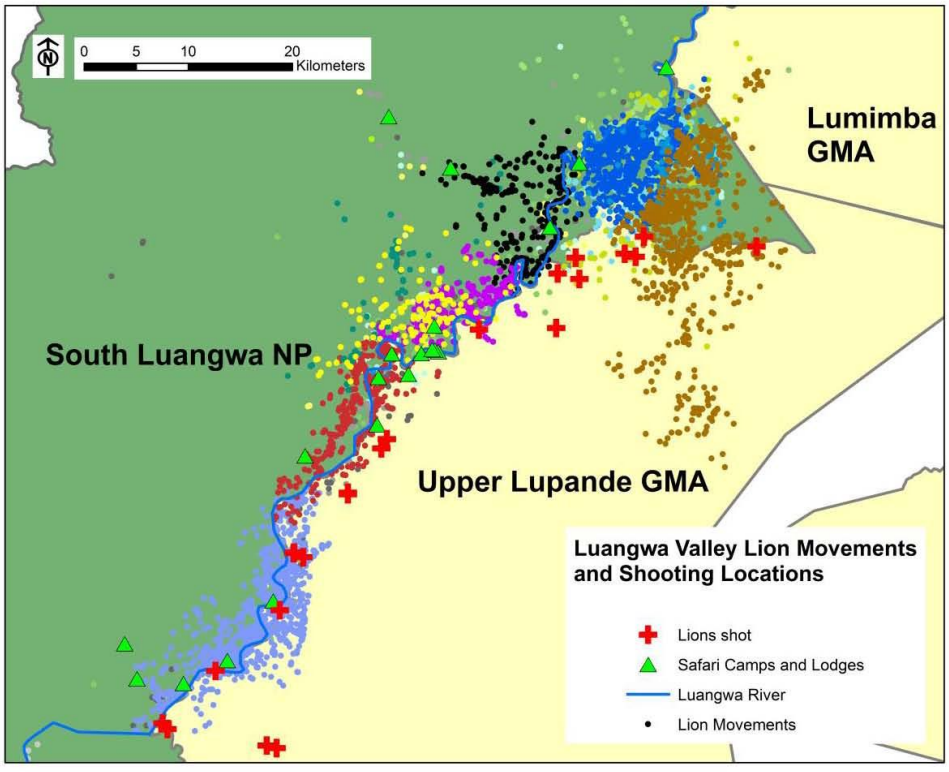
Figure 6. Differences between hunting scenarios in the number of males legally harvested in each year. As population size and age structure changed through time, harvest rates declined for all scenarios, with the smallest decline for a maximum block quota of one, minimum permitted age of 7 or 8, and recovery periods of 3 years between 3 year periods of hunting.

Figure 7. The total number of adult males shot over 25 years, for scenarios varying the minimum age permitted, the duration of cycles between hunting and population recovery, and block quotas of one or two.



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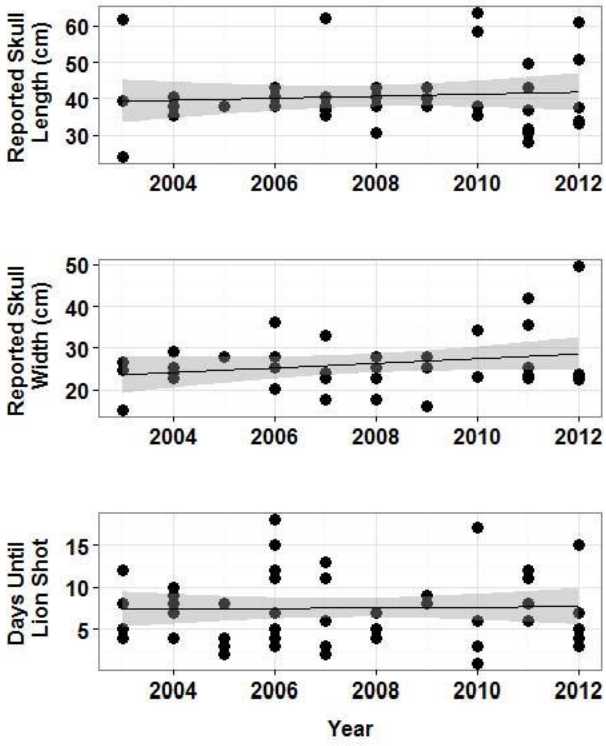

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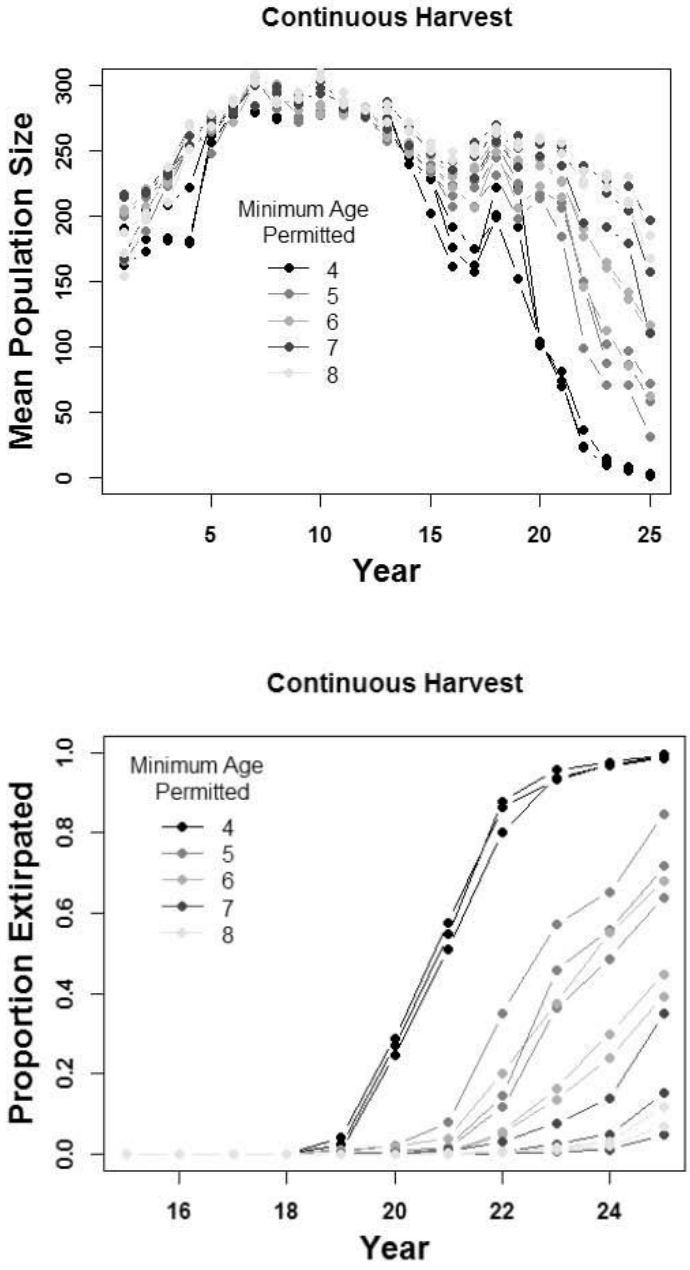

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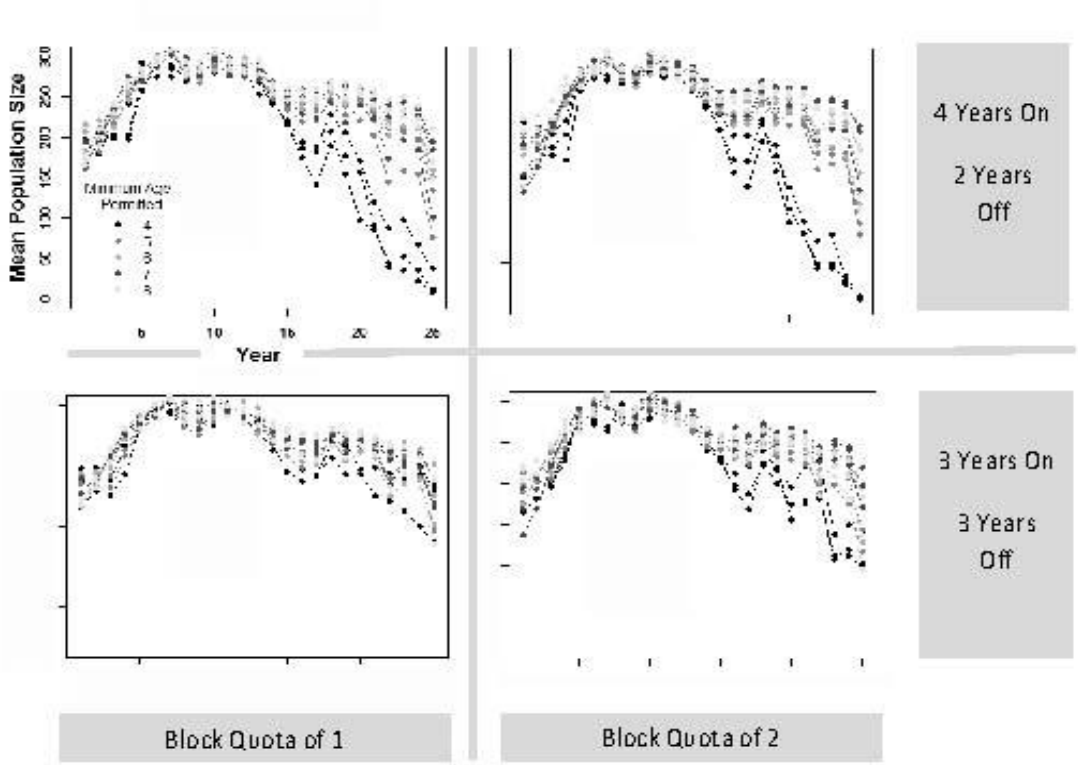

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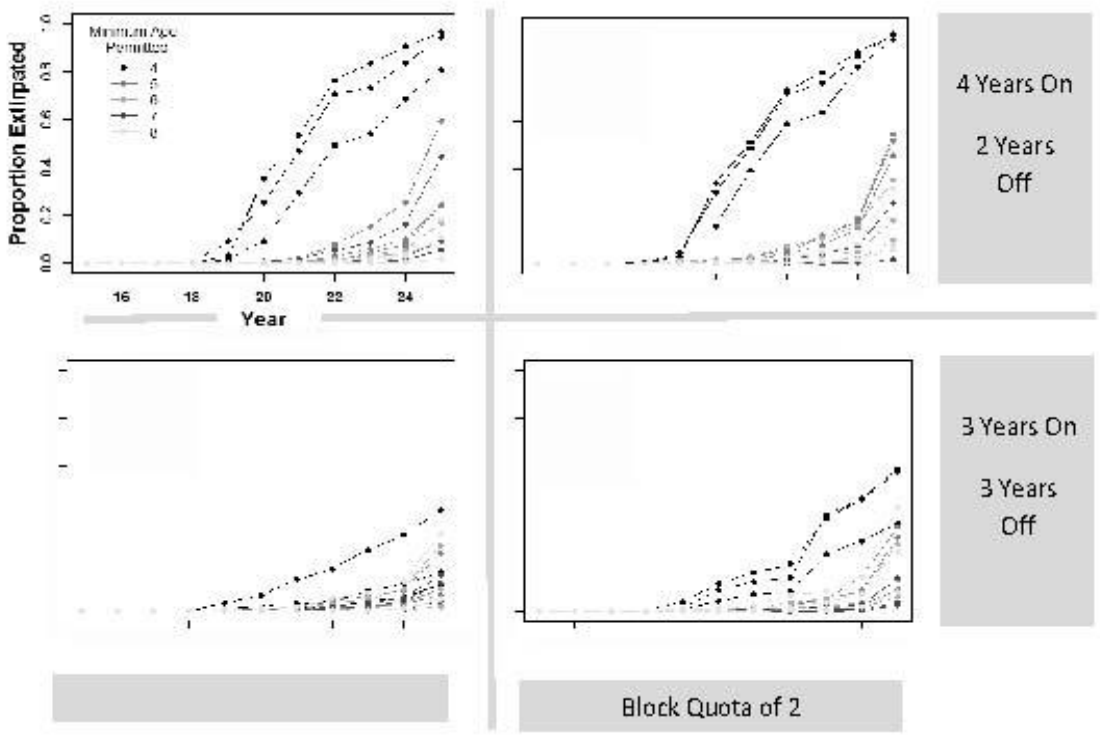

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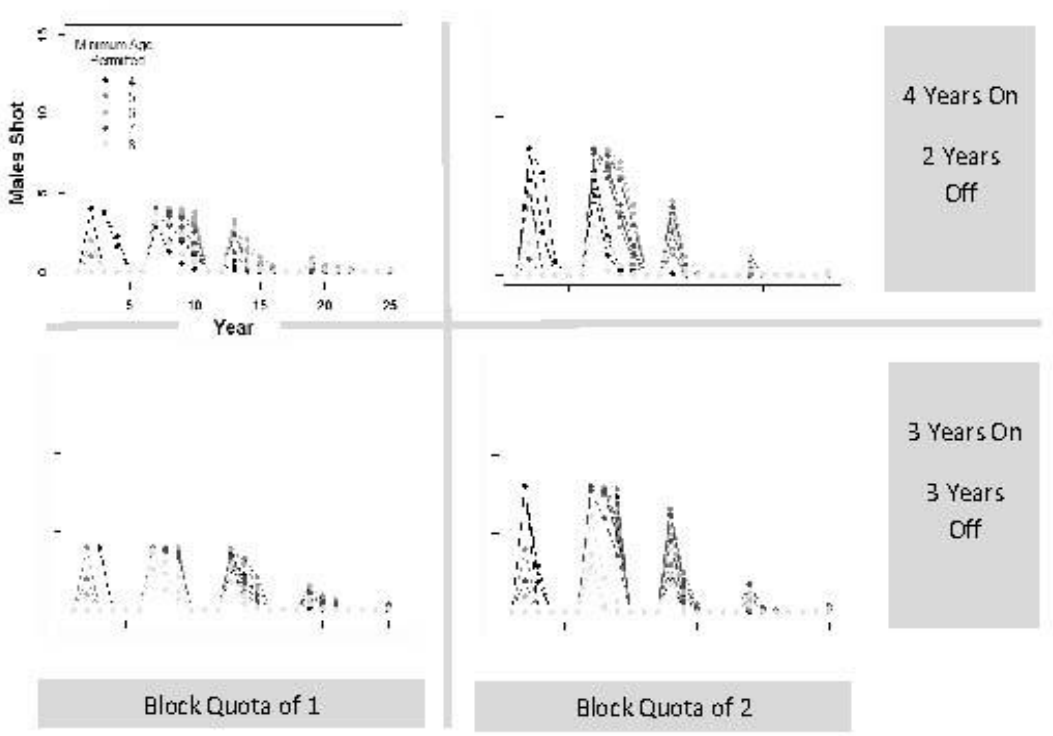

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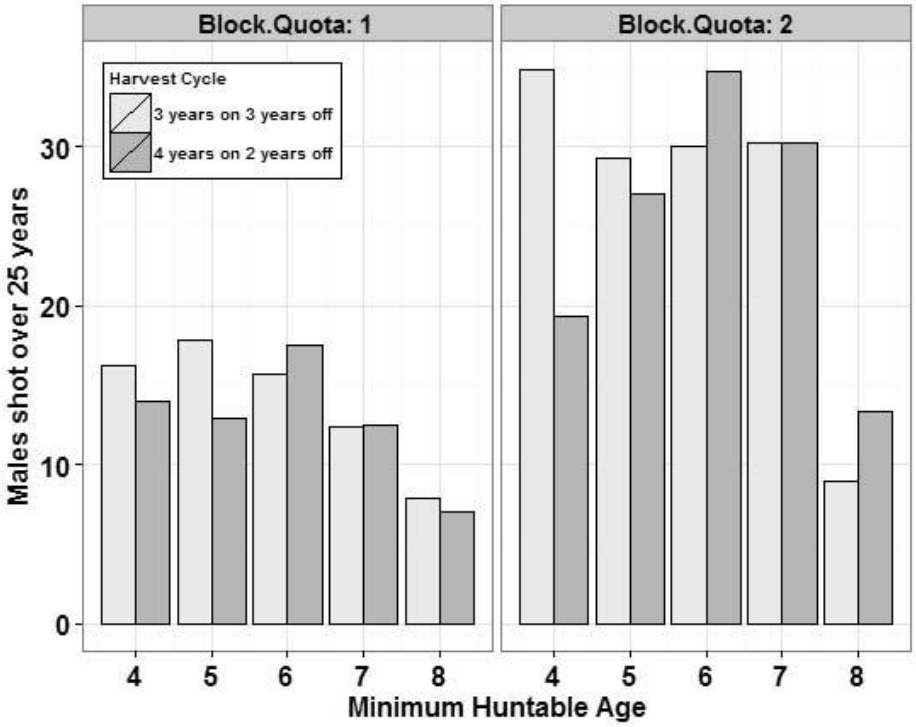

Figure 7.

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Fwd: PDFs of your two new lion papers please!

2 messages

Gadd, Michelle <michelle_gadd@fws.gov> Wed, Aug 10, 2016 at 2:05 PM
To: Darcy Vargas <darcy_vargas@fws.gov>, Anna Barry <anna_barry@fws.gov>, Mike Moore <mike_moore@fws.gov>, Tim Vannorman <tim_vannorman@fws.gov>, Sandra Farkas <sandra_farkas@fws.gov>, Kathleen Moore <kathleen_moore@fws.gov>, Emma Nelson <emma_nelson@fws.gov>

Please find attached some great new papers co-authored by our colleague Matt Becker from Montana, working in Zambia. Please let me know if you would like an email introduction to Matt directly - he runs the Zambia Carnivore Project which has done impressive research on large felids, canids and hyaenids in various land uses in Zambia and he also has mentored a number of Zambian carnivore biologists who are now going for their doctorates and veterinary degrees. This project also shares an airplane with an AFE-sponsored elephant project in South Luangwa. thanks, mg

---------- Forwarded message ----------
From: **Matthew S. Becker** <matt@zambiacarnivores.org>
Date: Tue, Jul 26, 2016 at 11:07 AM
Subject: RE: PDFs of your two new lion papers please!
To: Michelle Gadd <michelle_gadd@fws.gov>

Hi Michelle, Please find attached! All the best, M

Creel et al 2016
Miller et al 2016

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Michelle Gadd, Ph.D.
Program Officer, African Elephant and African Rhino Programs
Division of International Conservation
U.S. Fish and Wildlife Service
5275 Leesburg Pike, MS: IA
Falls Church, VA 22041-3803
michelle_gadd@fws.gov

2 attachments

Creel_et_al-2016-Ecological_Applications.pdf
710K

Miller et al 2016 - Biol Cons - Aging traits and sustainable trophy hunting of African lions.pdf
1067K

Barry, Anna <anna_barry@fws.gov> Thu, Aug 11, 2016 at 10:10 AM
To: "Gadd, Michelle" <michelle_gadd@fws.gov>

Thanks Michelle!

Anna

[Quoted text hidden]

Lion (*Panthera leo*) populations are declining rapidly across Africa, except in intensively managed areas

Hans Bauer[a,1], Guillaume Chapron[b], Kristin Nowell[c], Philipp Henschel[d], Paul Funston[d], Luke T. B. Hunter[d], David W. Macdonald[a], and Craig Packer[a,e]

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Edited by Chris Carbone, Zoological Society of London, London, United Kingdom, and accepted by the Editorial Board September 27, 2015 (received for review January 12, 2015)

We compiled all credible repeated lion surveys and present time series data for 47 lion (*Panthera leo*) populations. We used a Bayesian state space model to estimate growth rate-λ for each population and summed these into three regional sets to provide conservation-relevant estimates of trends since 1990. We found a striking geographical pattern: African lion populations are declining everywhere, except in four southern countries (Botswana, Namibia, South Africa, and Zimbabwe). Population models indicate a 67% chance that lions in West and Central Africa decline by one-half, while estimating a 37% chance that lions in East Africa also decline by one-half over two decades. We recommend separate regional assessments of the lion in the World Conservation Union (IUCN) Red List of Threatened Species: already recognized as critically endangered in West Africa, our analysis supports listing as regionally endangered in Central and East Africa and least concern in southern Africa. Almost all lion populations that historically exceeded ∼500 individuals are declining, but lion conservation is successful in southern Africa, in part because of the proliferation of reintroduced lions in small, fenced, intensively managed, and funded reserves. If management budgets for wild lands cannot keep pace with mounting levels of threat, the species may rely increasingly on these southern African areas and may no longer be a flagship species of the once vast natural ecosystems across the rest of the continent.

lion | *Panthera leo* | Africa | population decline

Large carnivores are generally declining worldwide (1), but trends vary according to geography (2) and the severity of threats posed to humans (3). The African lion (*Panthera leo*) exemplifies the challenges of carnivore conservation: widespread habitat loss (4), extensive prey base depletion (5 7), indiscrimi nate retaliatory or preemptive killing to protect humans and their livestock (8 10), poorly regulated sport hunting (11 18), and demand for traditional African and Chinese medicines (19). Although lions are relatively well studied compared with most large felids, regional scale population estimates remain scant across much of its range (20), and population surveys are gen erally repeated at irregular intervals because of the inherent difficulty of counting lions (21, 22) and shortage of funds for systematic surveys. No reliable data are available for Angola, Central African Republic, Somalia, South Sudan, and Ethiopia. Furthermore, systematic surveys are absent from large areas of potential lion habitat in countries with a rich tradition of wildlife research, such as Zambia and Tanzania.

With widespread declines in many reserves (23) and rapid deterioration of the lion's status in a substantial portion of the species' range (24), there is growing concern that lion numbers may be declining rapidly, leading to the lion's consideration for listing as threatened or endangered on the US Endangered Species Act. The lion is currently listed as vulnerable on the World Conservation Union (IUCN) Red List and would be considered endangered if numbers were to decline by at least 50% over three lion generations (LGs) (25). Here, we use a comprehensive dataset of repeated counts to assess lion status, calculate growth rate per population, and estimate broader trends per geographic region. We show that lion populations are rapidly disappearing from large parts of Africa, signaling a major trophic downgrading of savannah ecosystems.

Results

We present time series data for 47 of 67 areas (4) where lions are still known to occur (Fig. 1), with the most recent estimates to taling 8,221 lions (Dataset S1); note that this subsample only excludes areas where the available data are speculative. Almost all lion populations that historically exceeded ∼500 individuals are declining (Figs. 2 4). All West Central African populations other than Pendjari ($\lambda = 1.07 \pm 0.13$) are declining (Fig. 2), with lions in Comoé and Mole now likely extinct. A similar pattern is found in East Africa (Fig. 3), with Serengeti ($\lambda = 1.02 \pm 0.02$) being the only large population surveyed that is not decreasing, whereas data from Katavi indicate a dramatic decline ($\lambda = 0.67 \pm 0.11$). Southern African populations do not indicate such a drastic and widespread decline (Fig. 4), but one of the largest (Okavango; $\lambda = 0.97 \pm 0.1$) is, nevertheless, declining. Fenced populations reveal a completely different pattern: none have experienced a sharp decline, and many small fenced populations are increasing (Figs. 3 and 4). Data and model inferences for 47 populations included in our study are given in Figs. S1 S4. When summing posterior densities of growth rates into regional groups, we found that West Central African populations were sharply declining ($\lambda = 0.90 \pm 0.22$) and that East African populations were also declining, albeit less sharply ($\lambda = 0.99 \pm 0.14$). In contrast, southern African

Significance

At a regional scale, lion populations in West, Central, and East Africa are likely to suffer a projected 50% decline over the next two decades, whereas lion populations are only increasing in southern Africa. Many lion populations are either now gone or expected to disappear within the next few decades to the extent that the intensively managed populations in southern Africa may soon supersede the iconic savannah landscapes in East Africa as the most successful sites for lion conservation. The rapid disappearance of lions suggests a major trophic downgrading of African ecosystems with the lion no longer playing a pivotal role as apex predator.

Author contributions: H.B., G.C., K.N., P.H., P.F., and C.P. designed research; H.B., G.C., K.N., P.H., P.F., L.T.B.H., D.W.M., and C.P. performed research; G.C. and C.P. contributed new reagents/analytic tools; H.B., G.C., K.N., P.H., P.F., and C.P. analyzed data; and H.B., G.C., K.N., P.H., P.F., L.T.B.H., D.W.M., and C.P. wrote the paper.

The authors declare no conflict of interest.

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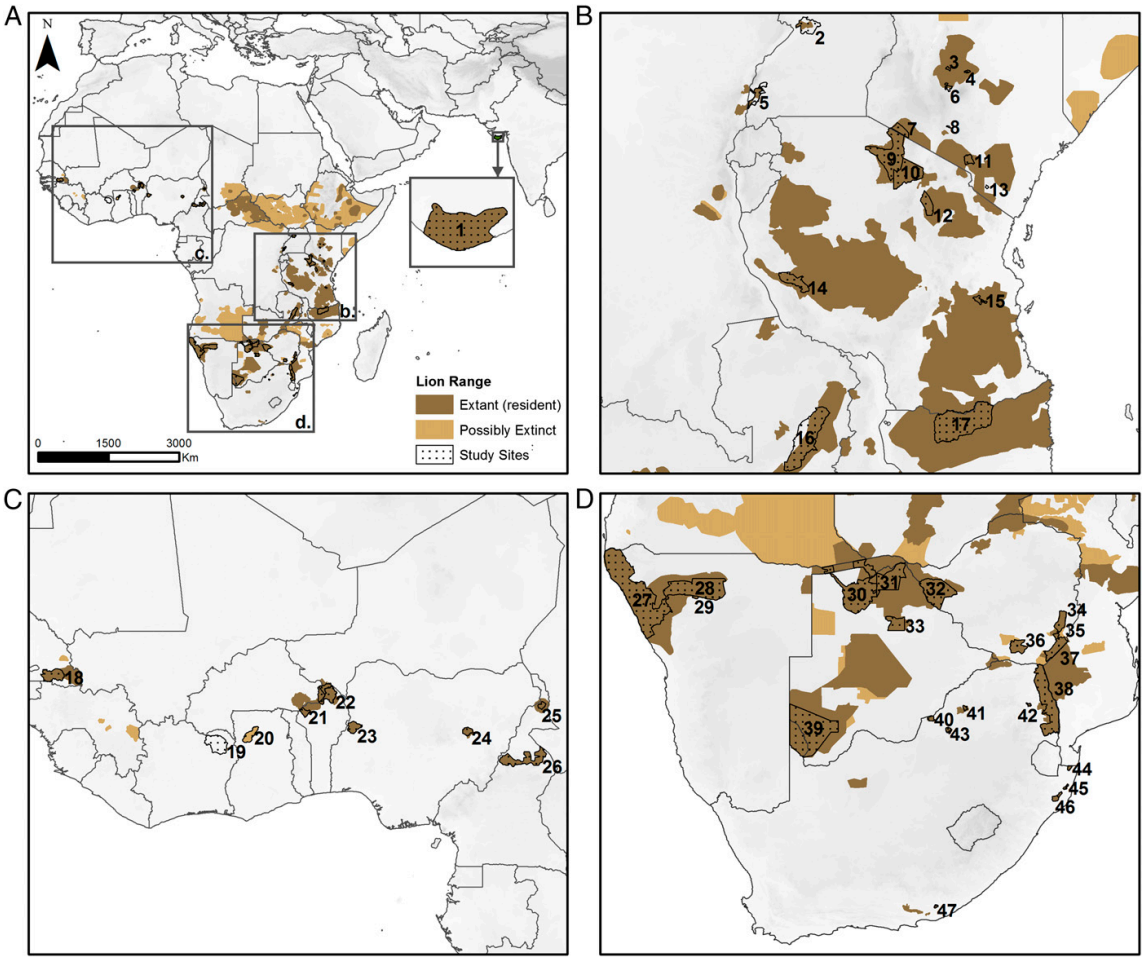

Fig. 1. Distribution map of monitored lion populations; zooming levels: (*A*) species wide, (*B*) East Africa, (*C*) West Central Africa, (*D*) southern Africa. 1, Gir; 2, Murchison Falls; 3, Laikipia; 4, Samburu; 5, Queen Elizabeth National Park; 6, Ol Pejeta Conservancy; 7, Masai Mara; 8, Nairobi; 9, Serengeti; 10, Ngorongoro; 11, Mbirikani; 12, Tarangire; 13, Taita Hills; 14, Katavi; 15, Matambwe; 16, Luangwa; 17, Niassa; 18, Niokolo Koba; 19, Comoe National Park; 20, Mole; 21, Pendjari; 22, W; 23, Kainji Lake; 24, Yankari; 25, Waza; 26, Benoue; 27, Kunene; 28, Etosha; 29, Ongava; 30, Okavango Delta; 31, Chobe Kwando; 32, Hwange; 33, Makgadikgadi Pans; 34, Save Conservancy; 35, Malilangwe Conservancy; 36, Bubye Conservancy; 37, Gonarezhou; 38, Kruger National Park; 39, Kgalagadi; 40, Madikwe Nature Reserve; 41, Welgevonden; 42, Makalali; 43, Pilanesberg National Park; 44, Tembe Elephant Park; 45, Phinda; 46, Hluhluwe iMfolozi; and 47, Kwandwe.

populations were increasing ($\lambda = 1.09 \pm 0.15$), as the majority were in fenced reserves showing strongest increases ($\lambda = 1.10 \pm 0.14$). Nationally, South Africa was the only African country with growth in every population, all of which were fenced; most were rees tablished over the past two decades and quickly reached saturation. The Asian population, representing a single contiguous population surviving in the Indian state of Gujarat, has stabilized inside the Gir Reserve (Fig. 2) and expanded in the surrounding countryside (26). Niassa Reserve in Mozambique also increased but is considered as a separate case (Fig. 2) (see below).

When population trends were assumed to remain unchanged in the future and, ignoring process error, were projected over a multiyear timescale (Table 1), we found that four of seven sur viving West Central African populations were extremely likely to decline by more than one half in two decades ($p^{20}_{0.5} > 0.7$) (Table 1). In East Africa, 6 of 14 surviving populations were very likely to decline by more than one third in two decades ($p^{20}_{0.33} > 0.5$) (Table 1). In southern Africa, the second largest population (Okavango) was also likely to decline by one third in two decades ($p^{20}_{0.33} > 0.5$) (Table 1). When considering projected growth rates summed by regional groups, we found that the West Central African group was likely to drop by one third in 5 y ($p^{5}_{0.33} = 0.56$) and very likely to drop by one half in 20 y ($p^{20}_{0.5} = 0.67$), whereas East African populations also had a bleak future, with $p^{20}_{0.33} = 0.45$ and $p^{30}_{0.5} = 0.43$, respectively. When applying IUCN thresholds, the West Central African group had a probability of projected decline of more than one half in three LGs of $p^{3LG}_{0.5} = 0.67$, and the East African group had a probability of declining by more than one half in three LGs of $p^{3LG}_{0.5} = 0.37$.

Discussion

These growth rate estimates represent the best available knowledge of the global trends of lion populations. However, we acknowl edge that they are intrinsically imprecise. In some sites, census

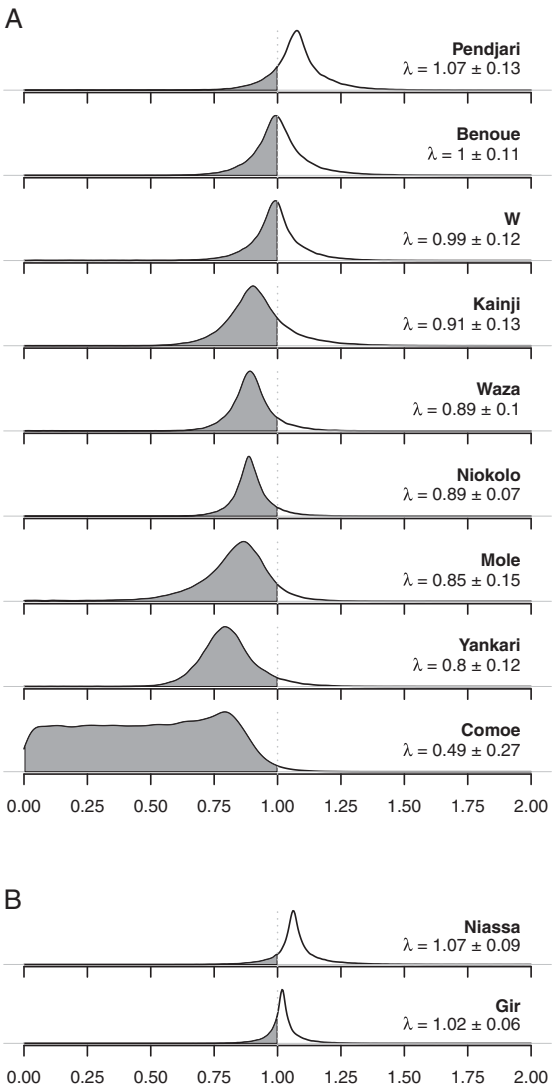

Fig. 2. Posterior densities of growth rates for (*A*) West Central Africa lion populations and (*B*) special cases. The gray areas under the curves indicate the probabilities of decline. Values shown are medians ± SDs of growth rate estimates.

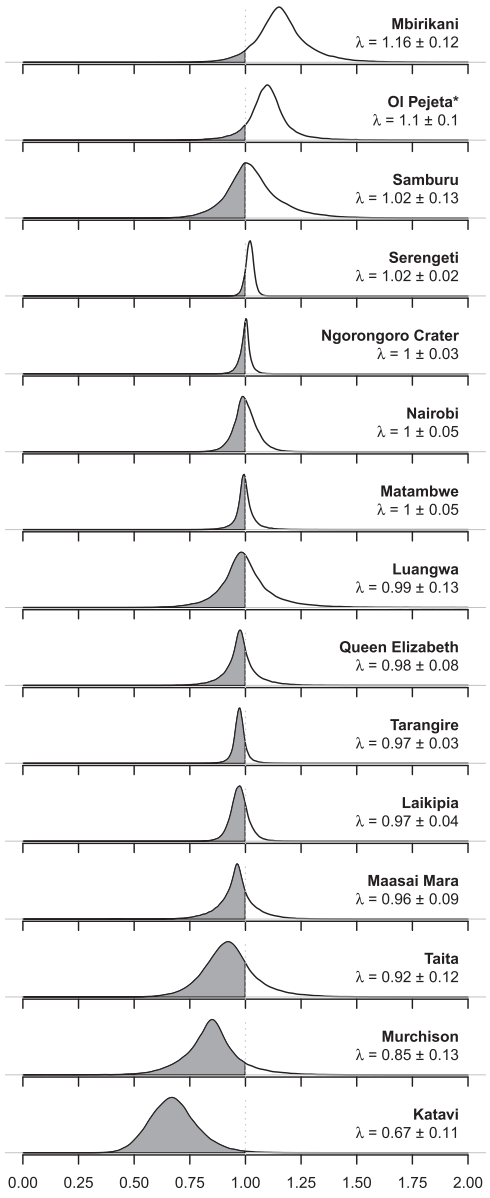

Fig. 3. Posterior densities of growth rates for East Africa lion populations. The gray areas under the curves indicate the probabilities of decline. Values shown are medians ± SDs of growth rate estimates. *Fenced populations.

methodology varied between years, although we limited our sample to counts that were consistently based on the most reliable survey techniques, and thus, the regional scale declines are unlikely to be an artifact of methodological shortcomings. If there is an overall bias in our results, it is probably toward optimism: our sample populations were all monitored in areas with at least partial protection, and research sites are known to be generally avoided by poachers and encroachers (27). Concomitantly, a clear pattern emerged that the most severely declining populations were the least well monitored (Fig. S5). In fact, it seems likely that unmonitored unfenced populations across much of Africa will have suffered even greater rates of decline than reported here, because lack of monitoring generally reflects a lack of conservation effort. The deteriorating conservation status of lions across much of the continent is further emphasized by the apparent extirpation of lions in 12 African countries, with possible recent extirpation in another 4 countries (25).

Niassa (Mozambique) was treated as an outlier because of the exceptional postwar situation, with the return of rule of law coinciding with increased scavenging opportunities resulting from high

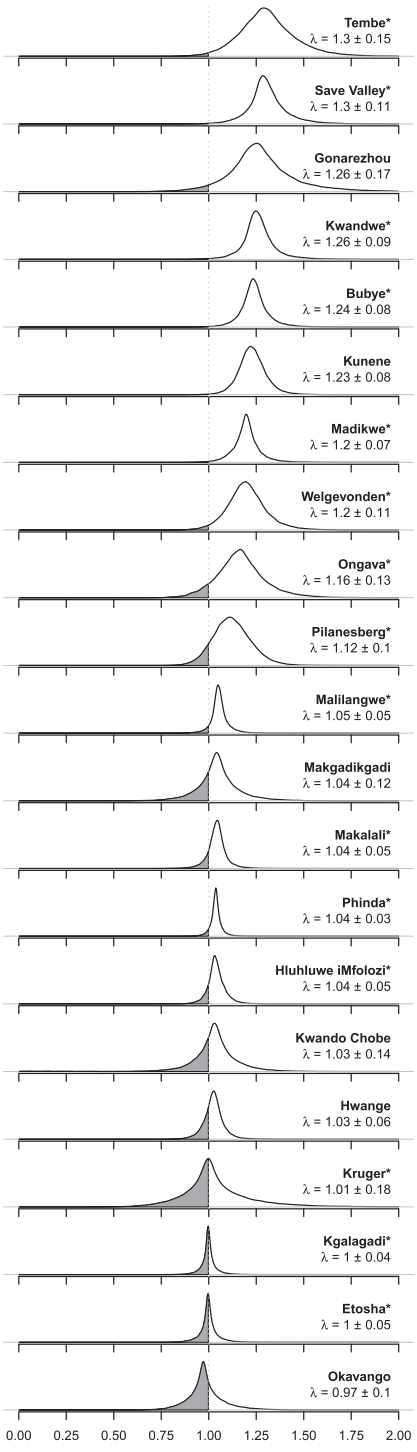

Fig. 4. Posterior densities of growth rates for southern Africa lion populations. The gray areas under the curves indicate the probabilities of decline. Values shown are medians ± SDs of growth rate estimates. *Fenced populations.

levels of elephant poaching. Human population density is relatively high in Mozambique, and therefore, unless management is further strengthened, this lion population may also experience declining prey abundance in the near future, which is common in most of Africa.

The striking contrast between countries in southern Africa and the rest of the continent is congruent with differences in human population density, which has been shown to be an important explanatory variable for population status (23). Another important determinant is prey abundance (28, 29), which is increasingly under threat from an unsustainable and increasingly commercialized bushmeat trade (6). Lion trends are consistent with time series data on their main prey species: whereas herbivore population sizes increased by 24% in southern Africa, herbivore numbers declined by 52% in East Africa and 85% in West Central Africa between 1970 and 2005 (5). Another important determinant is management budgets and capacity to protect parks, all of which are higher in the well maintained populations in southern Africa (23). Packer et al. (23) showed that management budget and the presence of wildlife proof fencing were the two most important determinants of short term lion population trends across Africa. Although the results presented in Figs. 3 and 4 are consistent with the benefits of fencing, we cannot present a formal analysis because of the negative relationship between data availability and rates of population decline (Fig. S5) and the lack of data on management budget for many of 47 sites in this analysis.

Nevertheless, our results clearly confirm widespread declines in West Central Africa and support the regionally critically endangered listing for West Africa (24). Moreover, they suggest that the lion is regionally endangered in East Africa, where lions have traditionally been abundant across large ecologically intact mosaics of landscapes (4). The rapid disappearance of lions from recently identified strongholds (4) also signals a major trophic downgrading of African ecosystems, with the lion no longer playing its ecological role as apex predator (30). The decline of lions was first apparent in West Central Africa (24) and is now apparent in East Africa. This decline is consistent with a broader pattern of defaunation (31), with multiple megafauna species experiencing massive declines (32).

Our results indicate that greatly increased intervention efforts are required to maintain viable and ecologically effective populations in most large "lion conservation units" (33, 34). Effective lion conservation requires management capacity and sizeable budgets (23), but most African reserves operate on low levels of funding and management capacity (23). Declining populations require immediate increases in financial support and improved governance and management capacity to reverse current trends, and cost effective monitoring will be essential in all of the important remaining lion populations. Accurate estimates of short to medium term changes require frequent counts, because time series data consisting of only two to three surveys can inevitably only provide very weak information on long term trends (Figs. S1 S4). These results emphasize the importance of consistent, rigorous large scale surveys conducted by independent agencies, particularly in countries like Tanzania, which has previously been assumed to hold a significant proportion of Africa's remaining lion populations.

Fenced reserves in Kenya and southern Africa are very effective, but these reserves include many small populations that require metapopulation management, euthanasia, and contraception and only make limited contributions to ecosystem functionality and conservation outcomes (23, 35, 36). Effective management of lions in large landscapes is also possible (9, 37) but has rarely been implemented at sufficiently large scale, except in southern Africa (21). Unless political and funding commitments are scaled up to address mounting levels of threat (23), lions may disappear from most of Africa.

Table 1. Cumulative probabilities of projected lion population decline by one-third (33%) and one-half (50%) in periods of 5, 10, 20, and 30 y and three LGs defined according to the IUCN

Population	Size	$p^{5}_{0\,33}$	$p^{5}_{0\,5}$	$p^{10}_{0\,33}$	$p^{10}_{0\,5}$	$p^{20}_{0\,33}$	$p^{20}_{0\,5}$	$p^{30}_{0\,33}$	$p^{30}_{0\,5}$	$p^{3LG}_{0\,33}$	$p^{3LG}_{0\,5}$
Western-Central											
Yankari	11	0.87	0.76	0.91	0.88	0.93	0.92	0.94	0.93	0.93	0.92
Niokolo	16	0.72	0.33	0.85	0.76	0.89	0.86	0.9	0.89	0.89	0.87
Waza	17	0.68	0.35	0.82	0.72	0.87	0.84	0.88	0.86	0.87	0.84
Kainji	32	0.56	0.33	0.69	0.6	0.75	0.71	0.76	0.74	0.75	0.71
W	64	0.2	0.1	0.34	0.23	0.44	0.36	0.48	0.42	0.45	0.37
Benoue	200	0.17	0.08	0.3	0.2	0.39	0.32	0.42	0.37	0.39	0.33
Eastern											
Taita	15	0.5	0.3	0.65	0.54	0.72	0.67	0.74	0.71	0.72	0.68
Samburu	26	0.15	0.07	0.25	0.17	0.32	0.27	0.35	0.31	0.33	0.28
Nairobi	30	0.06	0.01	0.19	0.08	0.34	0.23	0.4	0.31	0.35	0.24
Laikipia	60	0.1	0.01	0.37	0.15	0.59	0.43	0.66	0.56	0.6	0.45
Luangwa	94	0.21	0.1	0.36	0.24	0.45	0.38	0.49	0.44	0.46	0.39
Matambwe	112	0.03	0.01	0.12	0.05	0.26	0.14	0.36	0.23	0.28	0.15
Murchison	132	0.78	0.6	0.86	0.81	0.88	0.86	0.89	0.88	0.88	0.87
Queen Elizabeth	144	0.16	0.06	0.36	0.2	0.54	0.4	0.6	0.51	0.55	0.41
Tarangire	157	0.04	0.01	0.28	0.06	0.63	0.36	0.73	0.58	0.65	0.39
Maasai Mara	286	0.26	0.1	0.5	0.31	0.65	0.54	0.69	0.63	0.66	0.56
Southern											
Kgalagadi*	115	0.03	0.01	0.11	0.04	0.21	0.13	0.28	0.19	0.22	0.13
Kwando Chobe	285	0.11	0.06	0.19	0.13	0.25	0.2	0.27	0.23	0.25	0.21
Makgadikgadi	327	0.1	0.05	0.16	0.12	0.21	0.17	0.23	0.2	0.21	0.18
Etosha*	457	0.05	0.01	0.14	0.07	0.26	0.16	0.33	0.23	0.26	0.17
Okavango	1107	0.2	0.09	0.38	0.24	0.55	0.42	0.59	0.52	0.55	0.44
Kruger*	1672	0.2	0.12	0.3	0.22	0.37	0.31	0.39	0.35	0.37	0.32

Population sizes show most recent estimates of lion numbers. Extinct populations or populations unlikely to decline are not shown.
*Fenced population.

Materials and Methods

We compiled and analyzed data from 47 lion populations representing the best available knowledge of the species from the past two decades (23, 25) (Dataset S1). Population estimates were obtained by diverse methods, including total count, individual identifications, total or sample inventory using calling stations, radio telemetry, photo databases, transects, spoor counts, and density estimates based on direct observations corrected for patrol effort (20, 22, 24, 38). We excluded population estimates that were based on extrapolation of lion densities in adjacent areas and unpublished guesstimates by experts. There is a wide discrepancy between populations regarding the intensity of monitoring: some have only been monitored two times during the period of our study, others have been monitored more regularly, and a few are monitored annually.

We used a Bayesian state space model to estimate the growth rate-λ of each population (39). Theoretically, a hierarchical approach could be used to explain the growth rate of each population with hyperparameters (40, 41) describing, for example, broad geographic location (southern, East, or West Central Africa), human population density, whether the reserve is fenced, conservation efforts, or governance scores (23). What is often referred to as "borrowing strength" by modeling parameters in the data model as random variables at the group level drawn from a hyper-distribution would allow a more informative posterior parameter estimate than a separate analysis of each dataset (42–44). However this approach was ill suited for this analysis, because populations were not exchangeable since populations with small amounts of data were not random draws from the overall distribution of lambda (Fig. S1): growing populations are well-monitored, whereas declining populations are often poorly monitored. Two-thirds of the populations that are missing more than one-half of the data are declining, whereas two-thirds of the populations missing less than one-half of the data are increasing. Thus, a posthoc analysis confirmed that posterior median estimates of population growth rates were positively correlated with the number of years of data in each time series ($P < 0.05$). A hierarchical approach would, therefore, bias the posterior estimates of growth rate toward the information-rich growing populations and thus, provide spurious inferences about overall population dynamics, because the model would attempt to fit the data from the declining populations by increasing individual random effects without capturing any biological mechanisms.

Our process model assumes that true population size at time t (N_t) follows a log-normal distribution of the deterministic prediction of the median population size at time t (μ_t) with a stochastic process error on the log scale-σ_{proc}. The deterministic prediction results from exponential growth with rate-λ:

$$\begin{cases} \mu_t & \log(\lambda \cdot N_{t\ 1}) \\ N_t \sim \text{lognormal}(\mu_t, \sigma_{\text{proc}}) \end{cases}.$$

We link this process model to census data with an observation model, where the count of lions at time t ($Nobs_t$) is Poisson-distributed, with mean-ψ_t itself drawn from a Gamma-distribution with mean equal to the prediction of the process model and an SD for observation error σ_{Nobs}. This hierarchical formulation allows the uncertainty in the data to exceed the variance of the Poisson parameter-ψ_t (45):

$$\begin{cases} \alpha_t & \dfrac{N_t^2}{\sigma^2_{Nobs}} \\ \beta_t & \dfrac{N_t}{\sigma^2_{Nobs}} \\ \psi_t \sim \Gamma(\alpha_t, \beta_t) \\ Nobs_t \sim \text{Poisson}(\psi_t) \end{cases}.$$

For each population, we ran six Monte Carlo Markov Chains (100,000 iterations thinning by 10 after adapting and updating for 50,000 iterations) with JAGS (46) and R (47) and checked convergence (48).

Forty-seven unweighted posterior density distributions of growth rate (one per population) were summed across three sets to provide geographic conservation-relevant estimates of demographic trends. The four African regions defined by the IUCN regional lion conservation strategies (33, 34) constituted three sets after we lumped West and Central Africa because of similar genetic characteristics and conservation threats.

We estimated the projected probability of decline over T years by 33% [$p^{T}_{0\,33}$ $P(\lambda^{T} < 0.67)$] and 50% [$p^{T}_{0\,5}$ $P(\lambda^{T} < 0.5)$] for each population (without making inferences on true population size N), with T equal to 5, 10, 20, or 30 y. Because the IUCN Red List mandates an appraisal of species' population trends over the longer time period of three generation lengths (GLs) or 10 y (49), we also calculated $p^{T}_{0\,33}$ and $p^{T}_{0\,50}$, where T $3 \times$ GL. GL 7 is defined by GL $R_{\text{span}} \times Z +$ age of first reproduction, where age of first

reproduction is 3.5 y (50), R_{span} 12 [the number of years that females are reproductive (50)], and Z 0.29 [a constant calculated as the slope of the linear regression between GL and R_{span} for 221 mammalian species (51)] as recommended by the IUCN. Two populations are presented separately from any grouping: the Gir populations in India and Niassa Reserve in Mozambique, which is considered an outlier (*Discussion*).

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Supporting Information

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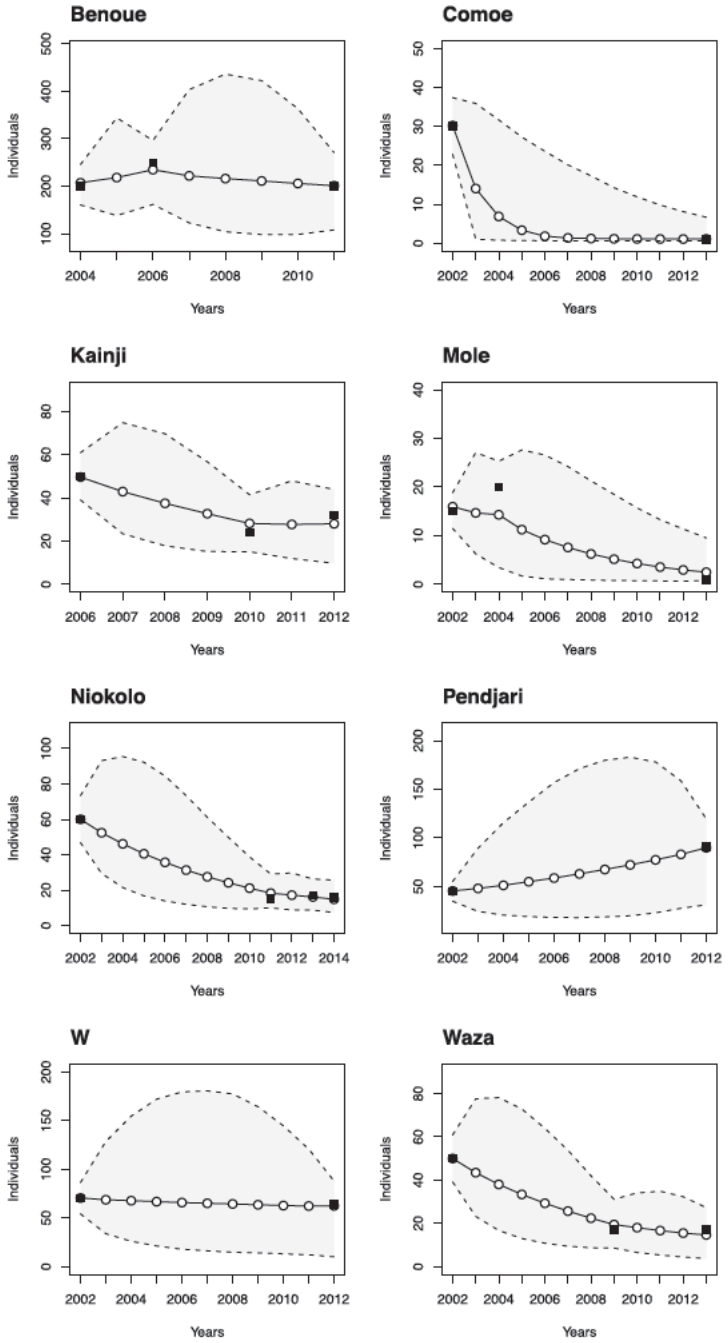


Fig. S1. (Continued)

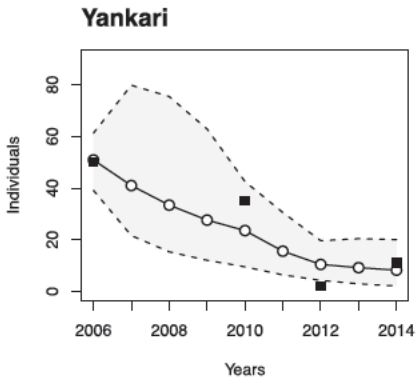
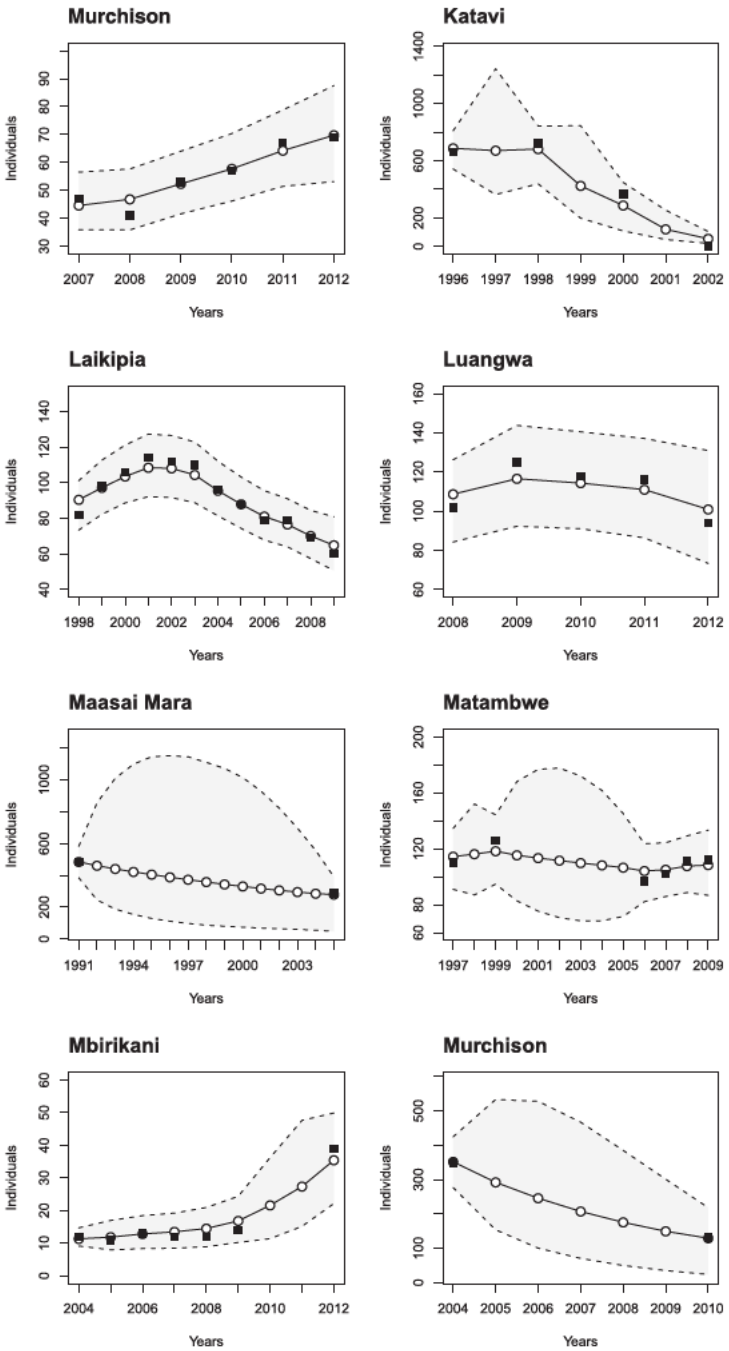


Fig. S1. West Central African populations: model fitted to time series (black squares are data, white circles are medians of the model-inferred true population sizes μ_t, and gray areas between dashes lines are 95% credible intervals).



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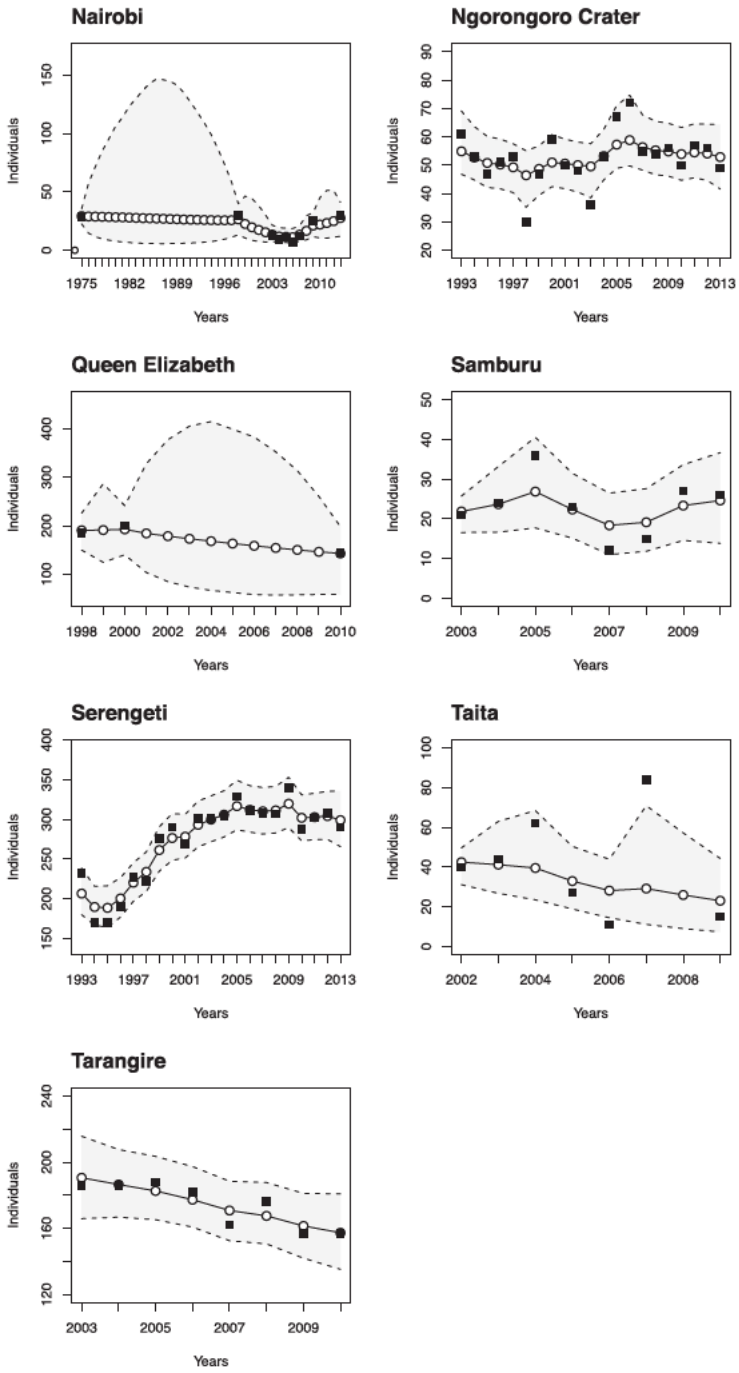
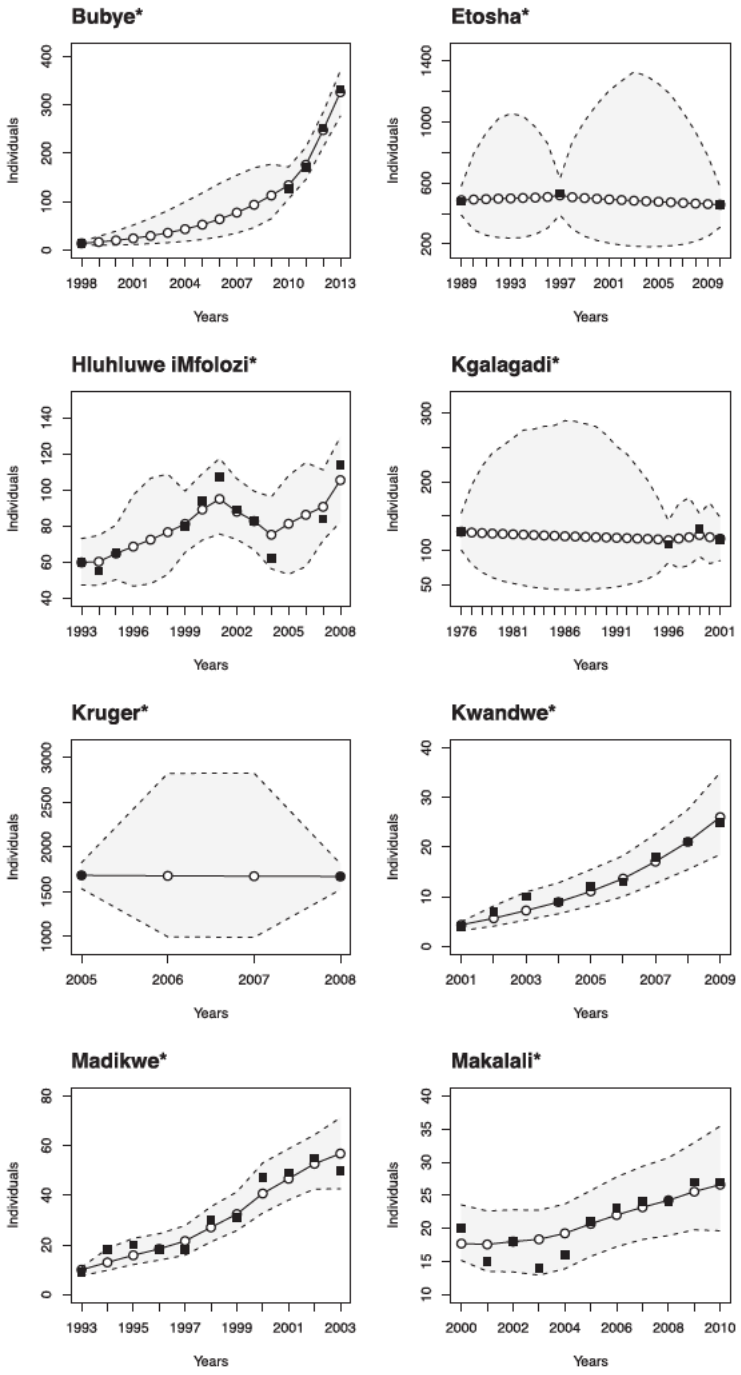


Fig. S2. East African populations: model fitted to time series (black squares are data, white circles are medians of the model-inferred true population sizes μ_t, and gray areas between dashes lines are 95% credible intervals). *Fenced populations.



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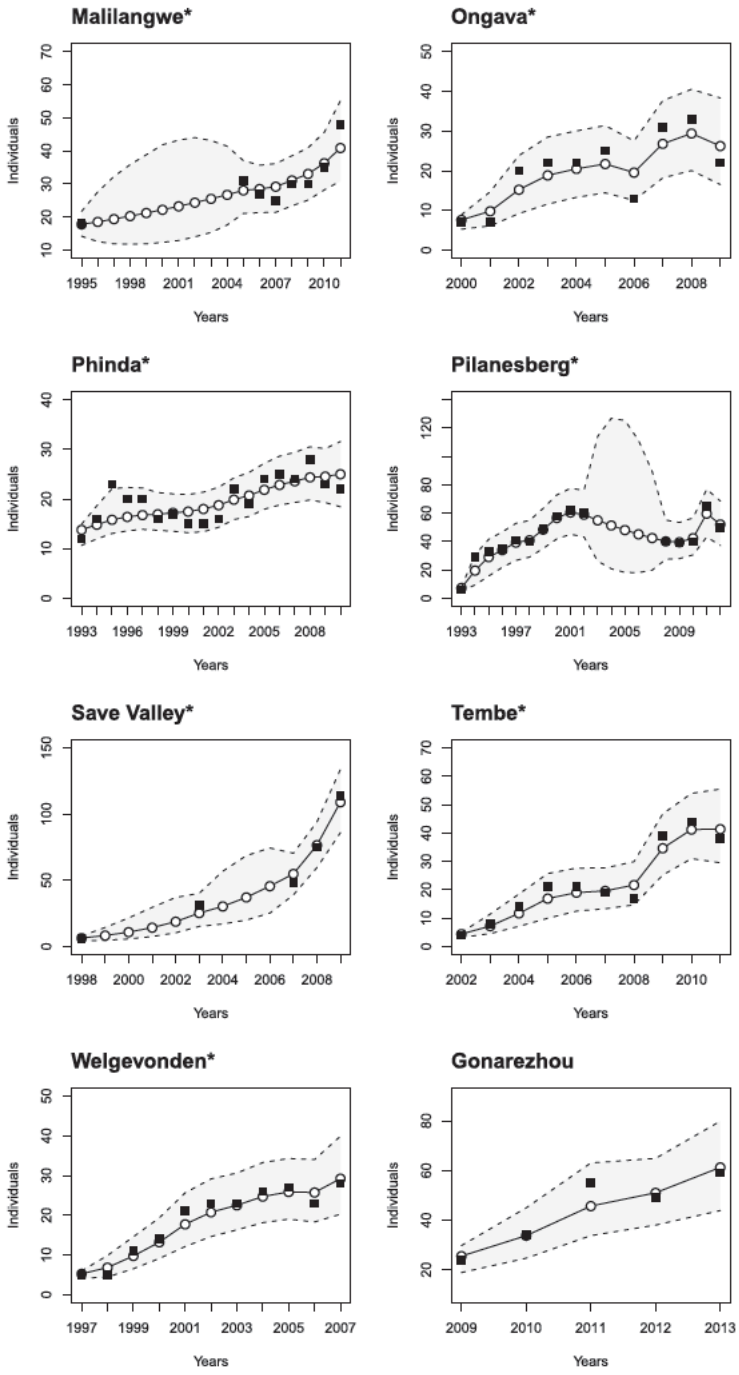

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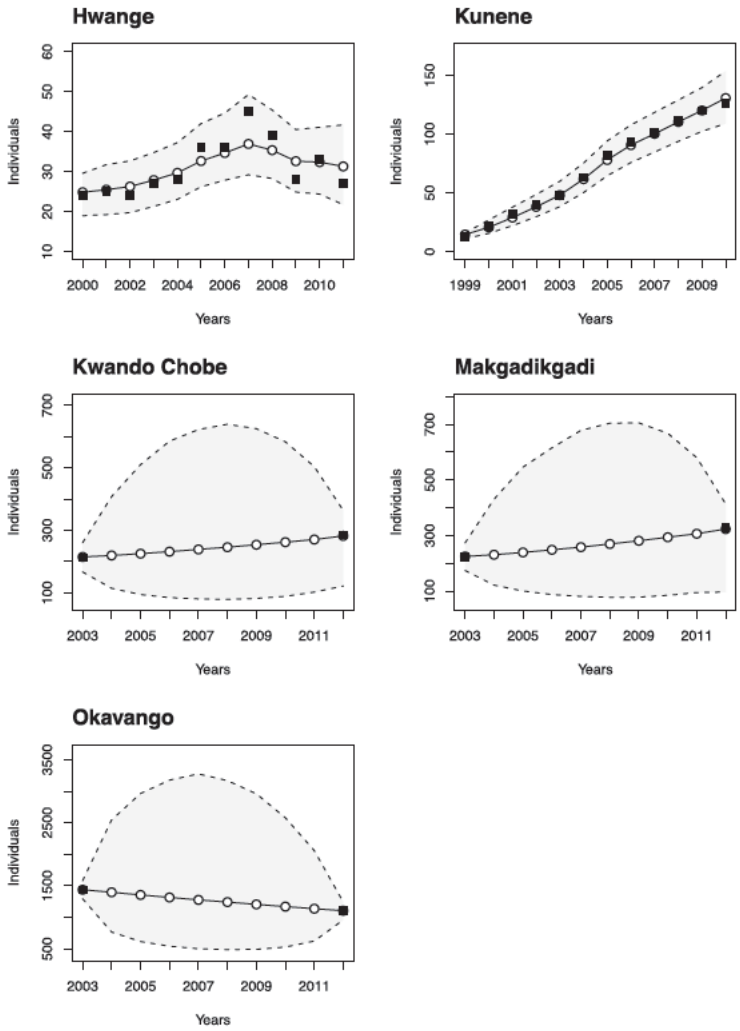

Fig. S3. Southern African populations: model fitted to time series (black squares are data, white circles are medians of the model-inferred true population sizes μ_b and gray areas between dashes lines are 95% credible intervals). *Fenced populations.

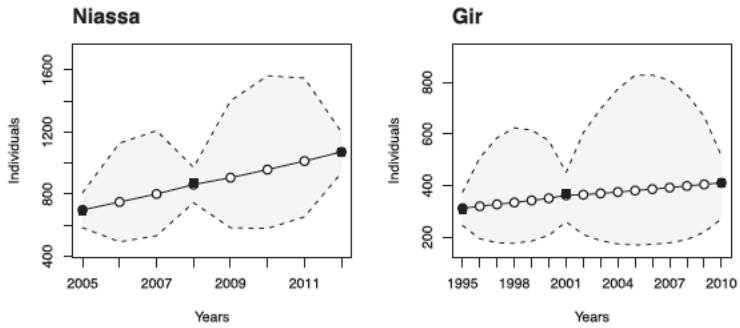

Fig. S4. Other populations: model fitted to time series (black squares are data, white circles are medians of the model-inferred true population sizes μ_b and gray areas between dashes lines are 95% credible intervals).

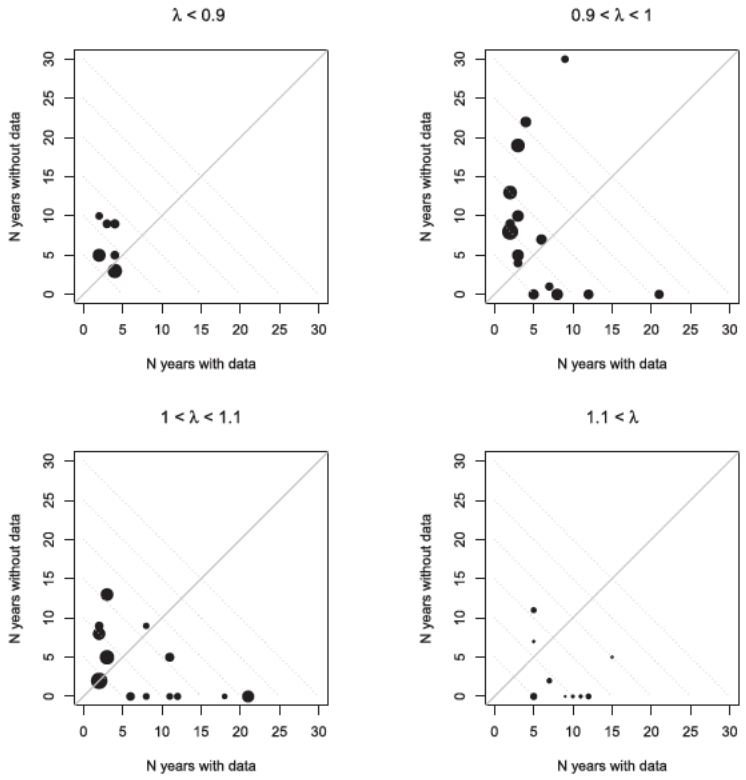

Fig. S5. Patterns of information in the time series data. Each site is represented by the number of years with and without data in its time series, and each point is scaled according to population size. Populations are grouped according to our modeled growth rate estimates. The area above the solid diagonal line indicates populations with times series that lack data for more than one-half of the years. The area below the solid diagonal lines indicates populations with data from more than one-half of the years in the time series. Dotted diagonal lines indicate the overall span of each time series. For example, a 10-y time series (including years with missing data) is indicated by the line having 10 as *x* and *y* intercepts.

Dataset S1. Monitoring data for 47 lion populations (23)

Dataset S1

ECOLOGY LETTERS

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LETTER

Conserving large carnivores: dollars and fence

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Abstract

Conservationists often advocate for landscape approaches to wildlife management while others argue for physical separation between protected species and human communities, but direct empirical comparisons of these alternatives are scarce. We relate African lion population densities and population trends to contrasting management practices across 42 sites in 11 countries. Lion populations in fenced reserves are significantly closer to their estimated carrying capacities than unfenced populations. Whereas fenced reserves can maintain lions at 80% of their potential densities on annual management budgets of \$500 km^{-2}, unfenced populations require budgets in excess of \$2000 km^{-2} to attain half their potential densities. Lions in fenced reserves are primarily limited by density dependence, but lions in unfenced reserves are highly sensitive to human population densities in surrounding communities, and unfenced populations are frequently subjected to density independent factors. Nearly half the unfenced lion populations may decline to near extinction over the next 20 40 years.

Keywords

Carnivores, carrying capacity, density dependence, exponential growth, landscape conservation, spatial separation.

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INTRODUCTION

Populations of large carnivores are declining around the globe, often with dramatic effects on lower trophic levels (Estes *et al.* 2011). These species typically range over such wide areas that it can be difficult to maintain viable populations without some individuals coming into close proximity to humans, posing serious threats to human safety and domestic livestock. Conservationists have therefore sought methods to promote human carnivore coexistence outside the confines of national parks and wilderness areas (Woodroffe *et al.* 2005; Dickman *et al.* 2011). Given the potential conflicts with humans, however, separation of large carnivores from human communities may ultimately be preferable to a landscape level conservation approach as has been demonstrated for forestry (Boscolo & Vincent 2003) and agriculture (Phalan *et al.* 2011).

Few species encapsulate these problems more dramatically than the African lion. Lion densities are directly dependent on prey biomass (Van Orsdol *et al.* 1985; Hayward *et al.* 2007), and annual range requirements for a single lion pride can exceed 1000 km^2 (Funston 2011). Habitat loss in the past 100 years has reduced the lion's range by 75% (Riggio *et al.* 2012), and human lion conflicts have intensified because lions kill livestock (Woodroffe & Frank 2005; Kissui 2008) and people (Packer *et al.* 2005a, 2011a). In addition, poorly regulated sport hunting has resulted in over harvesting in several countries (Packer *et al.* 2009, 2011b), the effects of which can extend into unhunted National Parks (Loveridge *et al.* 2007; Caro 2008; Kiffner *et al.* 2009). Finally, numerous lion populations are genetically isolated (Slotow & Hunter 2009), and inbreeding has caused measureable reductions in reproductive rates and disease resistance in several small populations (Kissui & Packer 2004; Trinkel *et al.* 2008, 2011; also see Johnson *et al.* 2010).

Yet, not all lion populations have declined. The Serengeti lions, for example, have steadily increased over the past half century (Packer *et al.* 2005b), populations have remained stable in several large South African national parks (Ferreira & Funston 2010; Funston 2011), and numerous private reserves in South Africa and Zimbabwe have successfully restored lions to areas where they had previously been extirpated (Hunter *et al.* 2007; Lindsey *et al.* 2009a,b; Slotow & Hunter 2009). However, lions are considered so dangerous in South Africa that they can only be re introduced after management authorities erect lion proof fencing and agree to recapture or destroy any escaping lions (Hunter *et al.* 2007; Slotow & Hunter 2009).

Wildlife proof fences effectively prevent most potential conflicts between lions and humans in southern Africa (Ferguson & Hanks 2010), yet this strategy runs counter to a long standing conservation ethic of keeping protected areas unfenced and contrasts with the wildlife policies of many range states (Hayward & Kerley 2009; Licht *et al.* 2010; Slotow 2012). Depending on the size of the enclosed population, fencing often also necessitates routine genetic and demographic management of smaller populations via translocations of breeding aged individuals (Trinkel *et al.* 2008; Johnson *et al.* 2010). Thus, many conservationists have instead sought to encourage human wildlife co existence through conflict mitigation programmes, compensation schemes, insurance plans or payments for tolerance (e.g. Dickman *et al.* 2011). However, the costs of managing dangerous wildlife are formidable. For example, effective elephant and tiger conservation has been estimated to cost $365 930 per km^2 per year (Leader Williams & Albon 1988; Walston *et al.* 2010), and the overall costs of anti poaching and compensation will only increase in range states with growing human populations (Wittemyer *et al.* 2008; Pfeifer *et al.* 2012), declining purchasing power of external funds (Garnett *et al.* 2011) or worsening corruption (Garnett *et al.* 2011).

African lions are among the most extensively studied carnivores in the world with population data available from a wide variety of protected areas in nearly a dozen different countries with divergent conservation practices. Several recently developed ecological models can accurately estimate lion carrying capacities across a wide range of ecological conditions (Hayward *et al.* 2007; Loveridge & Canney 2009), making it possible to estimate the effectiveness of lion conservation in a given reserve by measuring how closely the observed population density matches the expected density. The large number of long term studies also provides measures of population trends across a wide variety of circumstances. Here, we explicitly test the effectiveness of fencing and management budgets on lion population size and growth rates, while including the impacts of human population density, governance, sport hunting, private management and protected area size.

MATERIALS AND METHODS

Data come from repeated surveys in 38 sites (median span = 12 years; range: 3 46 years) and single surveys in an additional four sites. Population growth rates were estimated from the exponents of exponential regressions of population size over the most recent 10 years for each time series, using nonlinear models in Program R (R Development Core Team 2011), function *nls*. Because many long term study sites were surveyed irregularly, data were sometimes only available up to 1995 2004, and the median time span was 9 years (range: 3 14 years) (Table S1); Figure S1 shows time series as densities (lions/100 km^2) except for Mole Park, Ghana, where data were collected as number of 'contacts per 100 ranger patrols'.

In an analysis of historical data from 49 undisturbed sites, Loveridge & Canney (2009) found a tight correlation ($r^2 = 0.9271$) between contemporaneous population sizes of lions and large to

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medium sized ungulates; the resultant equation between lion and prey biomass was $Y = 0.0109x^{0.8782}$. Where ungulate surveys were not available, Loveridge & Canney found a close fit for ungulate biomass by modeling habitats according to NOAA's Africa Data Dissemination Service Rainfall Estimate (ADDS RFE) and cation exchange capacities taken from the ISRIC WISE soil profile data set (www.isric.org/data/isric wise international soil profile dataset) separated into high , medium and low nutrient levels. In the current analysis, 'expected' lion densities were calculated from known prey biomass where possible (34 sites); otherwise, herbivore densities were predicted from rainfall and soils (8 sites); the method used for estimating 'lion carrying capacity' did not significantly affect any of our results.

Each site is classified as managed by public or private agencies, subjected to sport hunting, separated from surrounding communities by wildlife proof fencing, country/geographical region, and method of estimating carrying capacity (prey biomass vs. rainfall/soils); we also tested effects of reserve size. Human population data were taken from the AfriPop Project (www.afripop.org) (Linard *et al.* 2012; measuring human densities within one kilometre of protected area boundaries extracted from the World Database of Protected Areas (IUCN & UNEP 2009)(see Pfeifer *et al.* 2012). Governance was based on UNDP's six indicators (Voice/Accountability, Political Stability, Government Effectiveness, Regulatory Quality, Rule of Law and Control of Corruption) (UNDP 2010). Principal Components Analysis showed that 87% of variation between indicators was captured by a single component ('Governance') (Table S2). In the statistical analyses, management budgets are US$ per km^2 per year while controlling for purchasing power and likely losses to corruption (Garnett *et al.* 2011). Budgets could not be partitioned according to anti poaching, outreach, fence repairs, road maintenance, etc.

For 14 of 42 sites, wildlife surveys were restricted to the best protected portion of each reserve, whereas budgets were only available for the entire reserve. Expenditures per km^2 were based on two alternative measures: first, total budget divided by the size of the overall protected area (a lower bound which assumes that management expenditures are spread evenly over the entire reserve); second, total budget divided by the size of the survey area (an upper bound which assumes that management expenditures are spent exclusively within the survey area). These alternative measures produced virtually identical results; statistical tests are based on the geometric mean of the two extremes.

Human population densities, protected area sizes, annual management budgets and the ratios of current to expected population size were all lognormal, so statistics on the two response variables (population growth rate and current to expected population density) were run on the log transformed data. We used an information theoretic approach (Burnham & Anderson 2002), with Akaike's Information Criterion (AIC) to calculate statistical models, using simple linear models in Program R, function *lm*. We determined the magnitude and direction of the coefficients for each independent variable using multi model averaging across all models with ΔAIC less than 4.0 (Grueber *et al.* 2011). These outputs were examined to determine which predictors were statistically significant and to measure the relative importance of each variable (Tables 1 3). 'Relative importance' refers to the sum of the Akaike weights over all of the models containing the parameter of interest.

Given the nested nature of the geographical data, we evaluated a mixed effects model with nested random intercepts for Region and Country. Log likelihood ratio tests provided no support for including random effects: the fixed effects model outperformed all random effects models (testing Region only, as well as Country nested within

Table 1 Multi-model averages across all reserves for A. ratio of current-to-expected population densities (n 40) and B. exponential growth rates over the past 10 years (n 33). See Table S3 for the full list of models with ΔAIC less than 4.0

Variable	Estimate	SE	Adj. SE	z value	P-value	Relative importance
A. Multi-model averages for Current vs. Expected in all reserves:						
(Intercept)	0.990	0.177	0.182	5.435	0.000***	1.00
Fence	0.478	0.112	0.115	4.153	0.000***	1.00
Management Budget	0.102	0.029	0.030	3.427	0.001***	1.00
Namibia + South Africa	0.212	0.138	0.142	1.493	0.136	0.50
Human Pop. Density	0.109	0.068	0.071	1.548	0.122	0.46
Governance	0.003	0.040	0.041	0.077	0.939	0.16
Method	0.089	0.121	0.126	0.706	0.480	0.15
Size of PA	0.044	0.073	0.076	0.578	0.563	0.12
Hunted	0.040	0.117	0.121	0.328	0.743	0.08
State run	0.013	0.091	0.094	0.141	0.888	0.07
B. Multi-model averages for exponential growth rates in all reserves:						
(Intercept)	0.040	0.070	0.072	0.565	0.572	1.00
Fence	0.094	0.043	0.045	2.098	0.036*	0.78
State Run	0.096	0.044	0.045	2.113	0.035*	0.69
Initial Pop. Size	0.096	0.051	0.053	1.830	0.067	0.52
Namibia + South Africa	0.079	0.055	0.057	1.386	0.166	0.44
Size of PA	0.026	0.026	0.027	0.965	0.335	0.17
Method	0.058	0.061	0.064	0.901	0.368	0.15
Governance	0.006	0.014	0.015	0.385	0.700	0.14
Human Pop. Density	0.006	0.030	0.031	0.198	0.843	0.08
Hunted	0.010	0.048	0.050	0.201	0.841	0.07
Management Budget	0.001	0.012	0.013	0.086	0.932	0.07

*$P < 0.05$, **$P < 0.01$, ***$P < 0.001$

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Table 2 Multi-model averages of the fenced reserves for A. ratio of current-to-expected population densities (n 17) and B. exponential growth rates over the past 10 years (n 16). See Table S4 for the full list of models with ΔAIC less than 4.0

Variable	Estimate	SE	Adj. SE	z value	P-value	Relative importance
A. Multi-model averages for Current vs. Expected in fenced reserves:						
(Intercept)	0.297	0.411	0.421	0.706	0.480	1.00
Size of PA	0.169	0.095	0.100	1.691	0.091	0.60
Namibia + South Africa	0.238	0.137	0.148	1.604	0.109	0.45
State Run	0.233	0.133	0.142	1.634	0.102	0.38
Governance	0.036	0.030	0.032	1.132	0.258	0.38
Human Pop. Density	0.008	0.106	0.109	0.073	0.942	0.15
Hunted	0.089	0.314	0.325	0.274	0.784	0.14
Management Budget	0.063	0.073	0.076	0.827	0.408	0.13
Method	0.005	0.145	0.159	0.034	0.973	0.02
B. Multi-model averages for exponential growth rates in fenced reserves:						
(Intercept)	0.225	0.081	0.084	2.688	0.007**	1.00
Initial Pop. Size	0.108	0.037	0.040	2.706	0.007**	0.83
State Run	0.091	0.041	0.044	2.063	0.039*	0.37
Size of PA	0.039	0.018	0.020	1.924	0.054	0.37
Human Pop. Density	0.025	0.019	0.022	1.165	0.244	0.08
Management Budget	0.013	0.012	0.014	0.985	0.325	0.06

*$P < 0.05$, **$P < 0.01$, ***$P < 0.001$

Table 3 Multi-model averages of the unfenced reserves for A. ratio of current-to-expected population densities (n 22) and B. exponential growth rates over the past 10 years (n 17). See Table S4 for the full list of models with ΔAIC less than 4.0

Variable	Estimate	SE	Adj. SE	z value	P-value	Relative importance
A. Multi-model averages for Current vs. Expected in unfenced reserves:						
(Intercept)	1.186	0.332	0.344	3.443	0.001***	1.00
Management Budget	0.159	0.034	0.036	4.365	0.000***	1.00
Human Pop. Density	0.326	0.127	0.136	2.405	0.016*	0.93
Hunted	0.420	0.282	0.295	1.423	0.155	0.35
Namibia + South Africa	0.517	0.388	0.405	1.278	0.201	0.25
Size of PA	0.149	0.124	0.131	1.141	0.254	0.18
State Run	0.169	0.157	0.167	1.011	0.312	0.14
Method	0.078	0.150	0.161	0.486	0.627	0.06
Governance	0.012	0.044	0.047	0.265	0.791	0.05
B. Multi-model averages for exponential growth rates in unfenced reserves:						
(Intercept)	0.046	0.073	0.077	0.592	0.554	1.00
Namibia + South Africa	0.422	0.100	0.109	3.865	0.000***	1.00
Hunted	0.258	0.085	0.094	2.752	0.006**	1.00
Method	0.113	0.082	0.091	1.239	0.215	0.16
State Run	0.069	0.062	0.069	1.006	0.314	0.11
Initial Pop. Size	0.060	0.061	0.068	0.886	0.376	0.09
Governance	0.015	0.016	0.017	0.836	0.403	0.09
Size of PA	0.026	0.033	0.036	0.717	0.474	0.08
Management Budget	0.004	0.012	0.013	0.313	0.755	0.06

*$P < 0.05$, **$P < 0.01$, ***$P < 0.001$

Region). However, South Africa and Namibia deviated most strik ingly from other countries and geographical configurations, so we ran all AIC models using 'Namibia + South Africa vs. Other' as a fixed effect to minimise the number of coefficients. Note that because many of the fenced reserves were smaller than the overall average, 'fenced/non fenced' showed a moderate degree of co line arity with protected area size (Spearman rank order correlation, $r_s = -0.516$); however, protected area size was not strongly corre lated with either of the dependent outcome variables in a univariate analysis, and the effects of fencing remained robust in all AIC mod els that included protected area size. Finally, we extrapolated popula tion sizes at 5 year intervals for 100 years into the future by combining current population size with the exponential growth rate over the past 10 years. Populations were considered likely to persist if their extrapolated population sizes exceed 10% of their potential carrying capacities at particular time points in the future.

RESULTS

Table 1 summarises the variables with the strongest effects on lion population status and population growth rates across Africa. Current population densities are highest compared to their expected values in

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reserves that (1) are fenced and (2) have the highest management budgets per km^2 (Fig. 1, Tables 1a and S3a). Over the past 10 yrs, population growth rates have been highest in (1) fenced reserves (Fig. 2) and (2) privately managed reserves (Tables 1b and S3b). Because fences have such a profound impact on lion management, we performed separate analyses for fenced and unfenced reserves. For fenced reserves, none of the tested variables had a significant effect on current population status (Tables 2a and S4a), whereas recent population growth has been highest in populations that had been farthest below their potential densities 10 years earlier (Fig. 2) with additional positive effects from private management (Tables 2b and S4b). For unfenced populations, current status is highest in reserves with the largest management budgets (Fig. 1) and lowest when surrounded by high human population densities (Tables 3a and S5a); growth rates were highest in Namibia + South Africa and in populations that were not subjected to trophy hunting (Tables 3b and S5b). Given current population sizes and recent trends, all of the fenced populations are expected to remain at or above their full potential for the next 100 years, whereas less than half of the unfenced reserves are likely to persist above 10% of their carrying capacities for the next 20 40 years (Fig. 3), including unfenced sites in Botswana, Kenya, Cameroon, Ghana, Tanzania and Uganda.

DISCUSSION

Negative conservation impacts of human land use can often be minimised by restricting conflicting activities to separate areas rather than by encouraging their co existence. For example, concentrating crop production in areas of intensive agriculture and sparing land as nature reserves can improve species conservation and crop produc tion more effectively than land sharing strategies that integrate con servation and low intensity agricultural production (Phalan *et al.* 2011). Establishing separate areas of intensive timber production while maintaining well defined forest reserves is also preferable to low intensity harvests over a greater proportion of forest (Boscolo & Vincent 2003). Similarly, physical separation is highly effective for conserving African lions: all of the fenced lion populations were close to their estimated carrying capacities (Fig. 1), growth rates of the fenced populations were density dependent (Fig. 2), and every

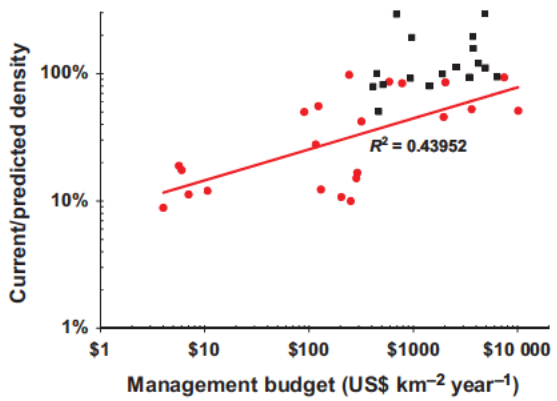

Figure 1 Percentage ratio of current population density to predicted carrying capacity of African lions in fenced (black squares) and unfenced (red circles) reserves according to management budget per square kilometre of lion survey area. The red regression line is for unfenced reserves; the effect of management budget in the fenced reserves is not statistically significant.

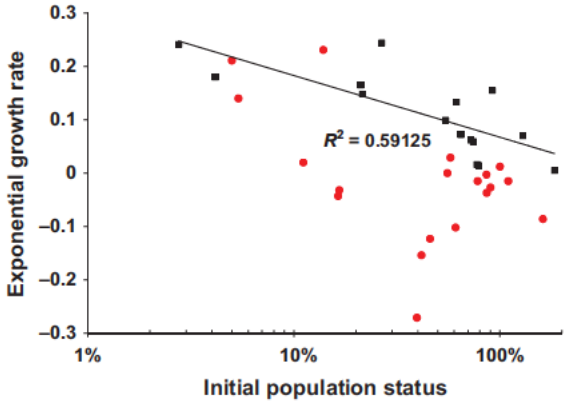

Figure 2 Effect of population density on population growth rate over the following 10 years for fenced (black) and unfenced (red) reserves. 'Initial population status' refers to the observed population density at the start of each time series compared to the expected density. The black regression line is for fenced reserves.

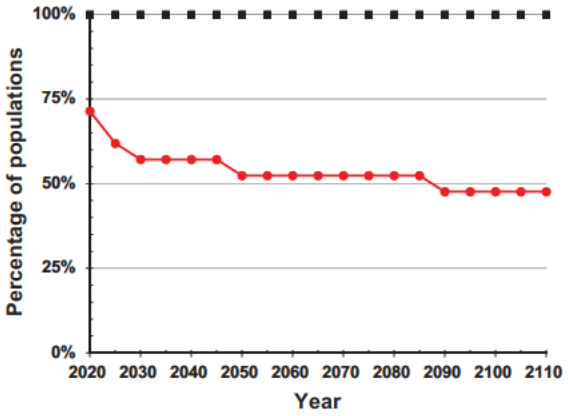

Figure 3 Percentage of populations expected to persist at densities > 10% of their potential in the future. Differences between fenced (black squares, *n* 16) and unfenced (red circles, *n* 21) reserves each year are all significant by Fisher test.

fenced population is expected to remain close to its carrying capac ity for the next century. Indeed, managers in many of the smaller fenced reserves currently remove 'excess' lions in attempts to stabi lise ungulate numbers (see Fig. S1). Fenced lion populations were less sensitive to human densities in adjacent areas than were unfenced populations, presumably because fences reduce poaching, minimise habitat loss, curtail illegal grazing and prevent direct human lion conflict (Kiffner *et al.* 2012). Such density independent 'edge effects' likely prevented recovery of numerous unfenced lion populations that had fallen substantially below their respective carry ing capacities 10 years earlier.

Conservationists have long recognised that large carnivores should be kept apart from humans. However, fencing has so far only been widely employed in a few African countries because of aesthetic objections, financial costs and the impracticality of enclosing large scale migratory ungulate populations. Thus, recent conservation efforts have increasingly promoted human wildlife co existence, either by initiating conflict mitigation projects in buffer zones or by providing economic incentives for local people to tolerate the costs

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of living with wildlife (Woodroffe *et al.* 2005; Dickman *et al.* 2011). However, our analysis suggests that human lion co existence should only be considered in areas where large scale megafaunal (and pasto ralist) migration precludes any form of fencing. In some cases, human occupied zones within larger wildlife dominated ecosystems may even need to be fenced as enclaves (e.g. 30,000 people live in 40 villages inside Mozambique's Niassa National Reserve), as has been recommended for reducing conflicts between wolves and ranchers in livestock production areas around Yellowstone National Park (Stone *et al.* 2008).

Whether or not more lion populations are eventually fenced, large scale lion conservation will be expensive. Currently, many of the best financed reserves are too small to sustain long term ecosys tem processes without frequent and costly management interventions (e.g. Hunter *et al.* 2007), and a 10 to 100 fold increase in manage ment budget will be required to sustain many of the reserves that are not yet fenced (Fig. 1). Although fenced reserves can typically achieve considerable management success on annual budgets as low as \$500 km^{-2} (Fig. 1), fences cost ca. \$3000 per km to install (Ver cauteren *et al.* 2006). Long term costs of successfully managing unfenced lion populations are even higher: \$2000 per km^2 per year is only sufficient to maintain an unfenced lion population at 50% of its potential density (Fig. 1). By comparison, the 2010 management budget in Yellowstone was \$4100 per km^2 enough to maintain an average unfenced lion population at about two thirds of its potential. Under current financial practices in Africa, only a small proportion of tourism revenues are directly available to park managers (Bushell & Eagles 2007) and trophy hunting rarely raises more than \$1000 per km^2 (Lindsey *et al.* 2012).

Although our focus on a single species may seem narrow, top predators can only flourish in healthy ecosystems: many compo nents of lower trophic levels must also thrive for lion populations to remain close to their potential limits, thus the price of successful lion management provides an important gauge for the true costs of sustaining *intact* savannah ecosystems. Finding financial solutions to long term conservation of Africa's largest remaining intact ecosys tems such as Niassa, Okavango, Selous, Serengeti and the W Arly Pendjari Complex will present an enormous challenge to African governments and conservationists.

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AUTHORSHIP

CP, AL, GB, TC, AS, HBa, CMB, KSB, SB, CB, TB, HBr, AB, ACB, BC, SD, AD, TD, SMD, DD, LF, PF, NG, RG, CH, LH, HHdeI, CJJ, SMK, BK, WK, BL, PAL, SDM, JWMcN, SMM, SN, PN, CN, KN, JOO, EOO, BDP, AP, JS, EAS, KJS, CW and HW performed field research. SC and AL developed the ecological model. CP, SC, AL, STG, DMacN, MP, AS and KKZ analysed data. CP, TC, AS, STG and SP wrote the manuscript. All authors discussed the results and commented on the manuscript.

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SUPPORTING INFORMATION

Additional Supporting Information may be downloaded via the online version of this article at Wiley Online Library (www.ecologyletters.com).

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Barry, Anna <anna_barry@fws.gov>

Lion documents

1 message

Gadd, Michelle <michelle_gadd@fws.gov> Fri, Aug 19, 2016 at 9:32 AM
To: Anna Barry <anna_barry@fws.gov>, Darcy Vargas <darcy_vargas@fws.gov>, Sandra Farkas <sandra_farkas@fws.gov>, Kathleen Moore <kathleen_moore@fws.gov>, Tim Vannorman <tim_vannorman@fws.gov>, Craig Hoover <craig_hoover@fws.gov>, Emma Nelson <emma_nelson@fws.gov>

Attached please find Craig Packer's powerpoint presentation from Nat Geo and several publications about impact of lion hunting.

---------- Forwarded message ----------
From: **Craig Packer** <packer@umn.edu>
Date: Tue, Aug 16, 2016 at 9:38 PM

Thanks for you message, though I'm not sure which rule you are referring. We had proposed a 6-yr age minimum, which is being observed quite strictly in Zimbabwe and Niassa Reserve in Mozambique. In the absence of any sort of age-based limit, we had recommended a limit of one lion per 2,000-km2. Recently, a paper was published based on demographic data from a declining population in Zambia -- and recommended that the age minimum in populations subjected to significant snaring, poaching, etc., be set at 7-8 yrs while also limiting offtakes to one lion per 2,000-km2.

Attached is the powerpoint of my talk plus the papers that were cited in the presentation.
The "Effects of trophy hunting" shows how lions were overhunted in Tanzania and that hunting was the primary cause of declining harvests.
The "Sport hunting and predator control" paper shows how lions had been overhunted in the '80s and '90s in Zimbabwe, Botswana, etc..
The "Dollars and Fence" paper shows, first, that lion populations hunted reserves are more likely to be in decline, and, second, provides an empirical measure of how much it costs to effectively manage lion populations ($2k per thousand square kilometers).
The "Declining lion" paper shows that two hunted reserves in Zimbabwe are among the fastest increasing lion populations in Africa (the only documented hunting success stories in Africa) -- but also emphasizes the need for independent population surveys in Tanzania. This latter statement was included because the Tanzanian Government has systematically blocked lion research in recent years. Besides terminating long-term lion studies in the Serengeti and the phototourism section of the Selous in the past 2 yrs, it has prohibited any lion surveys in 100% of its hunting blocks.

Please let me know if you'd like any other information. I also have newspaper clippings about the illegal activities of several of the most important figures in the Tanzanian hunting industry.

Craig

5 attachments

Lion hunting for Lion Day at NGS - cp.pptx
6990K

Effects of trophy hunting on lions and leopards in Tanzania.pdf
1024K

Sport Hunting, Predator Control and Conservation of Large Carnivores.pdf
3614K

Conserving large carnivores - Dollars and fence - Ecology Letters 2013.pdf
255K

Bauer et al 2015 Lions are declining across Africa PNAS.pdf
5457K

Tourist Hunting and Lion Conservation

1. Unsustainable harvest strategies
2. Revenue shortfalls
3. Going forward

Craig Packer
University of Minnesota

Lion populations are sensitive to trophy hunting



- Resident males protect their prides
- Replacement males kill small cubs
- Males fully mature at 4 yrs of age & must remain resident for 2 yrs to rear their cubs
- Trophy hunting should be restricted to males ≥6 yrs old

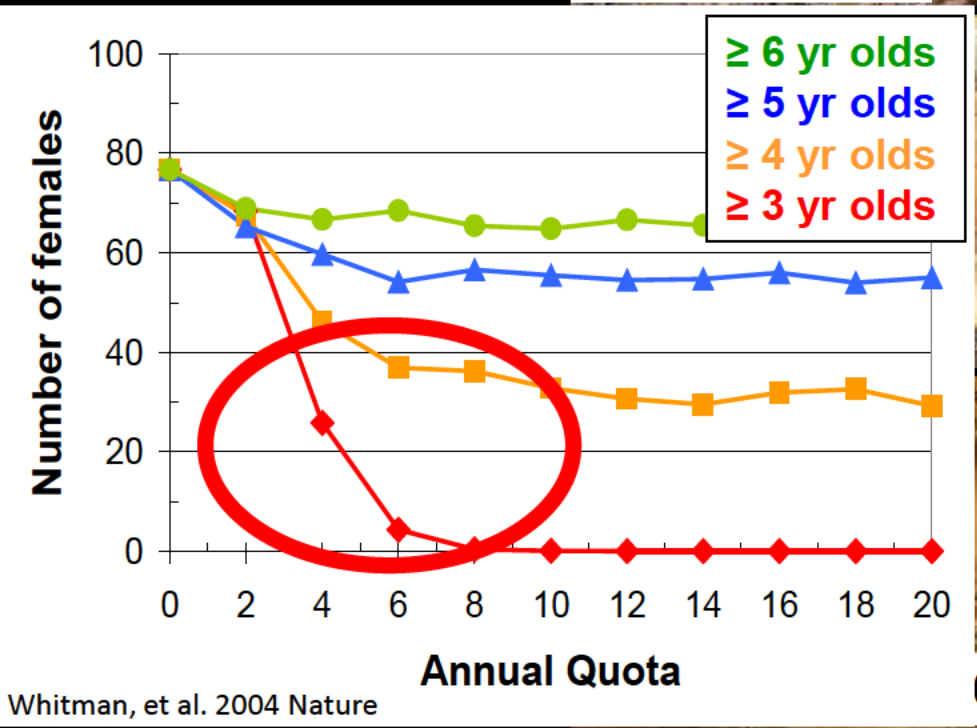
Males in hunting reserves rarely reach 6 yrs of age







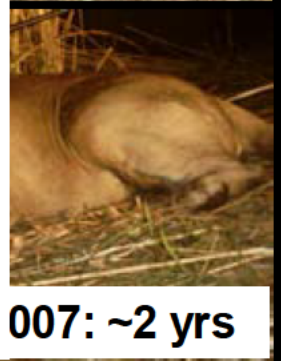




Whitman, et al. 2004 Nature



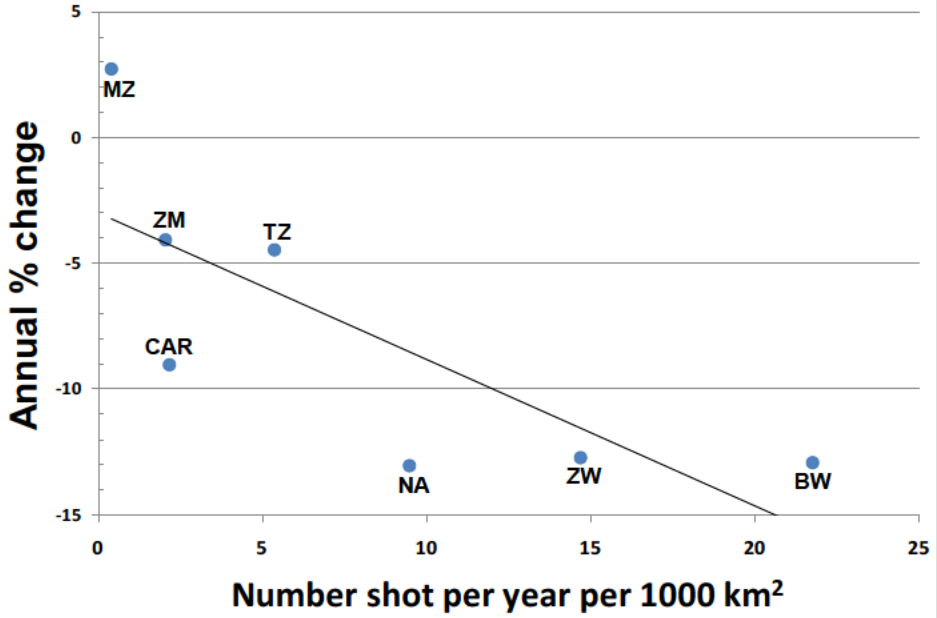






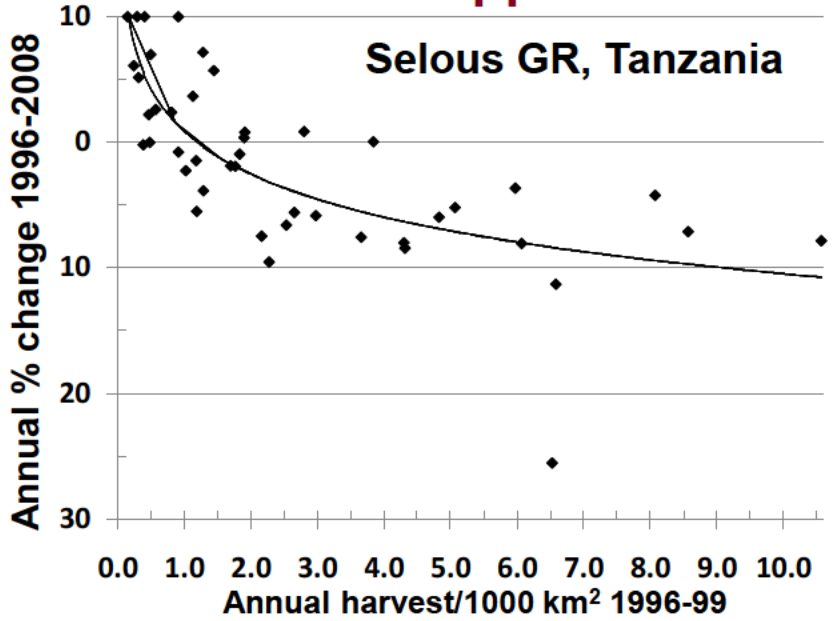
Trophy hunting can cause population declines

Countries that harvested the most lions showed the steepest declines



Packer, et al. 2009 PLoS-One

Hunting blocks with the highest lion harvests dropped fastest



Packer, et al. 2011 Conservation Biology

Mismanagement of lion hunting in TZ

- Lion "quotas" were production targets rather than limits
- Quotas could only be met by shooting immature males

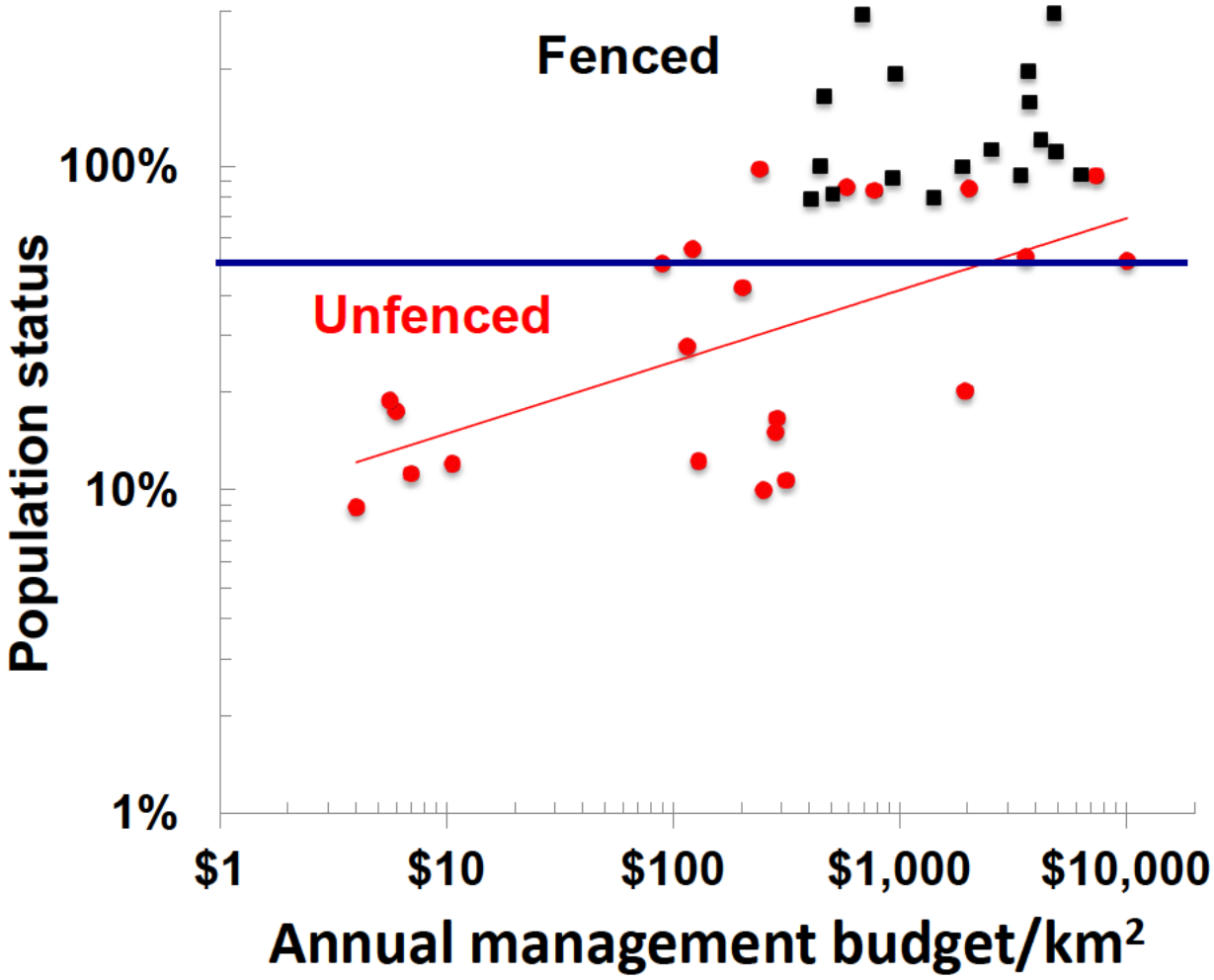
2010: TZ Parliament restricted harvest to males >6 yrs old… ***but the law was never enforced***





www.kilimanjarorifles.com/gallery_2010-5.html
www.pvt.co.za/gallery.asp?Section=2010TZ

Where's the money?



- Most hunting areas are unfenced
- Unfenced reserves require ~$2,000 km²/yr to keep lion populations at ~half their potential.

Packer, et al. 2013 Ecology Letters

Tanzania:

300,000 km^2 of hunting blocks
$15 million/year in Government revenues
$50/km^2/yr
Effective lion conservation costs >$2,000/km^2/yr

Why are revenues so low?

Block allocation = Patronage system

- **Current & recent elected politicians**
- **Corrupt insiders**
  - **Uranium scandal, Panama Papers**

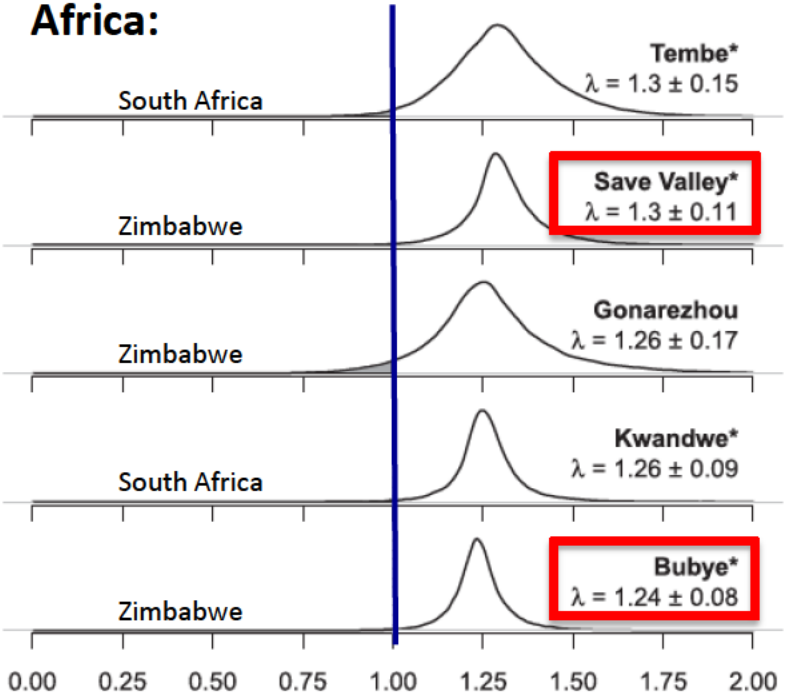
No re-investment

- **One-third of TZ hunting blocks abandoned since 2005**

Hunting Success Stories

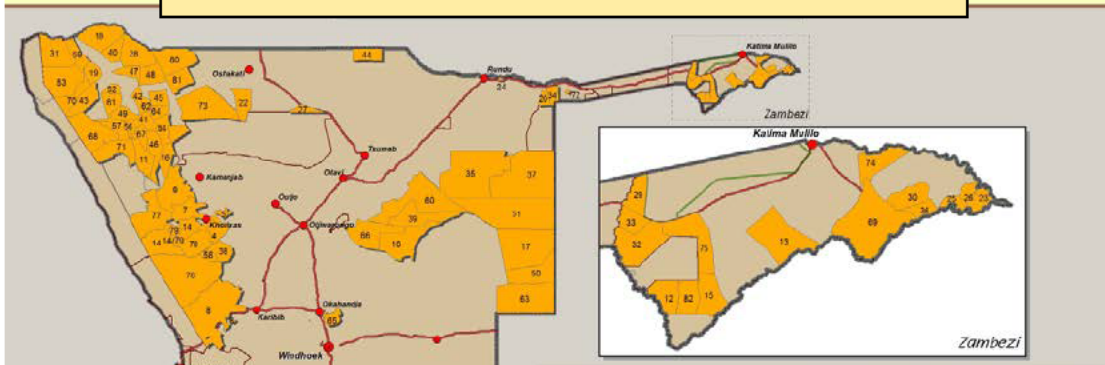
Communal Conservancies in Zimbabwe

5 fastest growing lion populations in Africa:



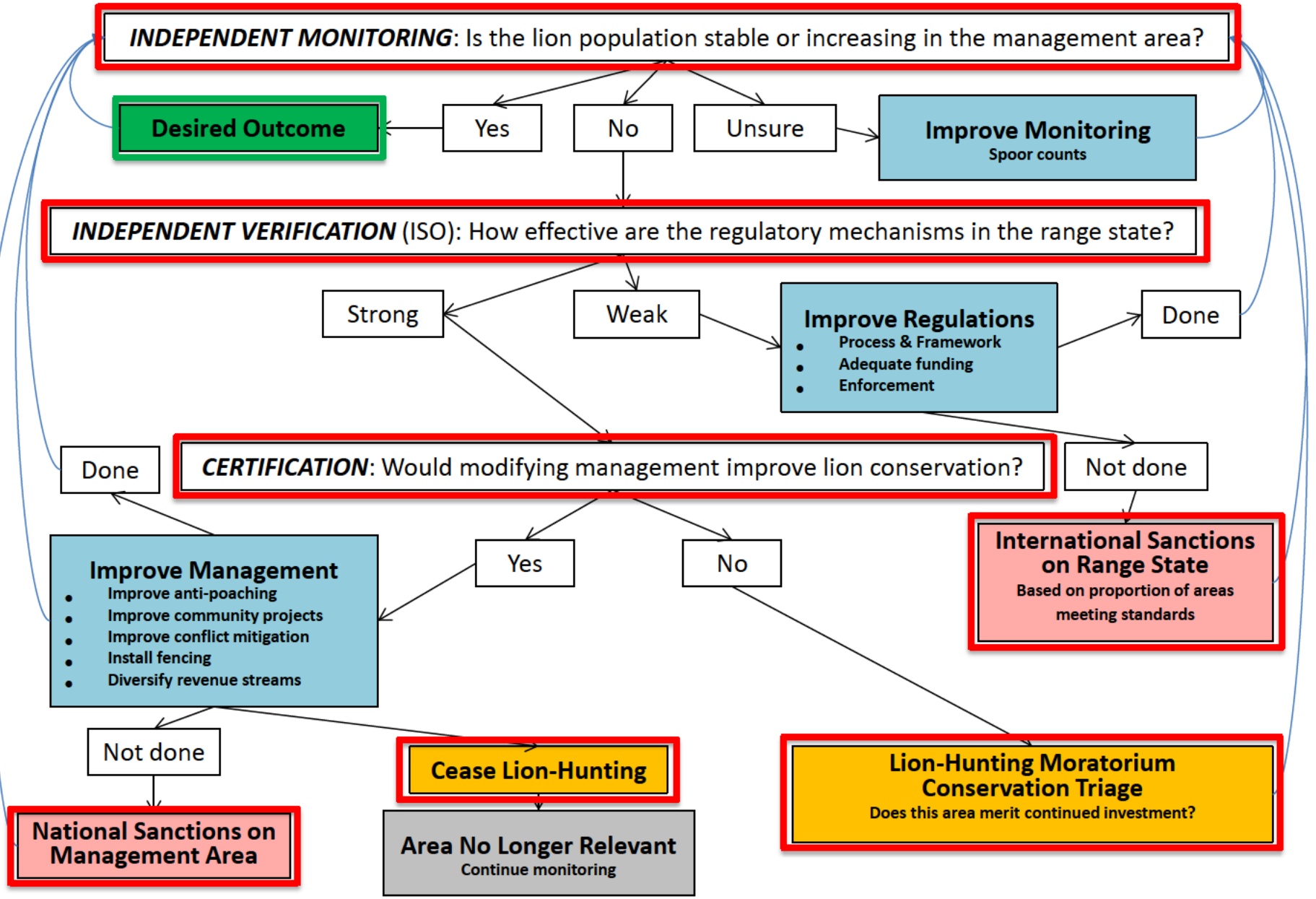
Bauer, et al. 2015 PNAS

Communal Conservancies in Namibia



No	Conservancy	Date Reg	No	Conservancy	Date Reg	No	Conservancy	Date Reg
1	Kawachub	2005	28	Kunene River	2006	56	Otjambangu	2009
2	Ikan /Awab	2008	29	Kwandu	1999	57	Otjikondavirongo	2013
3	Ikhoro Inaub	2003	30	Lusese	2014	58	Otjimboyo	2003
4	Ikhoro Igoreb	2011	31	Marienfluss	2001	59	Otjitanda	2011
5	//Audi	2006	32	Mashi	2003	60	Otjituuo	2005
6	//Gamaseb	2004	33	Mayuni	1999	61	Otjiu-West	2012
7	//Huab	2003	34	Muduva Nyangana	2005	62	Otjombande	2012
8	#Gaingu	2004	35	Nifa Jagna	2003	63	Otjombinde	2011
9	#Khoadi-//H|as	1998	36	Nakoboleiwa	2014	64	Otuzemba	2012
10	African Wild Dog	2005	37	Nyae Nyae	1998	65	Ovitoto	2008
11	Awabeb	2003	38	Ohungu	2006	66	Ozonahi	2005
12	Balyerwa	2006	39	Okamatapati	2005	67	Ozondundu	2003
13	Bamunu	2011	40	Okanguati	2012	68	Puros	2000
14	Doro Inawas	1999	41	Okangundumba	2003	69	Salambala	1998
14/79	Doro Inawas/Uibasen Twyfelfontein JMA	1999	42	Okatjandja Kozomenje	2012	70	Sanitatas	2003
15	Ototi	2009	43	Okondjombo	2008	71	Sesfontein	2003
16	Eti-Rovipuka	2001	44	Okongo	2009	72	Shamungwa	2005
17	Ekeb	2009	45	Okongoro	2012	73	Sheya Shuushona	2005
18	Epupa	2012	46	Omatendeka	2003	74	Sikungu	2009
19	Etanga	2013	47	Ombaru	2012	75	Sobbe	2006
20	George Mukoya	2005	48	Ombombo	2014	76	Sorris Sorris	2001
21	Halbes	2009	49	Ombujokanguindi	2012	77	Torra	1998
22	Iipumbu ya Tshilongo	2012	50	Omuramba ua Mbinda	2011	78	Tsiseb	2001
23	Impalila	2005	51	Ondjou	2006	79	Uibasen Twyfelfontein	1999
24	Joseph Mbambangandu	2004	52	Ongongo	2012	80	Uukolonkadhi Ituacana	2005
25	Kabulabula	2011	53	Orupembe	2003	81	Uukwaluudhi	2003
26	Kasika	2005	54	Orupupa	2011	82	Wuparo	1999
27	King Nehale	2005	55	Oskop	2001			

Monitoring, Verification & Certification



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PLoS one

Sport Hunting, Predator Control and Conservation of Large Carnivores

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Abstract

Sport hunting has provided important economic incentives for conserving large predators since the early 1970's, but wildlife managers also face substantial pressure to reduce depredation. Sport hunting is an inherently risky strategy for controlling predators as carnivore populations are difficult to monitor and some species show a propensity for infanticide that is exacerbated by removing adult males. Simulation models predict population declines from even moderate levels of hunting in infanticidal species, and harvest data suggest that African countries and U.S. states with the highest intensity of sport hunting have shown the steepest population declines in African lions and cougars over the past 25 yrs. Similar effects in African leopards may have been masked by mesopredator release owing to declines in sympatric lion populations, whereas there is no evidence of overhunting in non-infanticidal populations of American black bears. Effective conservation of these animals will require new harvest strategies and improved monitoring to counter demands for predator control by livestock producers and local communities.

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Introduction

Management agencies typically skew harvests toward males in order to protect adult females. However, in species with extensive paternal investment such as African lions (*Panthera leo*), trophy hunting can increase the rate of male replacement (and associated infanticide) to the point of reducing population size unless offtakes are restricted to males old enough to have reared their first cohort of dependent offspring (≥5 6 yrs of age) [1 3]. Solitary felids have none of the "safety nets" provided by the cooperative cub rearing strategies of African lions [4 5], and Fig. 1ab illustrates the greater vulnerability of solitary species by examining the effects of trophy hunting on a hypothetical population of "solitary lions" while leaving other demographic parameters from ref. [1] unchanged (Supporting Information Table S1, also see ref. [6]). Leopards (*Panthera pardus*) may be more sensitive to sport hunting than solitary lions (with a safe minimum age of 6 7 yrs of age, Fig. 1c), whereas cougar (*Felis concolor*) males can be safely harvested as young as 4 yrs of age (Fig. 1d).

We tested whether infanticidal species are vulnerable to over hunting by focusing on four large carnivore species with sizable markets for sport hunted trophies, comparing three infanticidal felids (lions, cougars and leopards) to American black bears (*Ursus americanus*). We used black bears as a control case because males do not kill cubs in order to increase mating opportunities (sexually selected infanticide SSI), so rates of infanticide are not increased by male biased trophy hunting; in fact, among ursids, SSI has been documented in only one population of European brown bears (*U. arctos*) [7 9].

We extracted data from the UNEP World Conservation Monitoring Centre (WCMC) CITES trade database (See Materials and Methods). Data on total trophy harvests of lions and leopards are not available, so we used CITES reported exports, which in cougars and black bears were highly correlated with domestic sport hunting totals (Supporting Information Fig. S1); likewise CITES reported trade in Tanzania's lion trophies showed a close match between imports and exports. Given sustained market demand, harvest trends should provide a reasonable proxy of population trends since sport hunters use intensive methods such as baits and hounds to locate these animals, and quotas on annual offtakes are either too high to limit harvests or (for black bears) reflect the management agency's perception of population trend [10].

Results

Fig. 2 shows the annual CITES exports for lions and leopards and US offtakes of cougars and black bears (See Materials and Methods). The reported number of trophies increased rapidly across all four species as markets grew during the 1980's and 1990's [11 12]. Offtakes have continued to increase for black bears, reflecting the sustained growth of bear populations

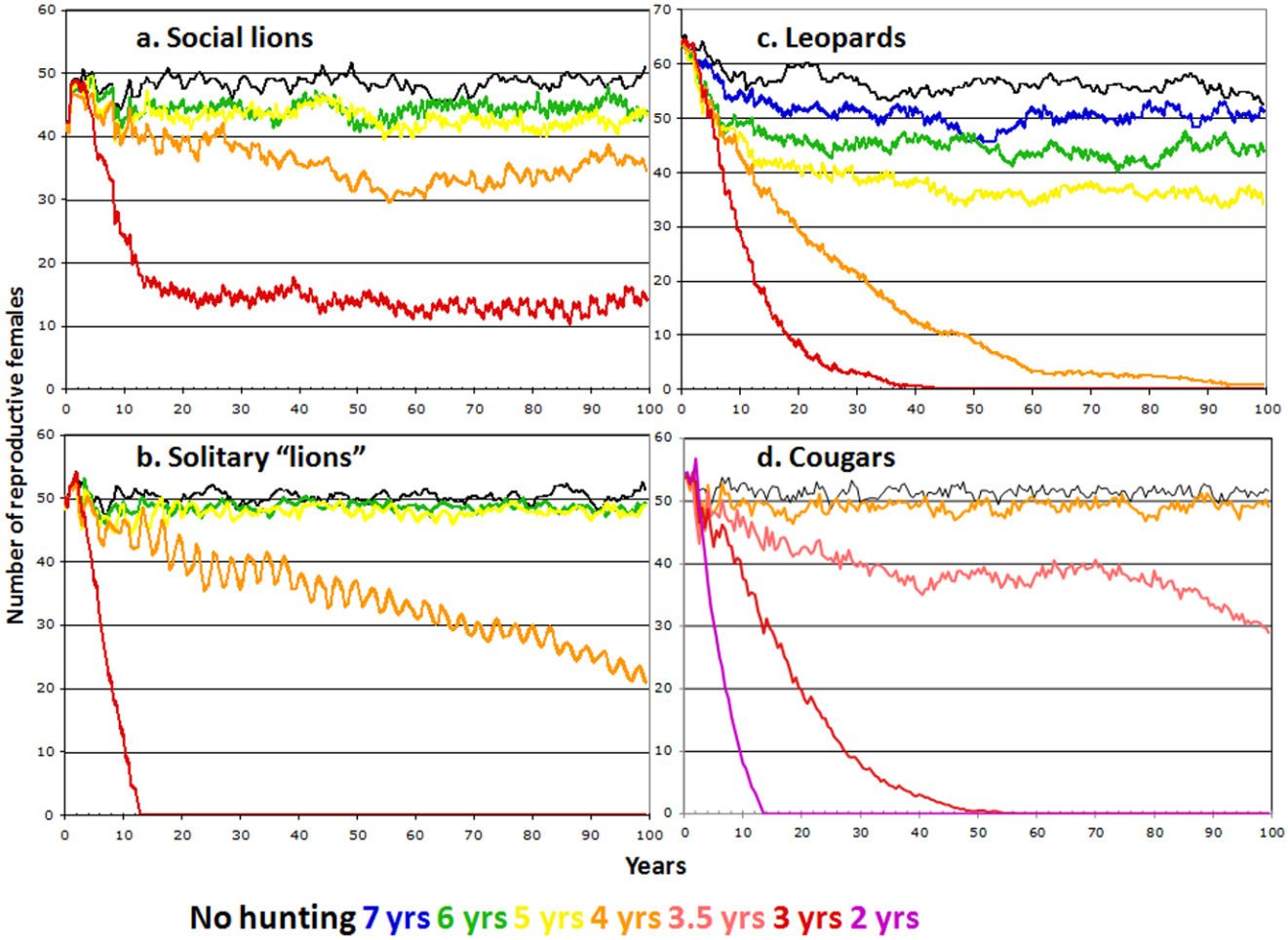

Figure 1. Average number of adult females in population simulations where all eligible males are removed during a 6 mo hunting season each year for 100 yrs. Colors indicate outcomes for different age minima for trophy males; each line indicates average from 20 runs. **A**. Population changes for "social lions" follow the assumptions and demographic variables in ref. [1] except to restrict hunting to 6 mo seasons and to incorporate additional details of dispersal, survival and reproduction [44 46]. **B**. Population changes for a hypothetical lion population where males and females are solitary and each territorial male controls one female. **C**. Population changes for leopards based on long term data from Phinda Private Game Reserve [33,47] and other sources [37,48]. **D**. Population changes for cougars based on demographic data from refs. [27,49 53].
doi:10.1371/journal.pone.0005941.g001

throughout North America [13]. Leopard offtakes reached an asymptote in most countries, except for declines in Zambia in the 1980's and Zimbabwe in the 1990's and a recent CITES granted increase to Namibia. In contrast, lion offtakes peaked then fell sharply in the 1980's and 1990's in Botswana, Central African Republic, Namibia, Tanzania, Zambia and Zimbabwe. Cougar offtakes showed similar peaks and declines in the 1990's in Arizona, Colorado, Idaho, Montana and Utah (Fig. 2).

The downward harvest trends for lions and cougars (highlighted in Supporting Information Fig. S2) most likely reflected declining population sizes: success rates (as measured by harvest/quota) have fallen for both cougars and lions (Supporting Information Fig. S3). Demand for lion trophies (as measured by total imports from across Africa) has grown in the US and held stable in the EU since the mid 1990s, sustained in recent years by imports of trophies of captive lions from South Africa [12,14] (Supporting Information Fig. S3). Several countries instituted temporary bans on lion trophy hunting (Botswana in 2001 2004, Zambia in 2000 2001 and western Zimbabwe in 2005 2008) or banned female lions from quota (Zimbabwe, starting in 2005), but these measures were implemented well after the major decline in lion offtake in each country. The harvest trends are also consistent with recent surveys suggesting a 30% continent wide population decline in African lions [15] and declining cougar populations in several US states [16 17]. Conversely, black bear populations appear to be increasing across their range [13], even in states where cougar populations have declined (Fig. 2). Although not apparent from most hunting offtakes, leopards have undergone an estimated range decline of 35% in Africa [18] and were recently listed as Near Threatened by IUCN due to habitat loss, prey depletion, illegal skin trade and problem animal conflicts [19].

Trophy hunting is likely to have contributed to the declines in lion and cougar populations in many areas. Over the past 25 yrs, the steepest declines in cougar and lion harvests occurred in jurisdictions with the highest harvest intensities (Fig. 3a). Similarly, hunting blocks with the highest lion offtakes per 1000 km^2 in Tanzania's Selous Game Reserve showed the steepest declines between 1996 and 2008 (r^2 0.26, n 45 blocks, P 0.0004). The Selous is the largest uninhabited hunting area in Africa (55,000 km^2) and has long been the premier destination for lion trophies. Across jurisdictions, declining harvests were unrelated to habitat loss for either lions or cougars (Fig. 3b) or to snow

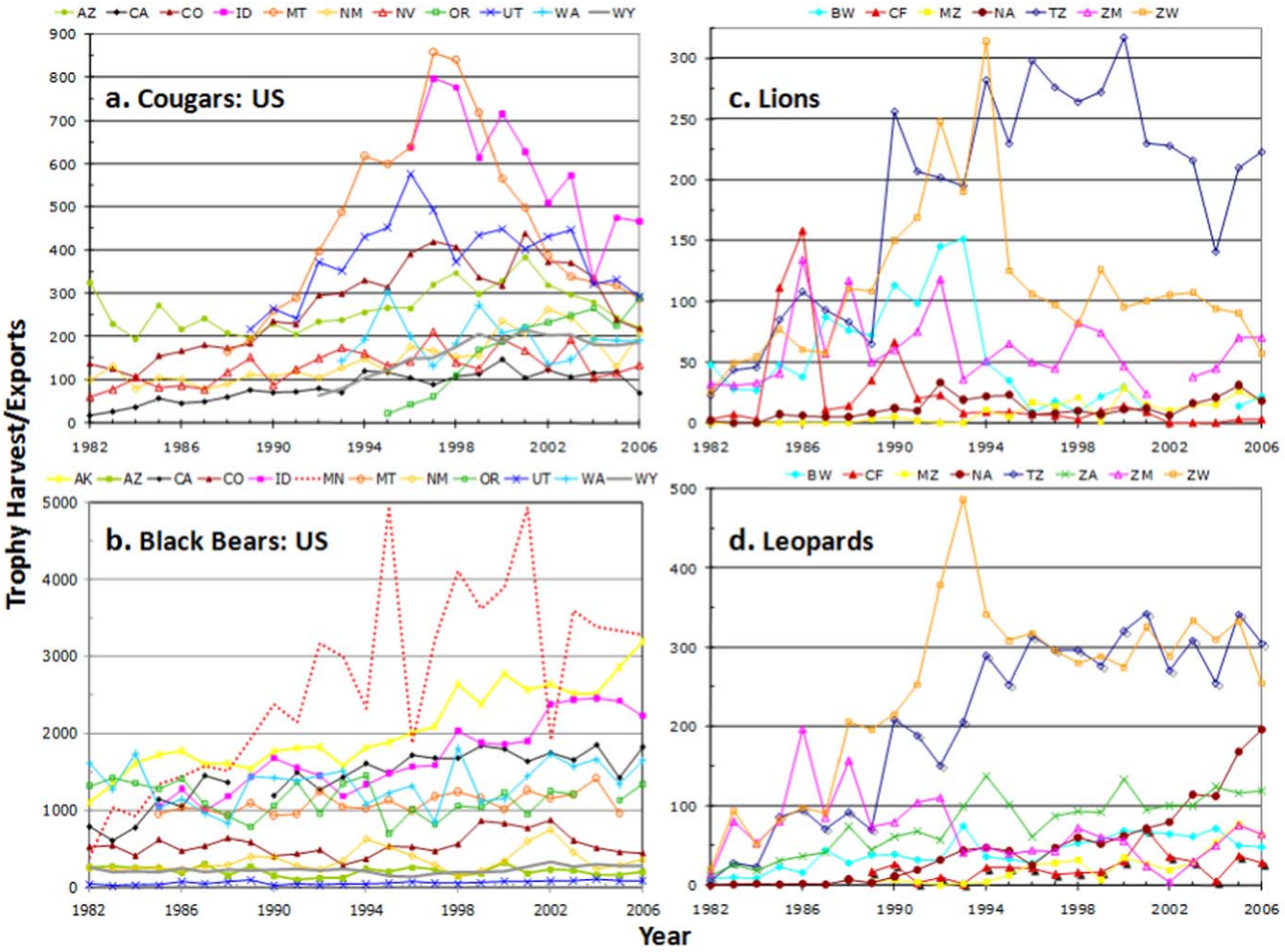

Figure 2. Domestic offtakes of a) cougars and b) black bears and CITES reported trophy exports of c) lions and d) leopards. For US states: AK = Alaska, AZ = Arizona, CA = California, CO = Colorado, ID = Idaho, MN = Minnesota, MT = Montana, NM = New Mexico, NV = Nevada, OR = Oregon, UT = Utah, WA = Washington, WY = Wyoming. For CITES data: BW = Botswana, CF = Central African Republic, MZ = Mozambique, NA = Namibia, TZ = Tanzania, ZM = Zambia, ZW = Zimbabwe.
doi:10.1371/journal.pone.0005941.g002

conditions for cougars. We modified our population simulation models to estimate impacts of sport hunting in a changing environment and found that habitat loss only imposes an additive effect on the impact of trophy hunting (Supporting Information Fig. S4). Note that habitat loss in many African nations has been so extensive (Fig. 3b) that lion offtakes have failed to recover for 10 20 yrs following the peak harvest years except in Namibia.

Although trophy hunting of lions and cougars is often portrayed as an economic strategy for increasing support for carnivore conservation, local communities often seek extirpation of problem animals [15,20 22]. Thus, sport hunting quotas may sometimes reflect pressures to control carnivores rather than to conserve them. Across Africa, countries with the highest intensity of lion offtake also had the highest number of livestock units per million hectares of arable land (P 0.047, n 7). In the US, Oregon announced plans in 2006 to reduce its cougar population by 40% to decrease depredation on livestock, pets and game mammals [23], Washington altered its cougar quotas in response to human wildlife conflicts in the 1990s 2000s, and recent offtakes have exceeded government sanctioned eradication programs in several states. For example, Utah's sport hunting cougar harvests averaged 500/yr in 1995 7 compared to peak culls of 150/yr in 1946 1949 [24], and Montana sport hunters harvested 800/yr in 1997 1999 vs. 140/yr in the peak "bounty" years of 1908 11 [25]. Likewise, South Africa exported 120 leopard trophies per year in 2004 2006, similar to the cull of 133 leopards per year in Cape Province (which covered most of the country) during 1920 1922 [26].

Fig. 4 shows the potential consequences of coupling a 40% cull of cougars with intensive sport hunting if the control program only targets males (reflecting traditional trophy hunting), removes males and females in proportion to their abundance, or only removes adult females. Fig. 4adg show population trends for the maximum fixed offtakes that never resulted in population extinctions during 20 simulations, whereas Fig. 4beh show the minimum fixed harvests that caused extinction in all 20 runs (often within 10 yrs of an initial decline). Fig. 4cfi show the consequences of applying the maximum "safe" offtakes if the population were inadvertently culled by 50% because of inaccurate population estimates. Consistent with population viability analyses [27 28], a female only harvest comes closest to maintaining a persistent population reduction; a mixed male female strategy allows the largest number of trophies to be harvested; a male only harvest never maintains a

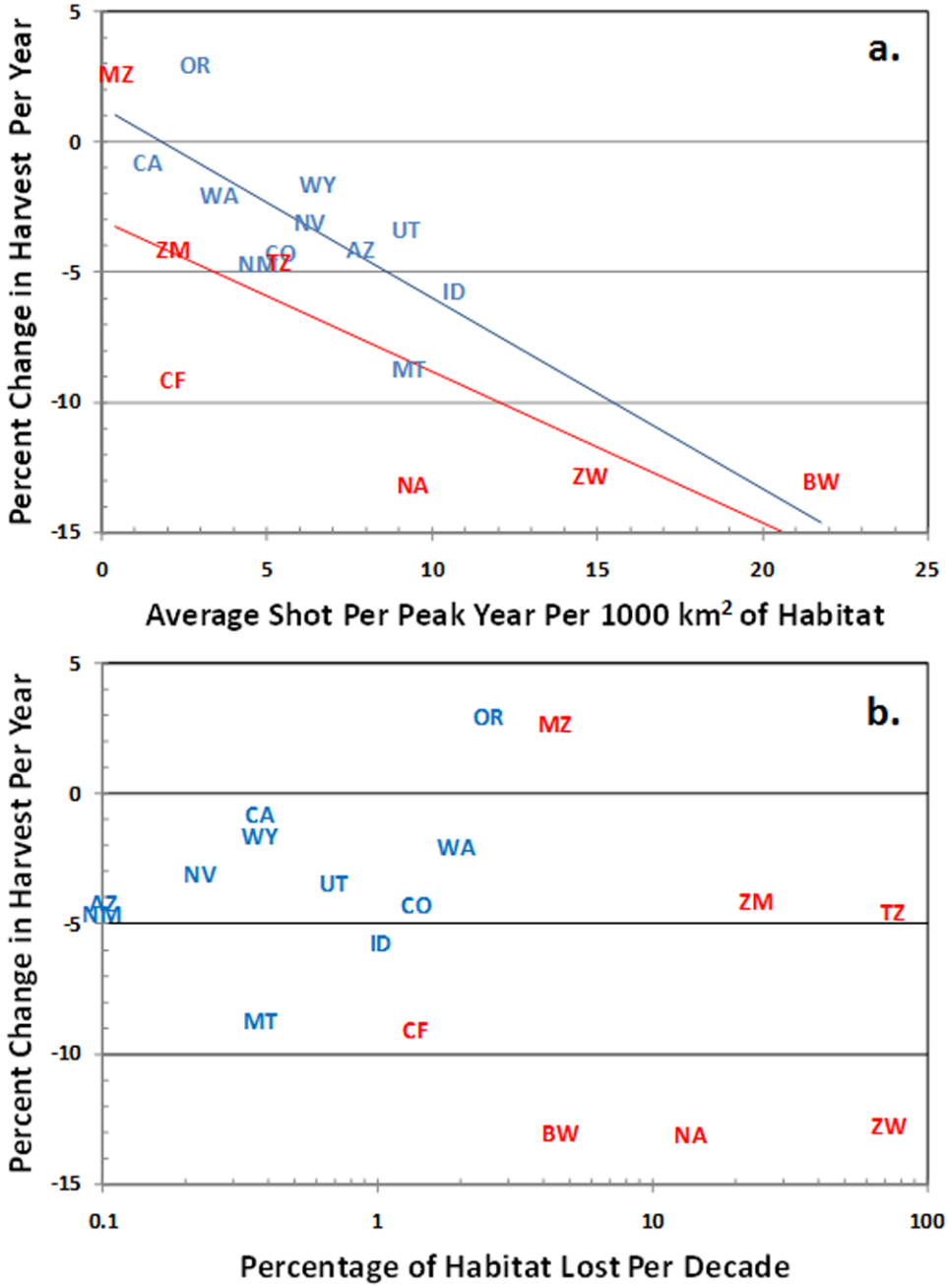

Figure 3. Recent trends in cougar offtakes (blue) and lion offtakes (red) as functions of a) harvest intensity and b) habitat loss. Jurisdictions with the highest harvest intensity showed the greatest decline in cougar offtakes ($r^2 = 0.5151$, $P = 0.0129$) and lion offtakes ($r^2 = 0.5796$, $P = 0.0468$). Habitat loss is plotted on a log scale to allow comparison between the African countries and the US states.
doi:10.1371/journal.pone.0005941.g003

40% reduction in population size and has the smallest margin of error (male only harvests can have catastrophic effects even in non infanticidal species [29]).

These simulations assume a fixed harvest whereas many wildlife agencies reduce their quotas in response to lowered offtakes (Supporting Information Fig. S3 also see ref. [30]). However, offtakes may often be maintained at constant levels through compensatory increases in hunting effort, running the risk of an "anthropogenic Allee effect" [31 32]. Hunters in Zambia, Zimbabwe and Tanzania maintain their lion harvests by shooting males as young as 2 yrs of age (Fig. 5). In Zimbabwe, high lion offtakes were sustained from 1995 until 2005 by allowing females on quota [3], and the duration of lion safaris increased by nearly 18% from 1997 to 2001 (Supporting Information Fig. S3). Similarly, hounds have been used to hunt leopards in Zimbabwe since 2001, potentially masking a continued population decline.

Discussion

Mortality from state sanctioned and illegal predator control likely contributed to the overall population declines of cougars and lions; while leopards are also killed as pests, the leopard's CITES Appendix I status requires international approval for national export quotas, potentially providing safeguards against overhar

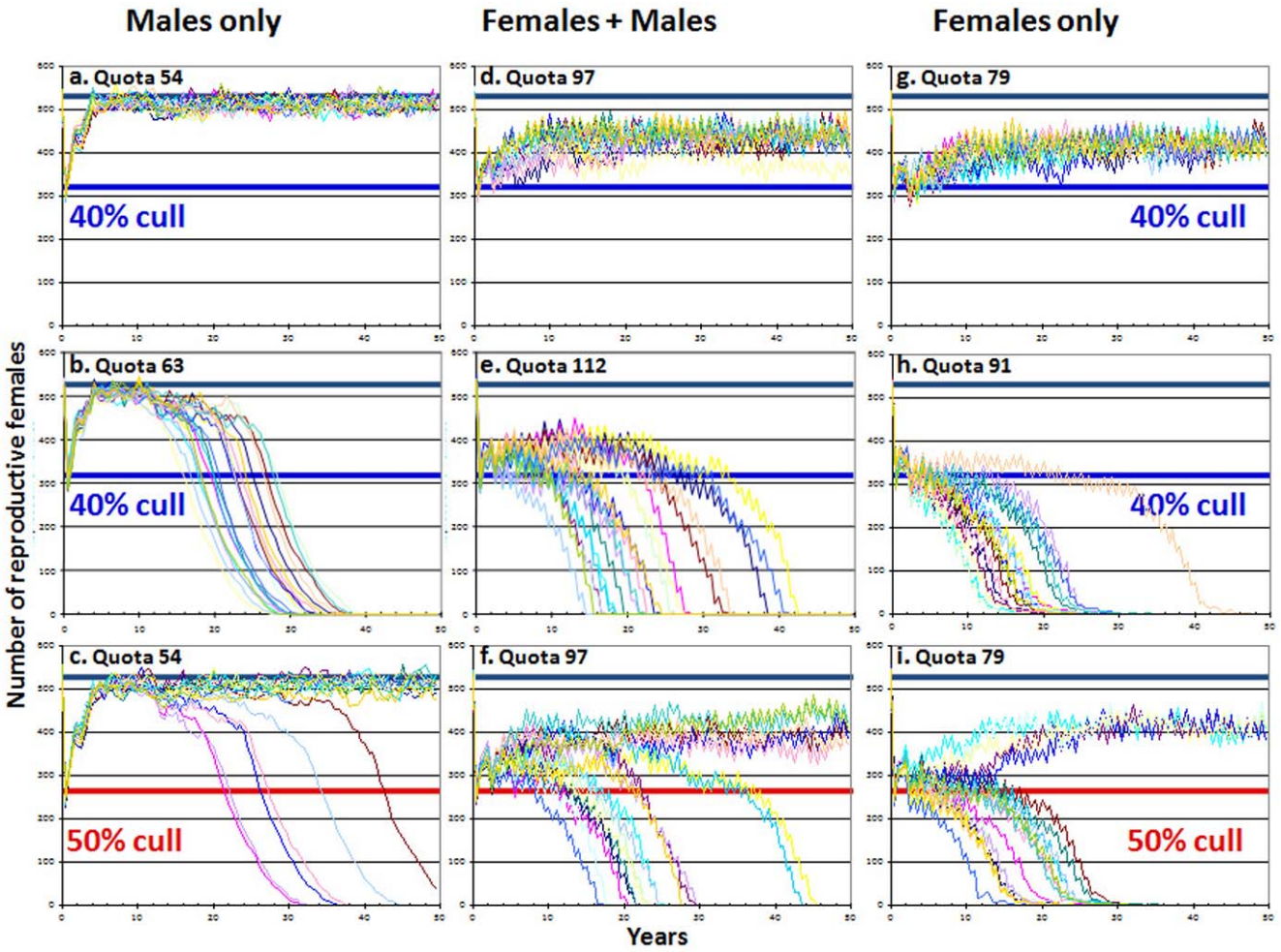

Figure 4. Simulated cougar populations subjected to an initial cull followed by fixed offtakes for 50 yrs. The initial cull is either 40% (top and middle rows) or 50% (bottom row), and the subsequent harvests are either the maximum offtake that incurred no extinctions in 20 runs following a 40% cull (top and bottom rows) or the minimum that produced 20 extinctions in 20 runs following a 40% cull (middle row). In the absence of sport hunting, the stable population size in these simulations is 527 reproductive females (indicated by the heavy black line in each graph); a 40% reduction in population size is indicated by blue lines, a 50% reduction by red lines. Each column represents a different harvest strategy: male only (left column), males and females (middle) and female only (right). Demographic parameters are set as in Fig. 1; quotas allow offtake of animals as young as 2 yrs; each graph shows outputs from 20 runs.
doi:10.1371/journal.pone.0005941.g004

vest. However, leopard exports have declined in some countries, quotas have risen in others, and concerns have been raised over the level of problem animal offtakes and the management of leopard hunting practices [33 35]. Further, leopard populations in many areas may have been "released" [36] by large scale declines in lion numbers: lions inflict considerable mortality on leopards [37]; consequently, hunting blocks in Tanzania's Selous Game Reserve with the highest lion harvest intensities showed the largest *increases* in leopard harvests (P 0.0059 after controlling for declines in lion offtakes, n 45 blocks). Thus the full impact of current trophy hunting practices on leopards may not be fully apparent for several more years.

Harvest policies for infanticidal species such as lions, cougars and leopards that relied on "constant proportion" or "fixed escapement" could help protect populations but require accurate information on population size and recruitment rates, which are virtually impossible to collect; a harvest strategy of "constant effort" can more easily be achieved by measuring catch rates and regulating client days [38 40]. Hunting efficiency could be reduced by banning or limiting the use of baits and hounds, but the absence of direct oversight in remote hunting areas would make enforcement difficult. Alternatively, the age minimum harvest strategies illustrated in Fig. 1 could be implemented without risk of over hunting, assuming that ages can be reliably estimated before the animals are shot [41] rather than afterwards [42]. Unsustainable levels of trophy hunting of lions and cougars appear to be driven by conflicts with humans and livestock: the intensity of lion hunting was highest in countries with the most intensive cattle production, and wildlife managers are under similar pressure from US ranchers to raise cougar offtakes. Thus an even more fundamental challenge for carnivore conservation will be to build community tolerance for predators by reducing the need for retaliatory predator control and by improving benefit sharing from well managed trophy hunting [15].

Materials and Methods

We analyzed trophy exports (http://www.unep wcmc.org/citestrade/) by using the term "trophy" and restricting the analysis to countries that exported at least 25 trophies of a particular



Figure 5. Sample of under aged male African lions shot by sport hunters in various countries from 2004 2008.
doi:10.1371/journal.pone.0005941.g005

species for at least 2 yrs from 1982 to 2006 (excluding captive bred lion trophies from South Africa). Other types of exports (skins) were also analyzed for lions, since non standard terms are sometimes used by reporting countries [43], but these did not alter overall export trends. Data on Tanzanian hunting quotas were provided by the CITES office at the Division of Wildlife headquarters in Dar es Salaam; data on duration of hunting safaris in Zimbabwe were from the head office of Parks and Wildlife Management Authority in Harare.

Offtake data for black bears and cougars were provided by the Alaska Dept. of Fish & Game, Arizona Game & Fish Dept., California Dept. of Fish & Game, Colorado Division of Wildlife, Idaho Fish & Game, Minnesota Dept. of Natural Resources, Montana Fish, Wildlife & Parks, New Mexico Game & Fish, Nevada Dept. of Wildlife, Oregon Dept. of Fish & Wildlife, Utah Division of Wildlife Resources, Washington Dept. of Fish & Wildlife, and Wyoming Game & Fish. Note that all cougar offtakes in California are due to predator control.

"Harvest intensity" is the average harvest of the three peak offtake years divided by the extent of habitat in that state/country. Regression coefficients were calculated across the time period beginning with the earliest of the three peak harvests and ending in 2006 for cougars or the last of the three lowest subsequent harvest years for lions (Supporting Information Fig. S3); percent change is the regression coefficient divided by the peak harvest. Limited lion and leopard offtake data were available from 1996 2008 in Tanzania's hunting blocks; trends were only calculated for blocks reporting ≥5 yrs of activity.

Cougar habitat is forest cover taken from the National Land Cover Database (NLCD) www.mrlc.gov/changeproduct.php; lion habitat is the extent of GLOBCOVER land classification categories 42, 50, 60, 70, 90, 100, 110, 120, 130, 134, 135, 136, 160, 161, 162, 170, 180, 182, 183, 185, 186 and 187 in each country, see http://postel.mediasfrance.org/en/DOWNLOAD/Biogeophysical Products/. Habitat loss is based on change in forest cover in the US 1990 2000 and in woodland/forest habitat in Africa 1990 2005 from FAO Global Forest Resources Assessment 2005, http://www.fao.org/forestry/32185/en/. Snow conditions for cougars are taken from http://www.wrcc.dri.edu/Climsum.html and African livestock production is taken from http://www.fao.org/es/ess/yearbook/vol 1 1/pdf/b02.pdf, using production levels from years of peak lion offtake in each country.

Supporting Information

Figure S1 The number of CITES reported exports of a) cougar trophies and b) black bear trophies from the US were highest in years when the most animals were harvested domestically in the western states ($P<0.001$ for each species).
Found at: doi:10.1371/journal.pone.0005941.s001 (0.69 MB EPS)

Figure S2 Trendlines for the population declines of a) cougars and b) lions. Individual states with statistically significant declines in cougar offtakes: MT, ID, AZ, UT and CO; individual countries with significant declines in lion offtakes: BW, TZ and ZW.
Found at: doi:10.1371/journal.pone.0005941.s002 (1.08 MB EPS)

Figure S3 Quotas, offtakes and catch rates each year since the peak harvests for cougars in Colorado, Montana and Utah and lions in Tanzania and Botswana; duration of lion hunts in Zimbabwe. Catch rates are (offtakes/quotas). Catch rates have generally declined because offtakes have fallen more quickly than quotas. Catch rates briefly improved in Utah and Botswana when quotas were adjusted downwards, but subsequently resumed an overall decline; Montana's adjustments in quotas are too recent to evaluate. For Zimbabwe, vertical lines indicate standard errors; numbers are sample sizes; duration of lion hunts became significantly longer between 1997 and 2001 ($P<0.01$). No other data are available on quotas or hunt durations from these or other countries/states. The bottom graphs show that declines in lion trophy exports are unlikely to reflect declining market demand; imports of lion trophies have increased, especially in recent years for captive bred or "canned" lion trophies for South Africa. The declines in trophy exports are also unlikely to be caused by irregular reporting; adding additional exports of skins from Botswana, Tanzania and Zimbabwe would not significantly change the pattern of decline.
Found at: doi:10.1371/journal.pone.0005941.s003 (1.38 MB EPS)

Figure S4 Simulated impacts of trophy hunting in cougars for varying degrees of habitat loss. Solid lines are the same as in Fig. 1: all available males above the age minimum are harvested each year and available habitat remains unchanged over 100 yrs. Dashed lines show population sizes with the same harvest strategies but with 20% habitat loss in 100 yrs; dotted lines represent outputs with 40% habitat loss.
Found at: doi:10.1371/journal.pone.0005941.s004 (1.49 MB EPS)

Table S1
Found at: doi:10.1371/journal.pone.0005941.s005 (0.03 MB DOC)

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Author Contributions

Conceived and designed the experiments: CP MK KN. Performed the experiments: MK. Analyzed the data: CP MK HB LP KN. Contributed reagents/materials/analysis tools: MK HC HB LP DLG GP MS AS GB LH KN. Wrote the paper: CP DLG KN.

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Darwin Initiative – Final Report

Darwin project information

Project Reference	DAR17-031
Project Title	**Ecological sustainability of leopard trophy hunting in Zimbabwe**
Host country(ies)	UK, Zimbabwe
UK Contract Holder Institution	WildCRU, Zoology Department, Oxford University
UK Partner Institution(s)	
Host Country Partner Institution(s)	Zambezi Society Zimbabwe Parks And Wildlife Management Authority
Darwin Grant Value	£214 886
Start/End dates of Project	December 2009 To November 2012
Project Leader Name	Dr Andrew J Loveridge
Project Website	http://wildcru.org/research http://zamsoc.david.co.zw/
Report Author(s) and date	Dr Andrew J Loveridge (WildCRU) Mrs Roseline L Chikerema-Mandisodza (Zamsoc/ ZPWMA) Mr Peter Musto (Zamsoc)



1 Project Background

This project aimed to address the need for improved management and sustainable conservation of African leopard (*Panthera pardus*) and the leopard habitat in Zimbabwe. The project collected ecological and management data to support a sustainable management of the species. The project was a three way partnership between the Wildlife Conservation Research Unit, Oxford University (WildCRU, lead UK institution), Zambezi Society (ZAMSOC) and the Zimbabwe Parks and Wildlife Management Authority (ZPWMA, project partner).

Zimbabwe have had a CITES allocated sport hunting quota of 500 leopards since 1992. However, this quota has never been fulfilled, which raises the question as to whether the leopard population can sustain the off take or whether the quota of 500 is allocated against a leopard population estimate that may no longer be realistic after several decades of land degradation and land use change.

This project sought to formulate the baseline data on which the impact of hunting on the leopard population could be assessed. There was little or no data to assess the impact of hunting on leopard populations or carry out a non-detrimental findings assessment. This project helped in the formulation of a CITES non-detriment determination for Zimbabwe through collecting baseline ecological and distribution data, establishing contacts with research experts and providing training.

2 Project support to the Convention on Biological Diversity (CBD)

Worldwide, leopards range from Critically Endangered (Amur, Javan and Arabian sub-species) to Near Threatened (Sub Saharan Africa). Sub –Saharan leopards (*P.pardus pardus*) were uplisted on the IUCN 'Red List' from a species of 'least concern' to 'near-threatened' in 2007 based largely on concerns over habitat loss. Leopards are on CITES Appendix 1. Trade in the species is strictly controlled. However CITES quotas are given to 12 African Countries on the basis of non-detriment reports to the CITES secretariat from the country concerned. Zimbabwe has the highest CITES quota of any African country. There is concern within the Wildlife Management Authority of Zimbabwe that this quota may no longer be appropriate given land use change and degradation within the country since the early 1990s when the quota was first implemented. This project has contributed information (with the first ever country wide survey for leopards) and capacity to addressing this question. Data collected by this project also contributes to the ongoing CITES 'Non-detriment finding' (NDF) determination for Zimbabwe.

Furthermore, leopards, being a large predator, are a crucial component of natural ecosystems in African Savannah ecosystems. Recent research suggests that ecosystems with intact predator guilds are more likely to be complex and biologically diverse. Finally large predators function as flagship species to motivate wide-scale conservation of natural ecosystems. Thus conserving large predators in their natural ecosystems contributes to the aims of the Convention on Biodiversity.

3 Project Partnerships

This project is a partnership of three institutions.

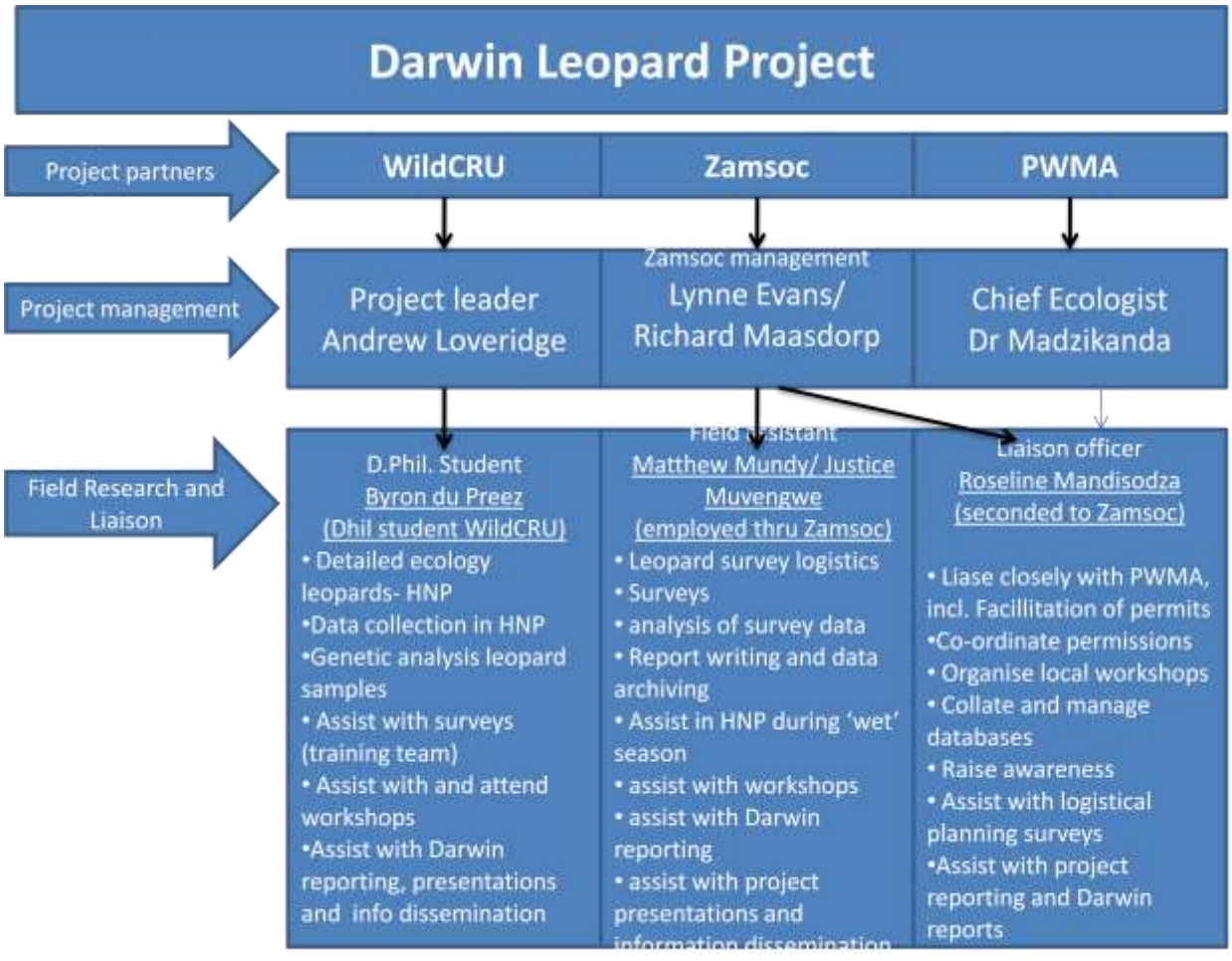
The WildCRU, Department of Zoology, Oxford University based research group is the UK partner in the project. Dr Andrew Loveridge is the project leader for this Darwin project. Mr Byron du Preez is a D.Phil. student registered at Oxford. Mr du Preez is working on a detailed study of leopard spatial ecology and social behavior in Bubye Valley Conservancy. His D.Phil study investigates the impact of trophy hunting on a closed/fenced population.

The Zambezi Society (ZAMSOC**),** an established conservation NGO that has previously undertaken assessments of the sustainability of leopard trophy hunting, has initiated the National Strategy for leopard conservation and brought together the partners for the project. ZAMSOC liaises closely with the Zimbabwe Parks and Wildlife Management Authority research staff, local stakeholders, will organise and run technical and management workshops, coordinate permissions and logistics for surveys, maintain the project website and disseminate results and information. ZAMSOC is the recipient of all host country DI funding.

Roseline Chikerema-Mandisodza, a Senior Ecologist in ZPWMA Scientific Services was seconded to ZAMSOC for the duration of the project and fulfilled a coordination and liaison role. Mr Peter Musto (Zamsoc Projects Officer) has been responsible for facilitating, co-ordination and running field surveys.

Zimbabwe Parks and Wildlife Management Authority (ZPWMA), is the government wildlife management authority responsible for management of protected areas and biodiversity, sustainable use of wildlife, population monitoring, and evaluation of CITES allocated quotas and other wildlife quotas. ZPWMA has commissioned this project and assigned a staff member to the research to facilitate and co-ordinate research, permission and compilation of data. ZPWMA are the management authority responsible for formulation of policy and implementation of CITES legislation. Thus, recommendations of this project can be translated into changes to policy and management. ZPWMA will provide access to official government records and databases. Staff time will be made available in CITES office, hunting and administration offices, permits office, scientific services, regional offices and national parks. ZPWMA will not receive direct funding. Roseline Chikerema-Mandisodza (ZPWMA, Senior Ecologist-Scientific Services), has been assigned to work on the project and has office space in the ZAMSOC office. The project has contact with and liaises with other projects working on leopards and other large carnivores. We anticipate collaborations arising from these contacts.

The organogram below sets out the operational structure of the project.



4 Project Achievements

4.1 Impact: achievement of positive impact on biodiversity, sustainable use or equitable sharing of biodiversity benefits

The goal of this project was to promote leopards as ecological flagships to reduce loss of biodiversity in whole ecosystems and as components of biodiversity to be sustainably used to generate revenue to benefit people. The project was able to highlight to wildlife authorities, professional hunters, photographic safari operators and other stakeholders within the country the need to monitor leopard population trends to ensure that levels of utilisation remain sustainable in relation to population size and the importance of future monitoring of population trends. Project staff (particularly R. Chikerema-Mandisodza) have also been integral in facilitating workshops and meetings, in particular a CITES facilitated Non-detriment finding workshop aimed at assessing the conservation needs and status of the species as a preamble to forming an NDF determination by the Parks and Wildlife Management Authority. This project's results, along with other stakeholder input, helped to inform this process and highlight management needs and gaps in knowledge.

4.2 Outcomes: achievement of the project purpose and outcomes

Project purpose

The project purpose was 'to collect ecological and management data to support a National Leopard Management Strategy and to build local and regional consensus to create and implement a conservation strategy to manage leopards and their habitats on a sustainable basis'. The project has made significant strides in gaining a detailed understanding of the distribution and size of leopard populations in Zimbabwe as well as of the factors that may determine population size and viability. A key output has been a series of baseline surveys of leopard populations that will inform current management and serve as a foundation for future assessment of population trends.

At the policy level this project did not achieve as much as had been hoped for, and in retrospect these aims may have been overly ambitious. However, significant strides were made in drawing attention to the need for sustainable management for leopards in Zimbabwe. This is likely to lead to further progress in implementing a more sustainable approach to setting quotas for leopard, based upon rigorous population data.

Furthermore, as part of improving and designing management strategies for leopards, the project has been engaged in the CITES non-detriment finding (NDF) process for this species. This is a crucial step in putting in place sustainable hunting practices in the country. The general consensus is that the current CITES quota of 500 leopard exports per year should be revisited to verify whether this is in fact sustainable for the species.

Project outcomes

Leopard population surveys

This project provided the first ever baseline leopard population data for many of the most important protected areas within Zimbabwe. This provides important information for wildlife managers to set hunting quotas sustainably on the basis of population size. In addition these surveys provide a starting point for future surveys designed to detect population trends over time. Population trend rather than finite population size is critical information on which wildlife managers should base their decisions. Survey sites were chosen based on areas identified as being important for leopard conservation in the county and covered a range of land-use areas ranging from fully protected National Parks, Safari Area, Communal Lands (Campfire Areas) and conservancies where leopards are trophy hunted

The survey method used by this project (spoor surveys) was chosen because it is relatively cheap and simple to implement and requires little training and expertise (aside from traditional tracking skills) and can thus be used to provide indices of population size over time. The project has provided the necessary training to wildlife managers to independently implement these surveys in the future. It is likely that ongoing engagement by the project PI (Loveridge), Zamsoc and research staff within PWMA will facilitate future survey work.

Surveys were undertaken at the following sites, largely by the Darwin Leopard Project survey teams, except for those sites marked '*' which were undertaken in collaboration with research teams based in these areas.

The map below shows the survey areas covered between 2010 and 2012.

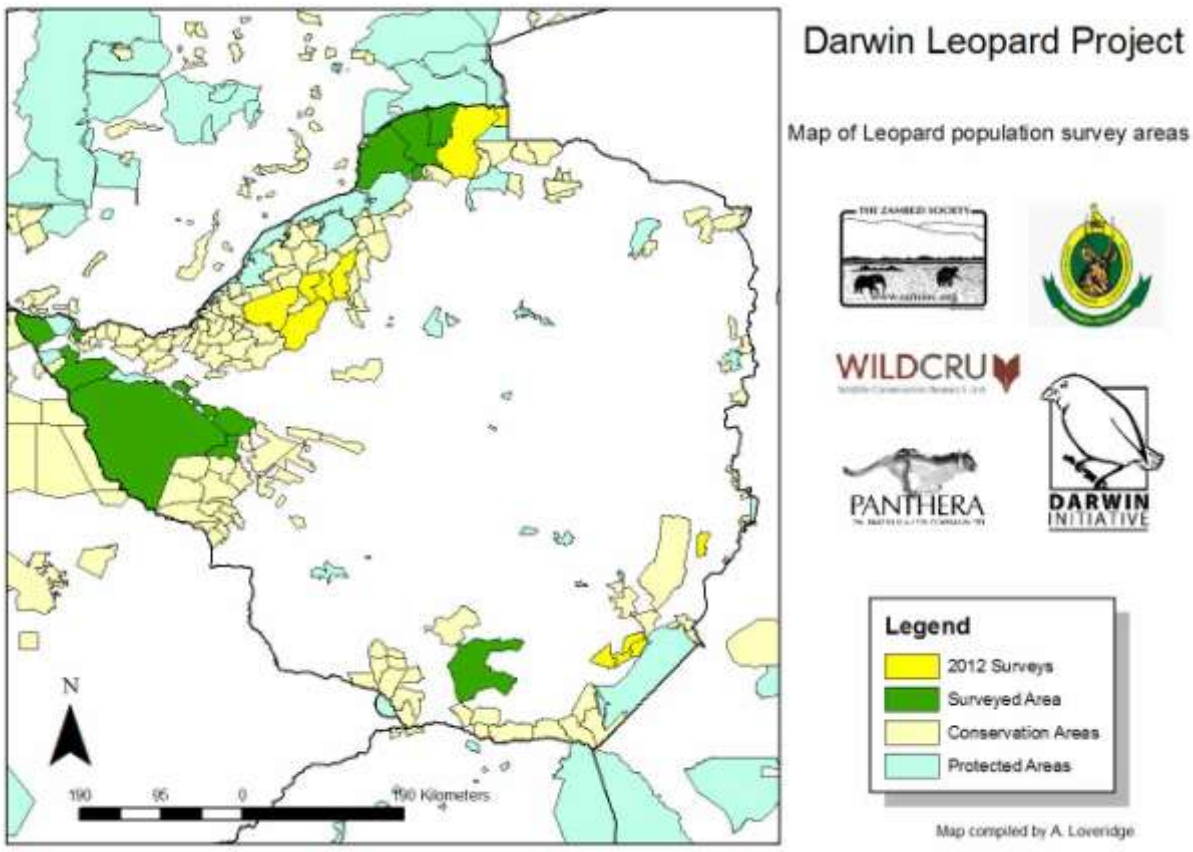


Figure 1: Map showing 2012 Leopard spoor survey areas

Western Region

Matetsi Safari Area

Hwange National Park (4 sites in 15 000km^2 Park)

Gwaai Intensive Conservation Area

Sikumi and Gwaai Forest

Tsholotsho Communal Land (Campfire Area)

Hwange Communal Land (Campfire Area, Chief Mvuthu's area)

Northern Region

Mana Pools National Park

Rifa and Urungwe Safari Areas

Chewore North Safari Area

Urungwe-Mukwichi Communal Land (Campfire Area)

Dande North and South Safari Areas

South-East Lowveld

Bubye Valley Conservancy

Save Valley Conservancy*

Malilangwe Conservancy*

Chipinge Safari Area

Gonarezhou National Park*

Baseline surveys to estimate leopard population size were undertaken at 18 sites, identified by PWMA and project staff as being important for conservation and management of leopards. These areas included three National Parks, seven Safari Areas, four Conservancies and three community areas. These surveys provide a starting point for future monitoring programmes for the species as survey routes are mapped and repeatable and repeat surveys can be undertaken relatively cheaply in the future to provide comparably data. The survey data provides the opportunity to assess key factors determining the presence of leopards. A pilot analysis (described in the output section) suggests that factors most influencing leopard presence are broad regional abiotic factors, human population size and the presence of competing carnivores (largely lions).

Detailed Study of Leopard Ecology

Detailed studies of leopards are rare because leopards are a cryptic and elusive species that are logistically difficult and time consuming to study. To address this paucity of ecological information a three year study of leopards was undertaken on the Bubye Valley Conservancy (BVC), led by WildCRU D.Phil. Student, Byron duPreez. BVC is a private conservancy of 3 600km^2, used primarily for high end trophy hunting safaris. Leopards are a key species in marketing safaris in this area. This study employed GPS collars to determine leopard (and lion) movements within the study site in relation to both competing carnivores and trophy hunting offtake. Intensive camera trapping (both baited and passive methods) was used to provide population estimates and provide information on leopard population demography. Population estimates derived from camera trapping were also intended to verify simultaneous estimates derived from spoor transects at this site. In addition data were collected on diet, habitat use and interactions with other species in the sympatric large predator guild were obtained and contribute to knowledge of leopard habitat requirements which is an important factor in population management.

BVC is a medium to high nutrient ecosystem that is primarily dominated by basalt soils and mopane woodland habitat. The area has a low mean annual rainfall of approximately 300mm. Research was conducted between May 2010 and September 2012 by a team consisting of a D.Phil. research student, at least one assistant, and one full-time local tracker. Additional help was sought from time to time as the situation demanded.

Between 2010 and 2012 18 leopards and 11 lions were captured and fitted with GPS/Satellite radio-telemetry collars that were programmed to record GPS fixes every hour on the hour – providing high resolution simultaneous spatiotemporal data on the movements and habits of both species in relation to one another.

75 camera-traps were deployed in 6 capture-recapture surveys in 2 different study sites between the years of 2011 and 2012 during which there was a major change to the conservation and management of one of the sites, when lions were introduced for the first time. The leopard population in this site was monitored before and after this introduction to assess

the effect that the introduction on lions would have on their behavioural ecology. Another, neighbouring, population of leopards coexisting with a stable lion population was monitored simultaneously to provide a level of control.

Between the surveys of 2011 and 2012 whilst the cameras were not being used for the core research in the Bubye Valley Conservancy, they were loaned to Wild Horizons in Victoria Falls to conduct a camera-trapping survey on their leopard population.

Spoor transects were conducted annually in BVC from 2009 – 2012, providing baseline data on the leopard and lion populations in the study sites. Several local Zimbabwean researchers and ecologists were trained by the DI Leopard Team on how to plan, conduct and analyse the results of these surveys, with the goal that they would conduct autonomous research. Indeed, several of the researchers trained went on to conduct the national spoor transect surveys as part of the Darwin Initiative Leopard Project research.

Compilation of leopard management data

Harvest and hunting quota data have been compiled for the key leopard populations for the project period to provide an overall assessment of sustainably of utilisation. These data are also being used in the analysis of the factors that affects the size and viability of leopard populations, in particular the harvest in relation to population size is potentially an important factor in determining population viability of many long lived species. In addition we have compiled quota and harvest data for lions and spotted hyaenas which are key competitors within the carnivore guild and could potentially also have an impact on leopard populations.

Management meetings, workshops and regional collaboration

A number of stakeholder meetings were held to bring together research and management expertise from within Zimbabwe. The first meetings took place in Oxford. Mrs Chikerema-Mandisodza was flown over to begin the planning process and also to familiarise herself with WildCRU. Meetings to plan the initial stages of the project took place between Mrs Chikerema-Mandisodza, Mr duPreez and Dr Loveridge over the period of a week. The first workshop was held in August 2011 in Marula at Stone Hills Lodge. This meeting comprised of 10 research scientists . The second meeting was held in Bulawayo on the 17 August 2011 (see workshop meeting report, attached), this was hosted by the Parks and Wildlife Authority and facilitated by Dr A. Loveridge and attended by 18 researchers, ZPWMA ecologists and managers. A key recommendation of this meeting was to hold a non-detriment finding workshop facilitated by a CITES approved facilitator. This took place in November 2012, facilitated by the Head of TRAFFIC, Southern Africa (Dr David Newton) and provided the preliminary stages of the CITES NDF process for leopards (see attached report).

Wider collaboration has been achieved with other researchers working in Zimbabwe as follows:-

- Mr Dusty Joubert (undertaking leopard monitoring in Save Valley Conservancy)
- Dr Rosemary Groom (carnivore research in Gonarezhou National Park and Save Valley Conservancy)
- Ms Tanith Grant (leopard study in Marula District, Matabeleland South
- Roger and Jess Parry (Victoria Falls Wildlife Trust)
- Dr Guy Balme and Dr Peter Lindsay (Panthera and Leopard research in KwaZulu Natal).

Extensive collaboration has been achieved with hunting operators in the various safari areas and conservancies surveyed by the project, with logistical assistance and support provided by staff on the ground. Support and assistance was also provided to survey staff undertaking leopard surveys by PWMA field stations and staff.

Training and capacity building

Training in survey methods (primarily spoor transects) has been provided for 21 field staff from field stations around Zimbabwe. Much of the training occurred when survey teams worked with field staff. In addition a training workshop to provide in depth training on population surveys was help from 9^{h}-13th of May at Hwange Main Camp. This workshop trained twenty-one PWMA, Forestry and Rural District council field staff as well as a number of staff from local NGOs.





The twenty one participants were trainee ecologists and rangers from Zimbabwe's National Parks, Safari Areas and Forestry Commission Areas, CAMPFIRE representatives from Rural District Councils, and staff from the Zambezi Society itself. A combination of classroom lectures (pictured left) and field work (pictured right) were used.

The following areas were covered:-

- Overview of leopard population biology
- Distribution of leopards in Africa and Zimbabwe
- Overview of techniques used in monitoring carnivores
- Why study/monitor leopards?
- Discussion on use of spoor as a technique to monitor animals including leopards
- Differences between leopard spoor and other cat spoor
- Leopard identification and aging - in the field
- Aging and sex determination from spoor
- Trophy size estimates using spoor
- Spoor data collection
- Spoor data analysis

A key area where training was facilitated by the project was by arranging for two senior ecologists from PWMA (Mr Godfrey Mtare and Mr Edwin Makuwe), to attend the Postgraduate diploma course in International Wildlife Conservation Practice at the Recanati-Kaplan Centre at Oxford (see www.wildcru.org/courses/diploma). Both men passed the course (Mr Mtare has since gone on to complete a Masters degree) which focuses extensively on conservation and management of large felids. Both Mr Mtare and Mr Makuwe have returned to Zimbabwe and both are based in the field and in a strong position to utilise their new skills.

In addition to training and capacity building the project undertook a public outreach campaign. Leopards are frequently confused with other predator species (serval, cheetah and sometime spotted hyaena) and this leads to over-estimation of numbers and also incorrect identification of problem causing animals. The project produced and printed posters in English, Shona and Ndebele. These were distributed to schools, provincial and ZPWMA offices across the country. Samples of these posters accompany this report.

4.3 Outputs (and activities)

Leopard population surveys

Table 1 presents details of the leopard surveys undertaken by the project and project partners. Sites marked (*) are those undertaken by project partners outside the remit of the main project, but where data were provided for the purpose of analysis. In total 48123km^2 of important leopard habitat were surveyed. This constitutes 12.3 % of the land area within Zimbabwe and the most important leopard areas. Surveys were undertaken on transects totalling 14400km in length (with each transect being run on two or more occasions). These survey routes have been logged for use in any ongoing survey work. These are measures of the significant amount of effort that was put into leopard surveys for this project.

Table 1: Leopard survey sites

Survey Area	Year	Region	Area (km^2)	Land Use	Transect km
Chirisa&Sengwa	2012	Central	1713	Hunting	453.4
Chizarira	2012	Central	1948	Protected	534.9
Omay	2012	Central	1865	communal	466.16
Chewore North	2012	Northern	1648	Hunting	399.8
Dande	2012	Northern	1155	communal	443.1
Hurungwe (Nyakasanga+Rifa)	2011	Northern	1709	Hunting	732.8
Mana pools	2011	Northern	1287	Protected	469.4
Mukwichi	2011	Northern	1853	communal	386.6
Bubye Kwalusi	2010	South East	480	Hunting	165.8
Bubye North	2010	South East	1071	Hunting	307.8
Bubye South	2010	South East	1394	Hunting	432.8
Chipinge	2012	South East	261	Hunting	126.9
Gonarezhou*	2009	South East	4965.9	Protected	490.4
Save North*	2006	South East	1753	Hunting	565.1
Save South*	2006	South East	834	Hunting	387.1
Malilangwe*	2010	South East	476.5	Hunting	120.6
Gwaai Valley	2007	Western	927	Hunting	841.4
Hwange MC	2009	Western	1737	Protected	486
Hwange Robbins	2008	Western	1699	Protected	436
Hwange Wilderness	2008	Western	1817	Protected	430
Hwange Central	2012	Western	5676	Protected	674
Hwange Southern	2012	Western	2513	Protected	500.8
Matetsi	2008	Western	1934	Hunting	1095
Ngamo forest land	2008	Western	1386	Protected	488
Tsholotsho	2010/2011	Western	1397	communal	1275
Hwange- Vic Falls	2011	Western	392	communal	269.9
Marula*	2010	South East	2674	communal	610
			48 123.4		**14 400**

The map below (Figure 2) presents the results of population surveys across all study sites and shows leopards per 100km2. In general, as indicated in the figure, high densities were found in the North and South East of the country corresponding to high nutrient soils and well protected wildlife areas. Populations in the West of the country tended to be lower density, likely because of low nutrient, dystrophic soil systems. Overall leopard populations were higher in protected areas and low in human dominated systems (Communal Lands).

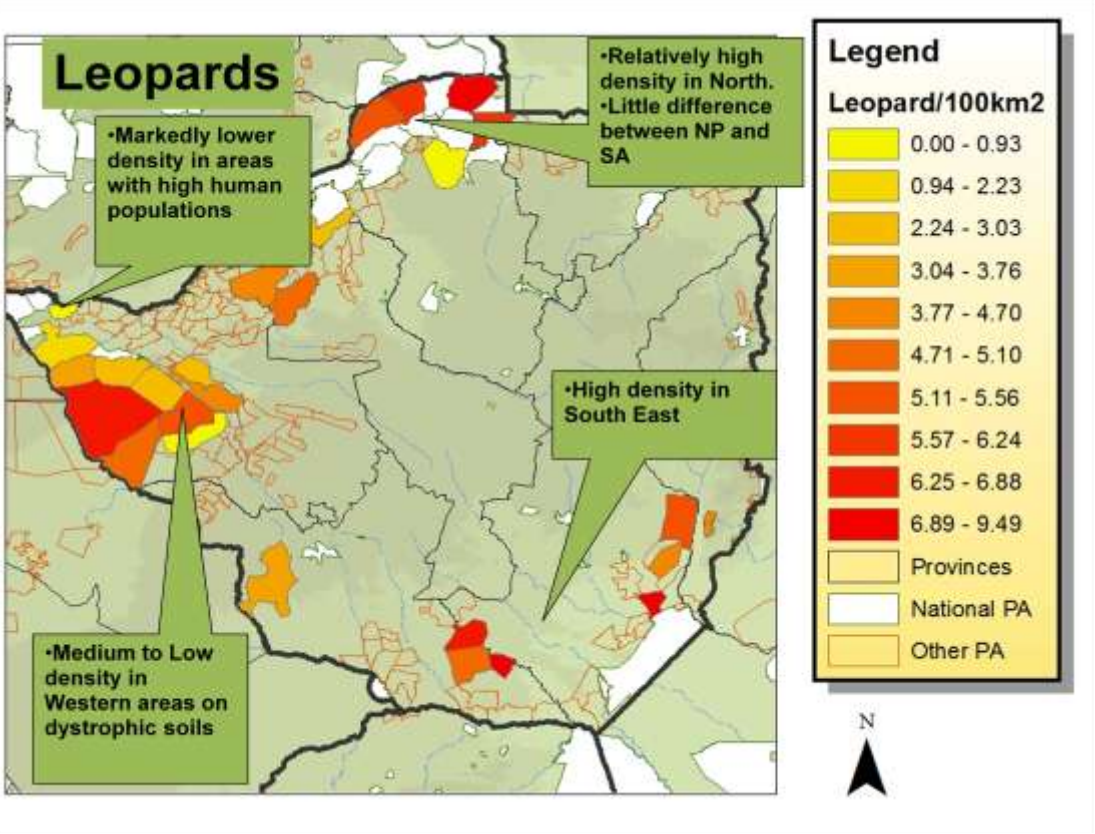


Figure 2: Map showing leopard population density in surveyed areas

Using the Akaike Criterion approach we examined factors that could potentially influence leopard distribution and population viability. Key factors were considered to be Human Appropriation of Net Primary productivity (HANPP), competing carnivores, Regional ecology, hunting pressure, Soil nutrient status and Rainfall. HANPP was closely correlated with human population density so that later was excluded from models to limit confounding correlation. The most highly weighted model (Table 2; 3 and 4) included the effects of HANPP, potential competitors within the carnivore guild and regional variation. Surprisingly the effects of trophy hunting were not included in any of the top weighted models. It is possible that use of quota rather than harvest data in the models may have limited the importance of this effect in the model, however harvest data were not available at the time of analysis. These models will be re-run with harvest data substituted for quota data. Nevertheless, human impact (HANPP/ human density) appears to have the most profound effects. The effect of competitors also appears to have a strong effect on leopard population density, suggesting that there may be an intriguing situation were in areas where lions are heavily hunted (and populations are therefore depressed) may improve the viability of leopard populations (Figure 3). Further data would help to disentangle these issues and steps are being taken to source data from extra sites. In particular sites where human impacts are high would be valuable (Figure 4). The project largely focused on survey sites that were important for leopards and these are in general well protected conservation areas with low human presence. These data are currently being written up for publication.

Model	Deviance	AICc	Delta	Weight
HANPP + Hyaena + Lion + Region	**77.14**	**131.42**	**0.00**	**0.28**
HANPP + Hyaena + Region	**95.34**	**133.37**	**1.95**	**0.10**
Hyaena + Region	**109.91**	**133.75**	**2.33**	**0.09**
Lion + Hyaena + Region	**97.93**	**134.12**	**2.70**	**0.07**
HANPP + Region	**111.76**	**134.22**	**2.80**	**0.07**
Hunting + Hyaena + Region	**102.82**	**135.48**	**4.06**	**0.04**

(+ 28 further models weighted < 0.04)

Table 2. Top weighted AIC models

Factor	Coefficient	SE	z value	Pr(>|z|)	P
Region (intercept)	**4.587516**	**1.692628**	**2.606**	**0.00916**	**0.001**
Human impact	**-1.345634**	**0.623206**	**2.064**	**0.03897**	**0.01**
Trophy hunting	**-0.406534**	**0.541359**	**0.715**	**0.47488**	**n/s**
Hyaena density	**1.615015**	**0.649844**	**2.381**	**0.01727**	**0.01**
Lion density	**-0.960855**	**0.501222**	**1.813**	**0.06983**	**0.05**
Soil nutrient	**-0.069419**	**0.460697**	**0.143**	**0.88640**	**n/s**
Rainfall	**-0.048322**	**0.636411**	**0.072**	**0.94260**	**n/s**

Table 3. Results of model averaging, showing that region, human impact and competitors remain the most important factors determining leopard density.

Variable	Relative importance
Region	1.00
Hyaena Density	0.83
Human Impact	0.70
Lion Density	0.56
Trophy hunting impact	0.17
Soil Nutrient	0.12
Rainfall	0.12

Multiple R-squared: 0.7036, Adjusted R-squared: 0.6189 F-statistic: 8.308 on 6 and 21 DF, p-value: 0.0001091

Table 4: showing the relative importance of variables in the model in determining leopard population size, Region, Competitors and human impact were all relatively important. Trophy hunting and abiotic factors contributed less weight to AIC models

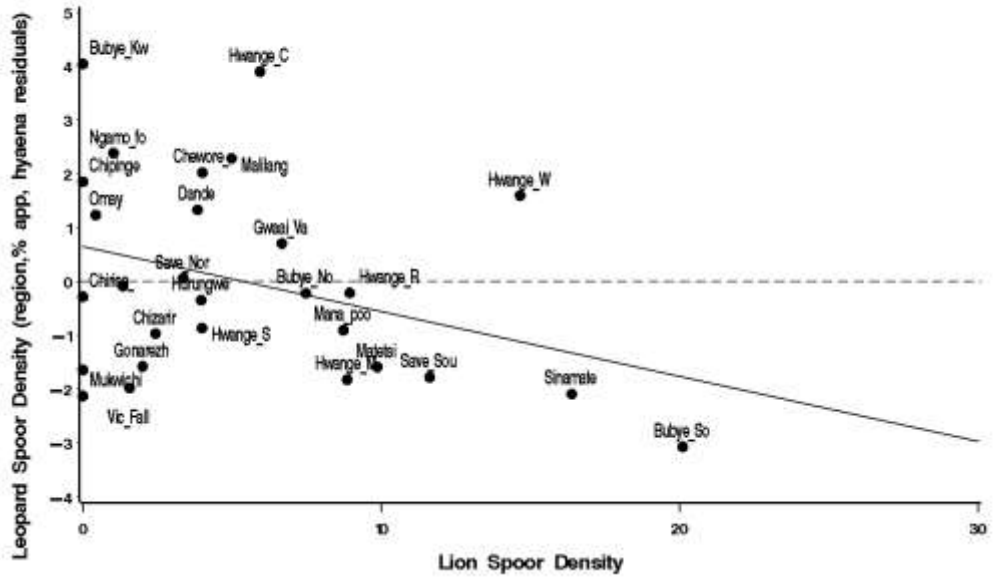


Figure 3: The relationship between Lion spoor density (a surrogate for population density) and variation in leopard spoor density.

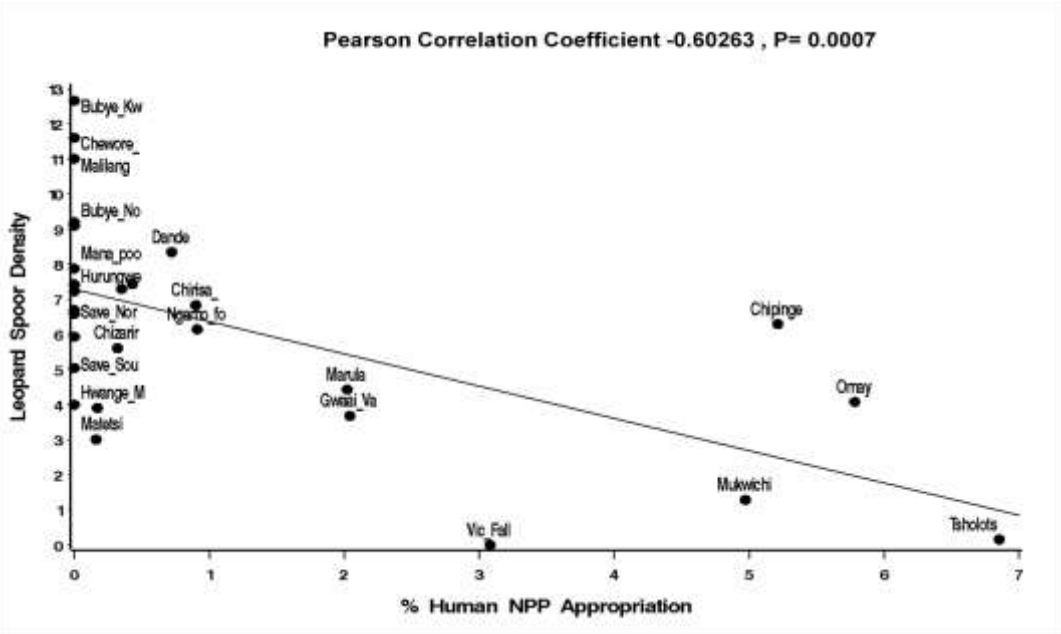


Figure 4: The relationship between leopard population density and human impact. Lower leopard densities were found when human impact was high.

Detailed field study of leopard population ecology

In total, over 150,000 GPS fixes from the radio-telemetry collars on both leopards and lions were recorded. These will be investigated for interaction between and within the species, and the outcome of these interactions. The GIS data also provides accurate details on species' home-ranges and territories, and the seasonality of these, as well as habitat preference and utilisation, survival rates, and habitat mediated behaviours.

Over 40,000 images of leopards were recorded in the 6 camera-trapping surveys carried out between 2011 and 2012. The cats in each of these photographs were individually identified and named, based on their unique pelage patterns. The results were then analysed using capture-recapture models that take the ratio of known ('marked') leopards to previously unmarked individuals, and repeat this over many occasions in order to estimate population abundance for

a given area. The more individuals that can be captured at each occasion, resulting in fewer unknown animals on subsequent occasions, the more accurate the results. We implemented a novel method of camera-trapping leopards using baits in order to attract them to the cameras so as to increase both capture probability and capture frequency. We tested this method against the traditional method that uses paired cameras carefully sited to capture both sides of the leopards as they naturally wander around their territory. This 'passive' method requires as much skill as luck, and whilst it has proven valuable in the past, we saw an opportunity for improvement. A comparison of these camera-trapping methods carried out on the same population of leopards in the same season shows that several resident leopards that were captured in the baited cameras are missed using the traditional passive set-up, and none of the cubs in the population are captured. Several cubs were captured on many different occasions at the baited camera-trap sites. This is an important demographic, and therefore result, as it indicates the health and stability of the leopard population, and may reflect and be affected by management decisions.

One collared male leopard was shot by trophy hunters during the course of the field work, and this provides important information on the effect of trophy hunting on leopard population demographics and behaviour, as the reactions from the leopards in nearby territories were monitored. An additional 2 collared leopards were killed by lions, and another by a leopard, indicating the importance and prevalence of intra-guild competition, and the need for solid data on this interaction so that management is able to make well informed decisions.

The data collected during the Darwin Initiative Leopard Project field work will be published as scientific papers in peer reviewed journals.

These will include papers on:

- A comparison between baited and passive camera-trapping methods
- Leopard ecology in the Bubye Valley Conservancy
- The effect of intra-guild competition on leopard behavioural ecology
- The effect of trophy hunting on leopard behavioural ecology
- Population management model

The leopard is a flagship species, but more importantly, it is an umbrella species. Leopards therefore have the ability to conserve other species by proxy. Researching relevant data on leopard behavioural ecology accurately is vital to sustainable management of the population, but also ensures conservation of a host of non-target species, as long as land and habitats are protected for trophy hunting of leopard. A reasonable regional hunting quota, based not only on abundance, but on the overall effect of removal at a population level, will ensure the long-term availability of leopards as a trophy species, and secure their future conservation status.

Results of the annual spoor transects and camera-trapping surveys were used to inform BVC management when setting trophy hunting quotas for lions and leopards. The lion quota was increased sustainably, and the leopard quota reduced based on the results of this research.

The results of this research were presented in Harare 2012, at a CITES Non-Detriment Finding workshop on leopard trophy hunting in Zimbabwe, during which a draft management plan for the future hunting off-take of leopards in Zimbabwe was formulated.

This study helped inform and shape several other local leopard research projects. We also planned and coordinated the National Leopard surveys, which is the first rigorous attempt to census Zimbabwe's leopard population.

Workshop and meetings

The project has organised several workshops involving key stakeholder groups and these have functioned to raise awareness of the need for improved management of the species and also provided opportunities for information exchange. Meetings undertaken are outlined in the section above and copies of workshop reports are provided.

Training and public outreach activities

Training was undertaken throughout the project, much of it as on the job practical training of ecological staff at ZPWMA stations in protected areas. In addition a formal training workshop was held and attended by ZPWMA research ecologists from across the country. Over the course of the project two Zimbabwean ZPWMA ecologists received post-graduate diplomas from Oxford University and one Zimbabwean is currently completing a DPhil. This training was all directly facilitated by the Darwin Initiative project. Posters aimed at increasing public awareness of leopards were widely distributed in the country as part of a public awareness campaign.

4.4 Project standard measures and publications

See table in Annex 4

4.5 Technical and Scientific achievements and co-operation

CITES Preliminary Non-detriment Finding (NDF) workshop

A key technical outcome of this work, largely resulting from attention to the issue of leopard sustainable use highlighted by ZPWMA, this project and other stakeholders (for instance Panthera Foundation), was a preliminary Non-detriment Finding workshop, held under the auspices of the CITES authority within Zimbabwe. The full report for this workshop accompanies this report and provides full details of the NDF process and workshop. This workshop was convened by PWMA and Panthera to bring together all stakeholders in leopard conservation and utilisation. The workshop, facilitated by Dr David Newton (head of TRAFFIC, southern Africa) brought together expertise from throughout the country. The radar chart (Figure 5) below summarises the findings of the workshop. Interpretation of the diagram suggests that points of information that fall far from the centre represent areas of uncertainty (and/or low confidence in the sustainability of harvest) that could result in a detriment finding by the CITES authority of the country. There was significant debate as to the real state of knowledge and consensus of the workshop was that a qualified or precautionary non-detriment finding be made, contingent on further management actions and research being carried out. The current CITES quota was to be continued for a further three years.

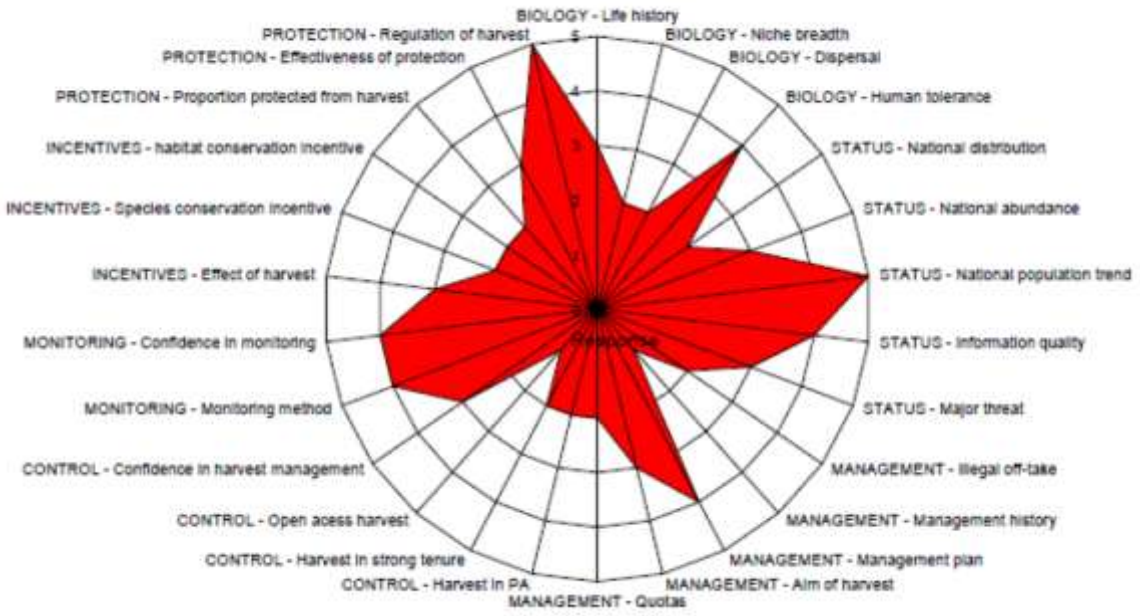


Figure 5: Radar chart showing the results of the NDF determination workshop (taken from NDF workshop report).

4.6 Capacity building

As outlined above the project undertook the following training activities

- Formal training of 21 ZPWMA / Forestry / Rural district council staff in survey methods. This was to enable local ecologists to undertake surveys in their areas of responsibility as part of the DI survey team and to continue with monitoring in future
- Practical on-the-job training provided to ZPWMA staff participating in surveys. Provision of this training ensures that staff on the ground are familiar with survey methods and are able to repeat baseline surveys in future
- Two ZPWMA ecologists (G. Mtare and E. Makuwe) received training at WildCRU, Oxford and qualified with Post-graduate diplomas (see www.wildcru.org/courses/diploma). Both ecologists have returned to Zimbabwe and are still employed within ZPWMA and are active in conservation management.
- A DPhil student (B. duPreez) is currently writing up a DPhil. Thesis at Oxford, having competed all the field data collection under the auspices of the project. Mr duPreez intends to return to Zimbabwe and contribute to Zimbabwean wildlife management and conservation

4.7 Sustainability and Legacy

In terms of legacy one of the key achievements of this DI project has been the baseline surveys for leopards and other carnivores in all the most important protected areas in Zimbabwe. This is the first wide-scale systematic survey of its kind. The surveys covered around 12% of the total area of the country and have provided baseline information for managers going forward. Should these surveys be repeated periodically by wildlife managers they will provide crucial trend data for many of the carnivore species in the country providing a basis for population trend assessment in future management. This will contribute to sustainability of wildlife resources in the country and be an outstanding legacy to the DI project. Further surveys, involving all the current project partners are planned for 2013, suggesting that project partners are likely to stay in touch and continue to work together. Project resources will continue to be used for their original purposes as part of ongoing research undertaken by WildCRU and continue to contribute to assessment of and research into sustainability and conservation of natural resources in Zimbabwe

Meetings and workshops organised and attended by the project have been important in bringing stakeholders together to discuss conservation and sustainable use of leopards in the country. Workshops (particularly the NDF process) have highlights gaps in knowledge and areas where the precautionary principle should be applied. It is hoped that attention drawn to the need for sustainable management of the species will have an influence on future management policy implemented by decision makers within the country's wildlife management authority.

5 Lessons learned, dissemination and communication

Throughout the project we have involved as many stakeholder groups as possible in dissemination of information. There has been a very enthusiastic response from other researchers in the country and many have contributed data to the project which has boosted the data available for analysis of factors influencing leopard distribution. ZPWMA ecologists have been included in training, planning and implementation of surveys and in all workshops. There is thus wide awareness of the DI leopard project in Zimbabwe. In addition project news has been posted on the Zambezi Society website (www.zamsoc.org). Talks on the project to stakeholder groups (such as professional hunting groups) have been given at suitable occasions and project partners are planning a final seminar presentation for mid 2013 to feedback the key results of the survey to Zambezi Society members and other stakeholders.

Scientific outputs of the project are in the process of being prepared. Data analysis from the detailed study and surveys is currently being undertaken and papers will be submitted for peer review during 2013.

Possibly the key lesson learned by the project is that changing management policy is a very slow process and three years is not enough to fully achieve this. However the project has highlighted the need for revision and reassessment of leopard management with Zimbabwe and this has been communicated to stakeholders and there is wide commitment within ZPWMA to achieving this.

5.1 Darwin identity

The Darwin project formed a distinct project (The Darwin Leopard Project) with a clear identity recognised by project partners and by other stakeholders within Zimbabwe. The Darwin Initiative for Biodiversity Logo was used on all project outputs and reports wherever possible. Logos were also used on project websites. There was recognition within the host country that the Darwin Initiative for Biodiversity funded much of the Darwin Leopard Project research and activities.

6 Monitoring and evaluation

Annex 1 has been completed and activities against project outputs and appropriateness of project indicators noted.

Output 1 was to undertake population surveys across Zimbabwe to ascertain leopard population distribution and abundance. Indicators of success were to complete surveys for leopards in at least 17 sites and to compile these data for analysis. 18 survey sites were completed and data compiled and presented to managers and ZPWMA decision makers at a workshop at the end of 2012.

Output 2 was to set up a detailed behavioural study of leopards to assess potential impacts of hunting and other important factors on leopard population dynamics. The study was undertaken at Bubye Valley conservancy from 2010 to 2012. As described above, this study successfully collared 18 leopards and undertook three camera trap surveys (providing demographic and population data). These data, once analysed, will contribute a better understanding of leopard population dynamics and the factors (including hunting) that affect leopard populations in protected areas. The data collected for this component of the project meet with the expected indicator of success put forward in the original log frame.

Output 3 was to compile data on past management from historical records, with the indicator success being a database of past management available to managers and policy makers to inform management of the species. We have compiled the hunting quota data for all out survey sites, but much information appears to be missing or unavailable from the official records and this highlights the need to overhaul record keeping within ZPWMA.

Output 4 was for a National management workshop. At the end of 2012 a National Non-detriment finding workshop was help for leopards. This workshop highlighted management needs for the species and came up with necessary activities to ensure sustainable management and better understanding of changing conservation needs of the species. This meeting was attended as far as possible by all identified stakeholders in leopard conservation (ZPWMA managers and ecologists, Conservation NGOs, independent research scientists and the hunting industry). It was originally envisaged that a more formal Management Strategy meeting would be held, however a stakeholder workshop held in 2011 identified that a CITES driven non-detriment finding workshop was crucial for ongoing leopard management and this largely subsumed and superseded the need for the management strategy meeting.

Output 5 was to organise workshops and meetings to facilitate regional collaboration of stakeholders and research scientists. These workshops were held and resulted in the wide and ongoing collaboration amongst stakeholders as well as identification of management needs such as the requirement for a non-detriment finding process to take place.

Output 6 aimed to provide opportunities for training of local field staff in survey techniques and to provide training to local ecologists and conservationists to facilitate ongoing management and conservation work in the country. Indicators were training provided for 25 field staff ,

opportunities sought for enrolment of local students in the WildCRU diploma course and training for a Zimbabwean DPhil. student and other field staff from partner institutions. A training course was held for field staff, two ZPWMA ecologists were enrolled, attended and passed the postgraduate diploma course and one Zimbabwean graduate student is currently completing a D.Phil. at Oxford. These appear to be suitable indicators of the success of the outputs for this component of the project.

The six monthly Darwin reporting schedule provided the project with the opportunity to evaluate progress as part of ongoing reporting. It was not felt that additional monitoring and evaluation was required in addition to this. There has been no external evaluation of this project.

6.1 Actions taken in response to annual report reviews

The last reviewer recommendation (May 2010) was that the Darwin project should be more fully reported on the host institution website, this recommendation was implemented. This was discussed with project partners. It was also suggested that a stakeholder analysis be undertaken. The project has considered carefully who may constitute stakeholder groups and attempts have been made to include all such in meetings and workshops.

6.2 Additional funds or in-kind contributions secured

- Toyota Zimbabwe provided a 4x4 vehicle for use on survey sites in the northern region of Zimbabwe
- Funds from the Recanati-Kaplan Trust were made available through WildCRU to purchase 30 additional camera traps for use in the field at the Bubye Valley Conservancy field site. This allowed the introduction of in depth passive camera trapping at the site and a comparison between baited and passive methods of camera trapping for leopards.
- Panthera (via PWMA and Roseline Chikerema-Mandisodza) funded and facilitated the CITES NDF workshop held in Harare in November 2012.

6.3 Value of DI funding

There is very little resourcing available for biodiversity conservation, field survey work or field studies and conservation work within Zimbabwe. Darwin funding was absolutely critical in making this project possible. It is inconceivable that this work could have been carried out to the extent that it has without the crucial support of DI funding. In addition, by covering core costs, the DI grant allowed the project to leverage additional funding and in kind assistance (outlined above) over the life of the project.

Annex 1 **Report of progress and achievements against final project logframe for the life of the project**

Project summary	Measurable Indicators	Progress and Achievements April 2007 - March 2008	Actions required/planned for next period
Goal: Effective contribution in support of the implementation of the objectives of the Convention on Biological Diversity (CBD), the Convention on Trade in Endangered Species (CITES), and the Convention on the Conservation of Migratory Species (CMS), as well as related targets set by countries rich in biodiversity but constrained in resources.			
Sub-Goal: Promote leopards as ecological flagships to reduce loss of biodiversity in whole ecosystems and as components of biodiversity to be sustainably used to generate revenue to benefit people.	Leopard populations are stabilised and increase, leopard habitats are conserved, providing protection for other components of biodiversity. Use of species is managed within sustainable limits.	• Non-detriment findings by National CITES Technical Committee submitted to CITES for the species • Future surveys show leopard habitats are better protected and leopard populations healthy	[redacted]
Purpose To collect ecological and management data to support a National Leopard Management Strategy and to build local and regional consensus to create and implement a conservation strategy to manage leopards and their habitats on a sustainable basis.	Increased understanding of the distribution, viability and previous management of leopard populations and improved motivation, capacity and tools to monitor and manage them.	This project collected both detailed behavioural (through GPS collars and camera trapping), abundance and distribution data (through population surveys) and compiled management information (from historical management records) on African leopards in Zimbabwe. This information has been used to inform reassessment of the management of the species. Training and capacity building has been undertaken to support future monitoring and research work.	
Output 1. National leopard survey provides knowledge of distribution, population viability and wider ecosystem that will inform national management.	Surveys of distribution and abundance of leopards and other mammals undertaken in 12 protected areas, 2 conservancies and 2-3 rural districts councils (years 1 and 2)	Population surveys were carried out in protected areas, safari areas, conservancies, forest land and communal land identified as key areas for leopard conservation. The indicator for this output was appropriate and suggests that the output was achieved by the project	
Activity 1.1 National leopard survey to determine leopard population size and distribution at ~17 sites across the country		Activity was undertaken and completed: 18 surveys were undertaken by the leopard project survey team.	
Activity 1.2, 1 Baseline survey data compiled. Results disseminated, reports to decision makers in management institutions, data inform quota allocation, CITES non-detriment findings		Activity was undertaken and completed and results of the surveys were compiled and presented to managers and decision makers at the workshop in December 2012. These results contribute to the CITES NDF	

		process.
Output 2. Impacts of trophy hunting on behavioural ecology and population viability recognised and incorporated into management during the life of the project and ultimately into policy through a National Management Strategy	Technical knowledge gained in years 1-3 by project scientists on the impacts of trophy hunting on behavioural ecology and viability of leopard populations, and put forward for inclusion in national planning, changes in management and policy	A detailed study of leopard behavioural ecology was undertaken over 3 years by DPhil. Student and project PI. The completion of this study is an indicator of the achievement of output 2. Valuable insights have been gained on behaviour of the species within a hunting area, including interactions with other competitors within the carnivore guild (which may have profound effects on leopard social and population dynamics).
Activity 2.1 Detailed ecological study to measure the demographic impacts of trophy hunting, undertaken at hunted and un-hunted study sites, results inform management strategy		Detailed study undertaken with 18 leopards radio-collared and 3 camera surveys completed (>150 000 photos of leopards taken). Results inform management at the conservancy and more widely.
Activity 2.2 Results disseminated, published in relevant peer reviewed journals, lessons inform management of leopards and setting of hunting quotas		The data collected by this study are currently being analysed as part of a DPhil. Thesis write-up. Data will be written up as 3-4 scientific papers and submitted for peer review.
Output 3. Trends in past management and utilisation identified and used to inform management during the life of the project and incorporated into the National Management Strategy	Database of historical leopard management and utilisation compiled by project staff by year two	Historical records of management leopard management were accessed and compiled where possible. Activity highlighted possible shortcomings in the current record system.
Activity 3.1 To inform future management, data on historical leopard hunting and management trends complied, database analysed for trends in quota allocation, trophy size, off-take		Where possible hunting quotas and off-takes have been compiled from historical management records. Quota data were compiled for all the survey sites in order to carry out analysis factors influencing leopard population size and distribution. Harvest data were unavailable, but are now being compiled.
Activity 3.2 Identify shortcomings of system and future management requirements. Propose solutions as part of National Strategy based on field/ historical data		A complete analysis of historical management data was not feasible as many records are missing or unavailable. Regional or locational analysis may however be possible and this is being explored.
Output 4. Sustainable management of leopard populations and leopard habitats implemented through National Leopard	National Leopard Management Strategy workshop held to devise strategy, in consultation with and attended by all stakeholders in year	Workshops were organised and attended by project staff, local conservationists, ZPWMA ecologists and managers and other stakeholders (eg hunting industry, local councils and conservation organisations). The final workshop contributed to a preliminary CITES non-detriment finding for leopards as well making significant management

Management Strategy	three	and conservation recommendations for future action. Given the urgent need (identified at a stakeholder and research workshop in 2011) for an NDF assessment a NDF meeting superseded the planned Management Strategy meeting.
Activity 4.1 Design a stakeholder driven National Leopard Management Strategy through participatory workshop		A participatory workshop (CITES NDF) organised and run by Roseline Chikerema-Mandisodza.
Activity 4.2 Approval sought by project partners from Minister for Environment & Tourism for National management strategy. Strategy endorsed		This activity has not been undertaken and it may have been over-ambitious to expect to achieve this within a three year project period as major policy change is relatively slow
Output 5. Improved regional collaboration and technical exchange between conservation managers and scientists in southern Africa	i) Regional technical and management meetings organised by the project (years 1 and 2). ii) Potential regional collaborations set up to enhance project impact	A number of meetings and workshops were held to facilitate exchange of information and technical knowledge between managers and research scientists. Significant collaboration between research scientists working on large carnivores was achieved and this has resulted in additional data being acquired for analysis (indicator i and ii). While some experts and scientists from beyond Zimbabwe attended workshops the project did not manage to include all experts from the wider region and this may have, in practice, been beyond the scope of what could be achieved (indicator ii).
Activity 5.1 Two Regional technical workshops, attended by regional and local scientists, conservationists and managers, organised. Knowledge transferred and collaborations established		Two meetings/ workshops organised and attended by stakeholders and scientists. Significant collaborations established and network of experts created that will have long lasting effects.
Activity 5.2 Workshops reports (2) complied, published and distributed to all stakeholders and workshop participants		Workshop reports compiled (see accompanying reports)
Output 6. Local conservationists monitor important components of biodiversity, using skills acquired during project, leading to improved monitoring of leopard trophy hunting off-takes and management of leopard populations and their habitats	i) 25 PWMA (field and administration staff), 5 RDC, 3 Forestry and hunting staff trained in monitoring of leopard populations, trophy hunting and survey methods ii) 2-4 Zimbabweans gain valuable training and experience on project, iii) 2-3 Zimbabwean graduates receive diplomas	Training was provided to ZPWMA, Forestry and RDC staff in survey techniques and followed up with field training where appropriate. Feild staff from WildCRU, Zamsoc and ZPWMA acquired experience of field survey techniques. Zimbabwean ecologists and conservationists receive training through a DPhil. Degree and Diploma courses. This training has increased the skills base within the ecology and conservation sector. Indicators of the success of Output 6 were appropriate.
Activity 6.1 Identify training needs, conduct field training exercises (surveys, radio-tracking, analysis of data), conduct in-house training programmes for administration staff		Training in survey techniques was identified as a key need. A training workshop was organised at Hwange Main Camp for 21 ZPWMA and Forestry ecologists. On the job training was provided by the survey team to local ecologists, managers and game scouts where ever possible.

Activity 6.2 Develop training manuals where needed (e.g., survey manual; quota allocation; trophy measurement protocols). Manuals used in conjunction with training sessions	A spoor survey manual was written and distributed as part of survey training provided by the DI project (see manual accompanying this report)
Activity 6.3 Identify host country personnel for Diploma training course	Two host country ZPWMA ecologist identified to attend the Oxford Diploma course and attendance facilitated by the DI project

Annex 2 **Project's final logframe, including criteria and indicators**

LOGICAL FRAMEWORK

Project summary	**Measurable Indicators**	**Means of verification**	**Important Assumptions**
Goal: Effective contribution in support of the implementation of the objectives of the Convention on Biological Diversity (CBD), the Convention on Trade in Endangered Species (CITES), and the Convention on the Conservation of Migratory Species (CMS), as well as related targets set by countries rich in biodiversity but constrained in resources.			
Sub-Goal: Promote leopards as ecological flagships to reduce loss of biodiversity in whole ecosystems and as components of biodiversity to be sustainably used to generate revenue to benefit people.	Leopard populations are stabilised and increase, leopard habitats are conserved, providing protection for other components of biodiversity. Use of species is managed within sustainable limits.	• Non-detriment findings by National CITES Technical Committee submitted to CITES for the species • Future surveys show leopard habitats are better protected and leopard populations healthy	
Purpose To collect ecological and management data to support a National Leopard Management Strategy and to build local and regional consensus to create and implement a conservation strategy to manage leopards and their habitats on a sustainable basis.	Increased understanding of the distribution, viability and previous management of leopard populations and improved motivation, capacity and tools to monitor and manage them.	• Survey data and technical information published as reports and peer reviewed papers, workshop reports published and disseminated • Information made publicly available to raise awareness • National Leopard Management Strategy published	• Ecological data collected through continuing collaboration of project partners • Workshops are attended by stakeholders and consensus reached on leopard management • Political motivation to protect and manage leopards as a sustainable resource is in place

Outputs 1. National leopard survey provides knowledge of distribution, population viability and wider ecosystem that will inform national management.	• Surveys of distribution and abundance of leopards and other mammals undertaken in 12 protected areas, 2 conservancies and 2-3 rural districts councils (years 1 and 2)	• Technical survey report published and made available to stakeholders • Information made available via websites and pamphlets • Peer reviewed papers submitted for publication	• Permissions remain in place to undertake surveys, collaboration between partners continues • Methods appropriate to survey leopards and suitable data collected and analysed
2. Impacts of trophy hunting on behavioural ecology and population viability recognised and incorporated into management during the life of the project and ultimately into policy through a National Management Strategy	• Technical knowledge gained in years 1-3 by project scientists on the impacts of trophy hunting on behavioural ecology and viability of leopard populations, and put forward for inclusion in national planning, changes in management and policy	• Technical reports made to PWMA yearly • Results and recommendations disseminated nationally and regionally through websites and printed material • Peer reviewed scientific papers submitted for publication	• Permissions remain in place to undertake research • Suitable and sufficient data collected using appropriate research tools • Data analysed and made available for use by managers
3. Trends in past management and utilisation identified and used to inform management during the life of the project and incorporated into the National Management Strategy	• Database of historical leopard management and utilisation compiled by project staff by year two	• Database available to managers • Reports disseminated to stakeholders and via project website • Peer reviewed papers submitted	• Data made available by stakeholders, RDCs, PWMA • Data effectively collated by project staff
4. Sustainable management of leopard populations and leopard habitats implemented through National Leopard Management Strategy	• National Leopard Management Strategy workshop held to devise strategy, in consultation with and attended by all stakeholders in year three	• Workshop reports prepared and disseminated • National Leopard Management Strategy disseminated to stakeholders, approved by Minister	• Co-operative relations established with all stakeholders • Stakeholders and resource managers willing to contribute to and adopt a management strategy
5. Improved regional collaboration and technical exchange between conservation managers and scientists in southern Africa	• Regional technical and management meetings organised by the project (years 1 and 2). • Potential regional collaborations set up to enhance project impact	• Two regional technical and management workshops facilitated, with scientists and managers invited from region • Workshop reports prepared and disseminated	• Regional scientists willing and motivated to collaborate with the project • Scope exists for regional collaboration

6. Local conservationists monitor important components of biodiversity, using skills acquired during project, leading to improved monitoring of leopard trophy hunting off-takes and management of leopard populations and their habitats	• 25 PWMA (field and administration staff), 5 RDC, 3 Forestry and hunting staff trained in monitoring of leopard populations, trophy hunting and survey methods • 2-4 Zimbabweans gain valuable training and experience on project, 2-3 Zimbabwean graduates receive diplomas	• Annual reports to PWMA • Annual project reports • Pre-survey training sessions at all 17 sites to be included as part of national survey	• Staff motivated to learn and apply new skills • Staff continue to be supported by PWMA and RDCs in conducting monitoring and management activities • Most project trained staff remain in conservation organisations • Entry requirements met by applicants for diploma course

Activities (details in workplan)

1.1 National leopard survey to determine leopard population size and distribution at ~17 sites across the country

1.2 Baseline survey data compiled. Results disseminated, reports to decision makers in management institutions, data inform quota allocation, CITES non-detriment findings

2.1 Detailed ecological study to measure the demographic impacts of trophy hunting, undertaken at hunted and un-hunted study sites, results inform management strategy

2.2 Results disseminated, published in relevant peer reviewed journals, lessons inform management of leopards and setting of hunting quotas

3.1 To inform future management, data on historical leopard hunting and management trends complied, database analysed for trends in quota allocation, trophy size, off-take 3.2 Identify shortcomings of system and future management requirements. Propose solutions as part of National Strategy based on field/ historical data

4.1 Design a stakeholder driven National Leopard Management Strategy through participatory workshop

4.2 Approval sought by project partners from Minister for Environment & Tourism for National management strategy. Strategy endorsed

5.1 Two Regional technical workshops, attended by regional and local scientists, conservationists and managers, organised. Knowledge transferred and collaborations established

5.2 Workshops reports (2) complied, published and distributed to all stakeholders and workshop participants

6.1 Identify training needs, conduct field training exercises (surveys, radio-tracking, analysis of data), conduct in-house training programmes for administration staff

6.2 Develop training manuals where needed (e.g., survey manual; quota allocation; trophy measurement protocols). Manuals used in conjunction with training sessions

6.3 Identify host country personnel for Diploma training course

Monitoring activities:

Indicator 1: Robust data available via monitoring data (collected by project-trained staff and with project protocols) to show that leopard off-take is demonstrably sustainable and allowing annual report, based on scientific evidence, to be made to CITES, by the CITES technical committee

Indicator 2: Leopard utilisation sustainable and populations stable (indicated by comparison of future surveys against baseline data collected by project) leading to habitat protection and improved benefits generated for stakeholders and communities

Annex 3 **Project contribution to Articles under the CBD**

Project Contribution to Articles under the Convention on Biological Diversity

Article No./Title	Project %	Article Description
6. General Measures for Conservation & Sustainable Use	5	Develop national strategies that integrate conservation and sustainable use.
7. Identification and Monitoring	30	Identify and monitor components of biological diversity, particularly those requiring urgent conservation; identify processes and activities that have adverse effects; maintain and organise relevant data.
8. In-situ Conservation	30	Establish systems of protected areas with guidelines for selection and management; regulate biological resources, promote protection of habitats; manage areas adjacent to protected areas; restore degraded ecosystems and recovery of threatened species; control risks associated with organisms modified by biotechnology; control spread of alien species; ensure compatibility between sustainable use of resources and their conservation; protect traditional lifestyles and knowledge on biological resources.
9. Ex-situ Conservation		Adopt ex-situ measures to conserve and research components of biological diversity, preferably in country of origin; facilitate recovery of threatened species; regulate and manage collection of biological resources.
10. Sustainable Use of Components of Biological Diversity	20	Integrate conservation and sustainable use in national decisions; protect sustainable customary uses; support local populations to implement remedial actions; encourage co-operation between governments and the private sector.
11. Incentive Measures		Establish economically and socially sound incentives to conserve and promote sustainable use of biological diversity.
12. Research and Training	10	Establish programmes for scientific and technical education in identification, conservation and sustainable use of biodiversity components; promote research contributing to the conservation and sustainable use of biological diversity, particularly in developing countries (in accordance with SBSTTA recommendations).
13. Public Education and Awareness	5	Promote understanding of the importance of measures to conserve biological diversity and propagate these measures through the media; cooperate with other states and organisations in developing awareness programmes.
14. Impact Assessment and Minimizing Adverse Impacts		Introduce EIAs of appropriate projects and allow public participation; take into account environmental consequences of policies; exchange information on impacts beyond State boundaries and work to reduce hazards; promote emergency responses to hazards; examine mechanisms for re-dress of international damage.
15. Access to Genetic Resources		Whilst governments control access to their genetic resources they should also facilitate access of environmentally sound uses on mutually agreed terms; scientific research based on a country's genetic resources should ensure sharing in a fair and equitable way of results and benefits.

Article No./Title	Project %	Article Description
16. Access to and Transfer of Technology		Countries shall ensure access to technologies relevant to conservation and sustainable use of biodiversity under fair and most favourable terms to the source countries (subject to patents and intellectual property rights) and ensure the private sector facilitates such assess and joint development of technologies.
17. Exchange of Information		Countries shall facilitate information exchange and repatriation including technical scientific and socio-economic research, information on training and surveying programmes and local knowledge
19. Bio-safety Protocol		Countries shall take legislative, administrative or policy measures to provide for the effective participation in biotechnological research activities and to ensure all practicable measures to promote and advance priority access on a fair and equitable basis, especially where they provide the genetic resources for such research.
Other Contribution		Smaller contributions (eg of 5%) or less should be summed and included here.
Total %	100%	Check % = total 100

Annex 4 **Standard Measures**

Code	Description	Totals (plus additional detail as required)
Training Measures		
1a	Number of people to submit PhD thesis	1 (to be submitted in later 2013)
1b	Number of PhD qualifications obtained	
2	Number of Masters qualifications obtained	
3	Number of other qualifications obtained	2 (post-graduate diplomas)
4a	Number of undergraduate students receiving training	
4b	Number of training weeks provided to undergraduate students	
4c	Number of postgraduate students receiving training (not 1-3 above)	
4d	Number of training weeks for postgraduate students	50 (2 x students at conservation in practice diploma course, attendance facilitated by project)
5	Number of people receiving other forms of long-term (>1yr) training not leading to formal qualification(ie not categories 1-4 above)	
6a	Number of people receiving other forms of short-term education/training (ie not categories 1-5 above)	21 attend survey training
6b	Number of training weeks not leading to formal qualification	
7	Number of types of training materials produced for use by host country(s)	1 (Spoor survey manual)
Research Measures		
8	Number of weeks spent by UK project staff on project work in host country(s)	25
9	Number of species/habitat management plans (or action plans) produced for Governments, public authorities or other implementing agencies in the host country (s)	
10	Number of formal documents produced to assist work related to species identification, classification and recording.	
11a	Number of papers published or accepted for publication in peer reviewed journals	
11b	Number of papers published or accepted for publication elsewhere	
12a	Number of computer-based databases established (containing species/generic information) and handed over to host country	3 (survey databases, camera trap database and trophy hunting/ quota database)

Code	Description	Totals (plus additional detail as required)
12b	Number of computer-based databases enhanced (containing species/genetic information) and handed over to host country	
13a	Number of species reference collections established and handed over to host country(s)	
13b	Number of species reference collections enhanced and handed over to host country(s)	
Dissemination Measures		
14a	Number of conferences/seminars/workshops organised to present/disseminate findings from Darwin project work	2
14b	Number of conferences/seminars/ workshops attended at which findings from Darwin project work will be presented/ disseminated.	2
15a	Number of national press releases or publicity articles in host country(s)	
15b	Number of local press releases or publicity articles in host country(s)	
15c	Number of national press releases or publicity articles in UK	
15d	Number of local press releases or publicity articles in UK	
16a	Number of issues of newsletters produced in the host country(s)	3
16b	Estimated circulation of each newsletter in the host country(s)	
16c	Estimated circulation of each newsletter in the UK	
17a	Number of dissemination networks established	
17b	Number of dissemination networks enhanced or extended	
18a	Number of national TV programmes/features in host country(s)	
18b	Number of national TV programme/features in the UK	
18c	Number of local TV programme/features in host country	
18d	Number of local TV programme features in the UK	
19a	Number of national radio interviews/features in host country(s)	1 (ZPWMA public relations office)
19b	Number of national radio interviews/features in the UK	
19c	Number of local radio interviews/features in host country (s)	

Code	Description	Totals (plus additional detail as required)
19d	Number of local radio interviews/features in the UK	
Physical Measures		
20	Estimated value (£s) of physical assets handed over to host country(s)	£10 000 (project assets still in use in the fieldwork or used by other field projects)
21	Number of permanent educational/training/research facilities or organisation established	
22	Number of permanent field plots established	18 (survey sites)
23	Value of additional resources raised for project	
Other Measures used by the project and not currently including in DI standard measures		
	Papers planned for publication in 2013/14	5

Annex 5 **Publications**

Type * **(eg journals, manual, CDs)**	**Detail** **(title, author, year)**	**Publishers** **(name, city)**	**Available from** **(eg contact address, website)**	**Cost** **£**
Report	Preliminary Non-detriment finding assessment	PWMA/ Panthera		Nil
Survey Report (*)	duPreez, B, Groom, R., Mundy, M and Loveridge, A. 2010. Results of the Bubye Valley Conservancy Spoor Survey 2010	Unpublished	andrew.loveridge@zoo.ox.ac.uk	Nil
Poster	Leopard awareness poster	ZAMSOC	http://zamsoc.david.co.zw/	Nil

Annex 6 **Darwin Contacts**

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Barry, Anna <anna_barry@fws.gov>

Fwd: A few Papers from Zimbabwe

1 message

richard maasdorp (b) (6) Sat, Aug 27, 2016 at 9:21 AM
To: anna_barry@fws.gov

Dear Tim and Anna
a lot of reading but a quick scan will give you a feel.
I will send you an update of the state of play with the Lion NDF
best regards RM

4 attachments

- **ZPWMA - 2015 - Zimbabwe national elephant management plan, 2015 -.pdf**
  2556K
- **MANA POOLS PREDATOR SURVEY_report_final.pdf**
  1039K
- **ZimECC_Position Statement EU Ban_draft 3_2016-04-12.pdf**
  1614K
- **DAR17_031_Final_Report_small.pdf**
  722K

MANA POOLS NATIONAL PARK PREDATOR SURVEY

July – October 2015

J. L. Seymour-Smith and A. J. Loveridge

Background

Park management requires accurate estimates of wildlife populations and population trends in order to make appropriate management decisions. Several methods are available ranging from aerial surveys (best for large easily observable species such as elephant and hippo) and sighted line transects (best for large diurnal species). Methods such as camera trapping and spoor surveys provide good estimates of carnivores and smaller less easily observed nocturnal mammal species. These methods are repeatable over time and can provide robust estimates of population trends. If multiple methods are used simultaneously (e.g. camera trapping and spoor transects) then cheaper more easily applied methods can be calibrated for accuracy.

Both lion and leopard are species for which more information is required and surveys are recommended actions in the 'Conservation Strategy and Action Plan for the Lion in Zimbabwe' (PWMAZ 2006) and the 'Preliminary Non-detriment finding assessment for leopards in Zimbabwe' (Lindsey and Chikerema-Mandisodza 2012) respectively for these species. The population sizes, distribution and co-occurrence with other carnivores and mammalian species is critical for long term management. The conservation value of the specially protected cheetah is acknowledged in a national conservation action plan. One of the main objectives within this plan is 'to improve the knowledge and expand research on the conservation biology of cheetah across Zimbabwe'. Based on their

questionnaire based field survey, the Cheetah Conservation Project Zimbabwe (CCPZ), currently estimates the cheetah population in Mana Pools to consist of 10-15 adult cheetah (see annual report CCPZ 2013). Ideally, this estimate would be supported by sightings and pictures received from the area. However, cheetah sightings and pictures from Mana Pools are scarce. Cheetah's have unique coat markings, which allows for the identification of individuals from pictures. Here we provide a report on predator a population survey undertaken between July and October 2015 in Mana Pools National Park (MPNP). This survey was a collaboration between WildCRU / Hwange Lion Research, Cheetah Conservation Project of Zimbabwe, Painted Dog Conservation, The Zambezi Society and Zimbabwe Parks and Wildlife Management.

Objectives

1) To undertake park wide surveys to estimate population density, distribution and habitat occupancy of common predator species in Mana Pools National Park.
2) To contribute to Cheetah Conservation Project Zimbabwe's (CCPZ) cheetah monitoring protocol.
3) To provide presence/absence data on all the larger mammal species.

METHODS

Camera Trap Survey

A pre-planned grid of camera traps was set up covering the national park from the Zambesi River in the North to the foothills of the escarpment in the South. The traps were approximately 4-5kms apart as this appears optimal for effective detection of large and medium sized carnivores and allows comparison with surveys undertaken by the team elsewhere in Zimbabwe. For logistical reasons the survey was conducted as two separate sub-surveys, North and South, with all the data being combined for the subsequent analysis. For statistical purposes and comparability between surveys each sub-survey (41 traps) was run for at least 40 days after the completion of the set-up process. At the end of the 40 day period the traps were removed in the same time frame and order in which they were deployed – as a result each trap was up for at least 48 days.

The basic grid was manipulated so that the position of as high a proportion as possible of the traps coincided with roads and tracks to provide easy access to the trap sites during the survey and also to ensure that subsequent monitoring was easier and more time effective. Prior to the setting up the trap positions are examined on Google Earth and the trap position optimised within a 500m radius of the selected point to maximize the captures of animals, positions along game trails and where trails cross the tracks, etc.

A camera trap station consists of two cameras, approximately six metres apart, facing each other though slightly off-set from one another to limit interference from the flash at night. The cameras were attached mostly to metal fencing standards hammered into the ground and where a suitable tree or stump was available they were strapped to it, all at approximately 60cms above ground level. The cameras and the metal stands were then covered with logs and branches so that they blended in to the background as much as possible, while the area between the cameras was cleared of any obstructions and the tall grass removed. It is important that there is nothing in or near the "capture zone" of each camera that may move in the wind as this will trigger the camera resulting in many unwanted images and the draining the cameras batteries.



Trap covering a road / path crossing



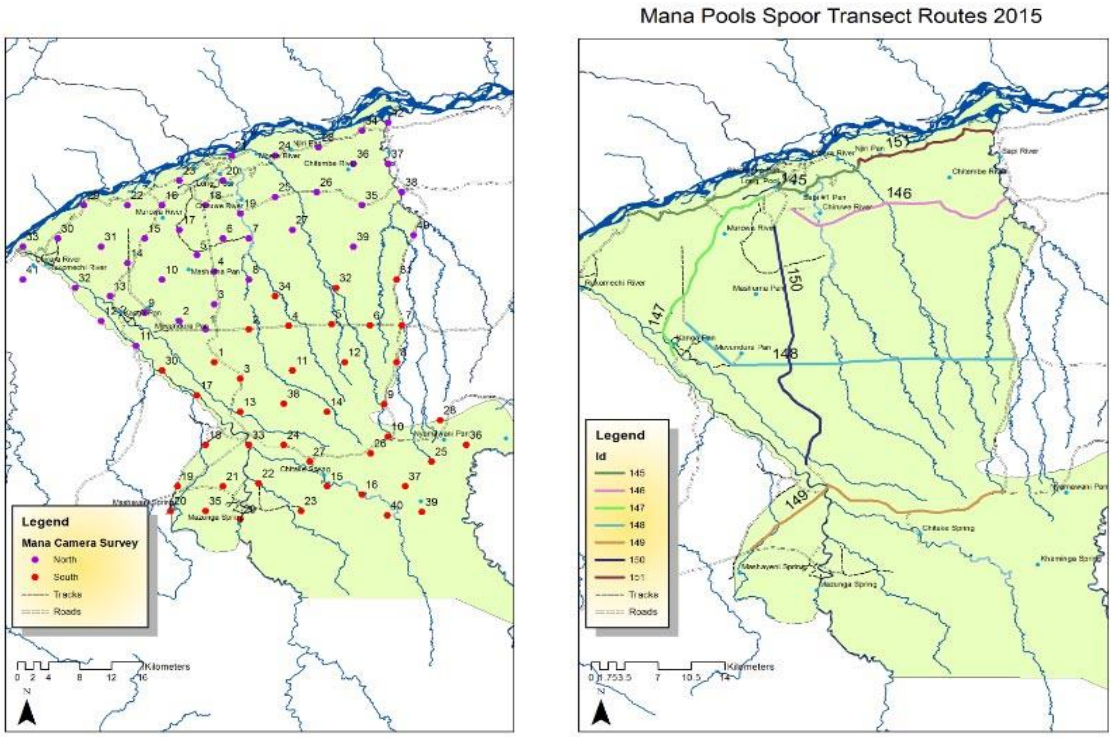
Trap covering intersecting paths

Once the cameras were set up the details of each camera, model, number and SD card, where applicable, were recorded so that it is known which images originate from which SD card or USB

download for each camera and therefore each trap. It is essential that this detailed recording of the origin of all the data images is done so that the "mark recapture" analysis can be undertaken to provide estimates of the population densities.

In the survey five different models of camera were used. Hwange Lion Research provided three different models of Cuddeback cameras (Models 1125, 1149 and C23) as well as some older Panthera cameras while the Cheetah Conservation Project of Zimbabwe and Painted Dog Conservation provided Stealthcam G42NG cameras. All the Cuddeback and Panthera cameras used standard "white or colour" flash for the night images while the Stealthcam cameras used the lower intensity "black" flash – this resulted in some images taken at night with the Stealthcams being "blurred" making the identification of individual animals more difficult. All the Cuddeback cameras were housed in protective metal boxes, primarily to protect them from the attentions of elephants and hyaena.

All the cameras are triggered by a motion sensor when an animal moves across the cleared "capture zone". The recycle interval for all the cameras used on the survey was 30secs, this being standardized as it is the fastest time that the older model Cuddeback cameras can recycle.



Maps of MPNP showing the position of camera stations (left) and spoor transect routes (right).

Spoor Transect Survey

Spoor transects are a standard method used for surveys of large carnivores. These involve a vehicle driven slowly (< 10kms/hr) along the designated transect road with a skilled National Parks tracker seated on the front of the vehicle while the driver or another person acts as the recorder of the data. From spoor encountered along the road the number of animals and the species, with the co-ordinates and distance from the beginning of the transect are recorded. Only spoor of not more than 24 hrs in age is recorded. In the case of lion and leopard the size of the tracks is measured for possible future analysis. Estimates of population densities, where there are sufficient recordings for each species, can then be calculated from this data using standard protocols (Funston et al. 2010).

The seven road transects used were a repeat of those that had been done on previous surveys in 2006 and 2011, these transects total 196 kms. Together they are considered to be representative of all the

major habitat types within the national park. Each transect was driven three times. This survey was conducted during the Camera Trap Survey so that the spoor survey results can be verified and possibly be recalibrated using simultaneously collected population estimates derived from an independent survey method. With the density of animals present it became practical to split Transect 145 and do it over two days, this resulted in each round of the survey taking eight days.

Additional Sightings

To try and improve the robustness of the camera trap survey it was decided to encourage the participation of the visitors and guides working in the national park. Posters were displayed in the Nat Parks offices at Nyamepi, Nyakasikana Gate and at Marongora showing what was required as well as a basic "business card" being distributed to members of the public within MPNP.

A Facebook page was also created for the survey that was regularly updated on the progress of the survey (Facebook.com/Mana Pools Survey 2015).

The information requested –

- Reasonable quality images of any of the five large predators seen. Only if images were taken then the following further details were then needed -
    - Date and time of the sighting
    - Basic details of the group size and composition
    - GPS co-ordinates or accurate description of the position

The above data could then be forwarded to the survey either using the Facebook page or by email using the gmail address set up for the duration of the survey. Details of the sightings where the individuals can be recognized are the fed into the Camera Trap Survey analysis – these extra data points then help improve the robustness of the survey.

RESULTS

Camera Trap Survey

A total of 30 319 data images were captured during the whole survey. The breakdown of the number of images and number of identified individuals for the large predators is as follows : -

Table 1: The total number of images capture for the main five large carnivore species and the number of individuals identified from camera trap images

Species	Images Captured	Individuals identified
Lion	267	67
Leopard	376	Not yet analysed
Cheetah	2	1
Wild Dog	191	51 (to be confirmed)
Spotted Hyaena	2969	Not yet analysed

During the survey five cameras were bitten by hyeana, five damaged to varying degrees by elephant, two destroyed by a bushfire, two removed by elephant and not found and one assumed to have been removed by poachers.



Wild Dog pups near the escarpment



Adult Cheetah near the Zambesi

Spoor Transects

Table 2: showing the number of spoor encounters and density estimates for the five main large carnivores

Species	Spoor Encounters	Estimate of Density/100kms²	Estimated numbers in MPNP
Lion	91	4.5	94
Leopard	51	2.5	55
Cheetah	4	Insufficient data	
Wild Dog	72	Calibration required	
Spotted Hyeana	746	Calibration required	

Lion and Leopard

The number estimated in the national park using the spoor transects is the same as that estimated using additional sightings / photographs / tour operator records, including the peripheral prides. If the peripheral prides are removed the number is 84. The density from the spoor transects is very similar to that of the 2011 survey.



Male lion in the centre of the Nat Park



Female leopard close to the Rukomechi River

Further analysis

Further technical analysis of the data collected in this survey is anticipated. For the main predator species, this will involve identification of individual animals from each camera trap station for each data of the survey and *ad hoc* photographs from researcher, guide and tourist sightings (for which there is accurate location data). The resulting data matrix will be analysed in a Spatially Explicit –Mark-Recapture analysis package (SPACECAP and/or SECR) which allows population density estimates to be derived along with confidence intervals (Gopalaswamy et al. 2012). It will be possible to analyse lion, leopard, spotted hyaena and wild-dog data in this way. There were insufficient cheetah and brown hyaena images captured to allow robust analysis using this method. These estimates will provide robust baseline population estimates for the park.

Additional Sightings

The participation of the public and guides was most disappointing. Only one image was forwarded to the Facebook page, this was not even of one of the large predators. There were eight emails from seven individuals, with 17 images attached, all from people personally known to the researcher-in-charge of the survey.

The researcher-in-charge provided 236 images while other interested parties provided another 157 images. All these additional sightings also assist with the identification of the individual large predators for the Camera Trap Survey.

SPECIES DETECTION

The following species were recorded on the Camera Trap Survey –

Lion	Elephant	Eland	Aardvark	Ground Hornbill
Leopard	Hippo	Kudu	Porcupine	Helmeted Guineafowl
Cheetah	Buffalo	Waterbuck	Chacma Baboon	Crested Guineafowl
Wild Dog	Zebra	Nyala	Vervet Monkey	Swainson's Spurfowl
Spotted Hyeana	Warthog	Impala	Ratel	Double-banded Sandgrouse
Brown Hyeana	Bushpig	Bushbuck	Civet	Red-billed Hornbill
Caracal	Scrub Hare	Grey Duiker	Genet	Yellow-billed Hornbill
Serval		Sharpe's Grysbok	White-tailed Mongoose	Meves' Starling
Wildcat			Bushy-tailed Mongoose	Bats
Side-striped Jackal			Banded Mongoose	
Black-backed Jackal			Slender Mongoose	

CAPTURES OF INTEREST

The capture of Brown hyaena (4 images) in two traps in the foothills of the escarpment and Black-backed Jackal (6 images) in the central areas of the national park are of considerable interest. This is further proof of the spreading of these two species in to the Lower Zambesi Valley, an area from which they have historically been absent.

Bushy-tailed mongoose were captured in five traps indicating a good representation of the species even though it is near the limits of its geographical range.



Brown Hyeana in “black” flash



Black-backed Jackal in colour



Bushy-tailed Mongoose in “black” flash







Porcupine Wildcat carrying prey Cararcal

FIELD PERSONNEL

The following people were involved in doing the surveys -

Camera Trap Survey

- WildCRU Justin Seymour-Smith Andrea Sibanda
- National Parks Ranger Samson Siakanoka

Spoor Transect Survey

- Cheetah Conservation Esther van der Meer Hans Dullemont
- ZamSoc Pete Musto Andy Wilkinson
- WildCRU Jane Hunt
- National Parks Ranger Bowers Edmond Zvenyika

We wish to thank the Area Manager, and his staff, for all their assistance and hospitality for the duration of the survey.

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THE ETHICS AND COORDINATION COMMITTEE FOR ETHICAL AND SUSTAINABLE SAFARI HUNTING IN ZIMBABWE

POSITION STATEMENT

THE ROLE OF HUNTING IN BIODIVERSITY CONSERVATION AND LIVELIHOOD RESILIENCE IN ZIMBABWE

Dr CHAP MASTERSON (Editor)



Figure 1: The true face and harsh reality of conservation in Africa.

Here an old widow of the Mahenye Community in SE Zimbabwe lives and sleeps in a makeshift shelter throughout the rainy season to protect her meagre crops from raiding elephant from the adjacent Gonarezhou National Park.

The reality of living and coping with dangerous wildlife in Africa is far removed from idealised concepts of conservation in the developed world. Without financial incentive to conserve elephant and other wildlife it would make life far easier & livelihoods more secure for communities to simply eradicate wildlife.

Safari hunting demonstrably remains the single largest source of funding for wildlife-based land use and Community Based Natural Resource Management (CBNRM) in Zimbabwe – providing financial incentive to conserve. Would a ban on elephant hunting help to conserve elephants in these areas? On the contrary, without an alternative financial pay-back it would most certainly be detrimental to conservation of elephants and biodiversity at large.

i. EXECUTIVE SUMMARY

Safari hunting remains by far the highest earner of revenue directly sustaining biodiversity conservation and wildlife-based land use in Zimbabwe – be it under communal, private or state tenure. Hunting revenues not only incentivise and pay for wildlife as a primary land-use option on private and communal land, but so too, in the face of ever mounting pressure for land, does it stave off political and social pressure to de-gazette protected areas (PA's) on state land.

In the absence of alternative revenue streams for conservation and without substantial increase in provision of funding and technical support to rectify regulatory and conservation concerns, unilateral trade bans that are not time-limited or from which there is no realistic chance of reprieve are bound to be unambiguously detrimental to iconic species and biodiversity conservation in Zimbabwe.

The single largest threat to wildlife and biodiversity conservation remains habitat loss through human encroachment. Human encroachment and impact on wildlife areas will continue so long as the following equation holds true:



Well-regulated safari hunting at less than 0.75% for elephant and >2% of populations of most other species is scientifically proven to be non-detrimental to wildlife populations and moreover provides revenue and incentive for active management and conservation of the resource base.

The total area under wildlife based land use and conservation in Zimbabwe amounts to some 10.7 Million hectares – or an area larger in extent than Portugal – and representing some 27% of the total surface area of the country (ca. 390,000 km^2). Of this, some 7.9 Million hectares, or 75% of all conservation land in the country, falls under safari hunting as the primary or only source of revenue. The vast majority of this land occurs in arid agro-ecological regions unsuitable for agricultural use.

Whereas the authors fully acknowledge that safari hunting in Zimbabwe has some very real and serious problems which certainly need urgent redress, it is also true that all respondents having input to this document, including all of the non-consumptive ecotourism operators who are ordinarily rather critical of hunting, were unanimous and unequivocal in their opinion that the major outcome of sudden prohibition of trophy hunting in Zimbabwe will be wholesale loss of biodiversity and wilderness as hunting land is converted to alternative land uses – predominantly slash-and-burn agriculture and livestock husbandry – with concomitant loss of wildlife, habitat, protected area (PA) connectivity and eco-services.

Under the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE), communities in Zimbabwe are able to benefit from natural resources and wildlife under their stewardship and resident on their land. The advent of CAMPFIRE was revolutionary in converting the value of wildlife from a direct commodity-based value, measured in kilograms of bush-meat or in terms of livelihood impact and danger factor, to a much greater financial value derived from sustainable utilisation and safari hunting. This changed perceptions and converted poaching communities into wildlife custodians and although the system is reliant on a small lethal harvest, its overall effect is to the betterment of wildlife conservation and wild-lands at large. Removal of this financial incentive to conserve and, moreover, their ability and right to manage their own resources, will not so much reduce their commitment to conservation, but will in fact necessitate impoverished communities to convert from wildlife to other land uses detrimental to the environment and conservation.

Communities that are not benefiting collectively from sustainable utilisation of wildlife are also not incentivised to counteract or abstain from poaching or to resist approaches from international wildlife trafficking (IWT) syndicates – to the detriment of wildlife as well as community security & resilience.

On private land hunting has also proved to be a valuable conservation tool. Bubye Valley Conservancy – funded entirely by hunting - has the largest population of wild lion and the largest population of endangered Black Rhino on private land anywhere in the world. In fact, 3 of the last 10 IUCN Key 1 Populations of Black Rhino remaining in Africa are to be found on private hunting conservancies in Zimbabwe.

Over-and-above financial factors, the real cost and danger of living with wildlife are also major factors influencing community disposition to wildlife and when communities come into direct conflict with wildlife it is the wildlife that will suffer. Revenues generated from safari hunting provide incentives for increased tolerance of wildlife that presents a direct danger to human life and livestock or is otherwise problematic.

Biodiversity conservation is drastically underfunded in Zimbabwe. Non-consumptive ecotourism is in the doldrums through a combination of intractable contributing factors - ranging from the global recession and downturn in tourism through to poor international perception and desirability of Zimbabwe as a tourist destination – compounded by a severely depressed local economy, decaying infrastructure and diminished road and air-travel access. The industry operates at well below 50% occupancy based on current beds available and there is not a single working and sustainable example of a community-owned non-hunting tourism venture catering to international clientele in the country.

Donor funding in support of conservation in Zimbabwe remains very low. Even the 11.5 Million €uro allocated to Environment under the 11th EDF over the next 5 years – although most vital and most appreciated – amounts to just 50% of the annual budget of the Zimbabwe Parks and Wildlife Authority (ZPWMA) administering just 25% of conservation land in the country.

ZPWMA has an operating budget of around US$20 Million per annum with around 50% of annual income being derived either directly or indirectly from hunting – through permits and fees. It is estimated that the remaining conservation areas in the country would require at least as much again in order to truly meet their conservation and community development objectives. It is unrealistic to believe that these budgets could be sustainably met through donations and neither can they be subsidized by other industries which themselves are disintegrating under the burden of escalating costs and diminishing returns. Where then is this money to be found if not through well-regulated sustainable-use of the very resource we are trying to conserve?

Notwithstanding the above, in many cases, hunting is not able to fully cover costs of anti-poaching and wildlife management as a stand-alone, but it nevertheless remains a key component of sustainable revenue generation for wildlife-based land use. It is therefore imperative that wildlife-based land use is diversified to create parallel and sustainable revenue streams from eco-tourism, non-timber forest products (NTFP's) and Payments for Eco-Services (PES).

Good governance, science-based adaptive management and regulation are key to sustainable resource management. Whereas blanket bans affect both good and bad hunting practices and undermine benefits to both conservation and livelihoods (1), conditional, time-limited bans targeting specific problems and accompanied by support for practical reform are more effective in achieving positive conservation and regulatory outcomes.

Rather than instigating counterproductive unilateral bans from afar, it is incumbent upon true conservationists and the developed world to assist conservation authorities, communities, NGOs and private sector partners to re-build technical, regulatory, scientific and administrative capacity to enable developing countries to conform to minimum standards of non-detriment, science-based conservation and accountability in accordance with best international hunting and conservation practice. Moreover, this has to be inclusive of as broad an array of stakeholders as possible and must be addressed with the utmost urgency.

Finally, it was the European Colonists who dispossessed native Africans of their stewardship and ownership rights over their natural resources before coming to the realisation that these very communities were in fact the most effective custodians and protectors of wildlife. Will it now be the Europeans who once again decide the interplay of Africa's people and her rich wildlife heritage?

ii. DESCRIPTION OF THE ETHICS AND COORDINATION COMMITTEE FOR ETHICAL AND SUSTAINABLE SAFARI HUNTING IN ZIMBABWE

On 21-22 June 2015 a National Hunting Stakeholders Review and Reform Workshop was held in Harare, Zimbabwe. This workshop was co-hosted by the Zimbabwe Parks and Wildlife Management Authority (ZPWMA), the Safari Operators Association of Zimbabwe (SOAZ) and the Zimbabwe Professional Hunters and Guides Association (ZPHGA) in recognition of the need to address key challenges to the financial and ecological sustainability, ethics, regulation, management and reputation of the hunting industry in the country.

The workshop was attended by a broad array of conservation and hunting stakeholders, regulators, community representatives, hunters, non-consumptive tourism operators, NGOs, academics and consultants.

The major recommendations and outputs of the workshop are contained in the workshop output document presented as an addendum hereto. One of the key recommendations was the formation of an Ethics and Coordination Committee (ECC) (or "Steering Committee") for Ethical and Sustainable Hunting in Zimbabwe, comprising representatives of the following organisations:

- Zimbabwe Parks and Wildlife Management Authority (ZPWMA)
- The National Council of Chiefs was included in the ECC at the suggestion of the Minister of Environment Water and Climate (MEWC), Hon. O.C.Z. Machinguri and underlined by a presentation by Senator Chief Charumbira at the stakeholders' workshop on 11 April 2016.
- The CAMPFIRE Association
- Safari Operators Association of Zimbabwe (SOAZ)
- Zimbabwe Professional Hunters and Guides Association (ZPHGA)
- Zimbabwe Hunters Association (ZHA)
- Zimbabwe Tourism Authority (ZTA)
- Wildlife Producers Association (WPA)
- Co-opted consultants, NGOs and academics

According to the recommendations of the Workshop Output Document, the specific terms of reference of the ECC is to develop and to *"preside over compliance to the Code of Conduct by [hunting] operators" … "and to assist with coordinating other functions of the industry, such as data collection and management; reporting; adaptive participatory quota setting; funding & fund-raising; public relations; advocacy; group marketing; etc*."

iii. MOTIVATION AND CONSULTATION FOR THIS POSITION STATEMENT

This position statement is intended as a primary response to the recent motion brought to the EU parliament to restrict import of trophies into the European Union – which, although of a non-technical nature and lacking substantive legal basis during initial phases, if implemented will nonetheless impact heavily on the safari industry, conservation authorities, communities and other conservation stakeholders in Zimbabwe.

More recently it has been learned that the European Environment Commission (EEC) intends to table a technical proposal at CITES 2016 calling for review of Leopard quotas and for Non-Detriment Findings for all Appendix I and II species and specimens intended for export. Although this statement sets out the principle position of the Ethics and Coordination Committee for Ethical Sustainable Hunting in Zimbabwe, greater technical detail will be required to answer such proposals to CITES as well as to formulate tools to gather and process information required for Non-Detriment Findings.

The statement has been drafted as an output of the Ethics and Coordination Committee for Ethical and Sustainable Safari Hunting in Zimbabwe including feedback from as broad a consultation process within all sectors of the conservation fraternity as possible given the very short notice of the motion under consideration.

Following initial invitation for inputs from stakeholders the first draft was re-circulated for comment and the second draft was the subject of a workshop convened by the Minister of Environment Hon. O.C.Z. Machinguri on 11 April 2016 – to provide further comments and consultation with stakeholders.

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1. INTRODUCTION

Properly managed and regulated, consumptive and non-consumptive wildlife-based land use is not only the most drought-tolerant and ecologically resilient but also one of the most profitable and sustainable land uses in drought prone agri-ecological regions 3, 4 and 5 of Zimbabwe and more broadly in southern, central and east Africa. However, in the absence of sustainable financial return from wildlife-based land use, setting aside land for wildlife and habitat conservation represents an opportunity cost to alternative land uses under communal, state and private tenure in Zimbabwe.

The bulk of income to fund conservation and to justify wildlife-based-land-use in Zimbabwe is derived from legal safari hunting.

It is a simple economic fact that without sustainable income arising from the investment in wildlife-based enterprise, wildlife and wilderness in Africa will be exterminated and at a terrifying rate.

In the absence of financial compensation and incentive, presence of wildlife – especially large predators, elephant and other dangerous game animals – is a net liability to communities, state conservation agencies and private land owners. Liabilities arise not only through direct Human-Wildlife-Conflict and impacts on human safety, livestock and crops and indirectly through competition for resources and conflict with alternative land use systems but also through direct costs in conserving, protecting and managing these animals and habitats.

The management of lion on the privately owned Bubye Valley Conservancy (BVC) in SE Zimbabwe is a topical case in point, which highlights not only the ideological conflicts around hunting and conservation, but also the hard economics of conservation of such high-impact species.

The establishment of BVC in the 1990s involved the conversion and rehabilitation of former cattle ranching land to wildlife-based land-use. Under cattle ranching lion had been completely extirpated from the area but, following reintroduction during establishment of the Conservancy, augmented over the years by intermittent natural ingress of vagrant animals, BVC is now home to some 500 lions, being the second largest population of lions in Zimbabwe (after Hwange National Park) and the largest population of free-ranging wild lions on private land anywhere in the world. It is estimated that this number represents an overpopulation of some 200 lions – having dire impact on antelope populations as well as a number of endangered species such as wild dogs and cheetah.

The BVC's sole source of revenue is derived from very well managed, well regulated, ethical and legal trophy hunting – providing the financial means for the conservancy's exemplary conservation infrastructure and management model spanning and conserving some 3400km^2 of rehabilitated habitat (formerly under extensive cattle ranching) and protecting the single largest population of endangered black rhino on private land anywhere in the world.

In January 2016, BVC advertised the auction of a legal lion hunt on the Conservancy with the proceeds earmarked to go towards funding of tracking collars and applied research intended to inform ecological management and planning within the Conservancy. This initiative was met with a furore of international opinion and protestation – led by well-publicised anti-hunting lobby groups who effectively shut-down the initiative through a concerted publicity campaign. When invited by BVC to find a home and funding to translocate 200 surplus lions off of BVC, who would donate the lions free of charge to the aforementioned groups, provided that minimum ecological, security, ethological, management and social conditions could be guaranteed in the area of destination - all further communications from the aforementioned lobby groups ceased. A classic example of not putting your money where your mouth is.

It is clear that safari hunting as a conservation tool is both highly technical and highly emotive. It would be a gross disservice to our morality and responsibility as human beings if we saw wildlife and wild places merely in terms of dollars and cents. But to sacrifice all common sense, sustainability and realism on the altar of

emotion would be equally feckless, superficial, irresponsible and dissolute. We are challenged to derive a sound and sensible and above all sustainable and morally defensible means of conserving the wildlife and wild-lands for which we are responsible and it is our duty to choose wisely.

2. ONGOING INITIATIVES FOR THE REVIEW AND REFORM OF CONSERVATION, HUNTING AND COMMUNITY-BASED NATURAL RESOURCE MANAGEMENT IN ZIMBABWE

2.1. Stakeholder Workshop for the Review and Reform of the Safari Hunting Industry in Zimbabwe

As alluded to in the preface, in June 2015, a workshop was co-hosted by the Zimbabwe Parks and Wildlife Management Authority (ZPWMA), the Safari Operators Association of Zimbabwe (SOAZ) and the Zimbabwe Professional Hunters and Guides Association (ZPHGA) in recognition of the need to address key challenges to the financial and ecological sustainability, ethics, regulation, management and reputation of the hunting industry in Zimbabwe.

The Hunting Review and Reform Workshop identified the following seven somewhat interrelated pillars for urgent attention and redress:

1. Implementing adaptive, participatory and transparent science-based quota setting.
2. Implementing accurate and transparent record keeping, information and data management as the basis for science-based adaptive management, regulation and accountability of the industry.
3. Ensuring effective management, conservation and protection of the hunted resource and supporting conservation of habitats and wild-lands.
4. Development and enforcement of a Code of Ethics and Best Hunting Practice for sustainable hunting.
5. Resourcing the Wildlife Authority and promoting wildlife-based land uses outside of the Parks Estate – including realistic beneficiation and participation of communities in wildlife based land use.
6. Coordinated Public Relations and Improved Public Image based on measurably improved industry practice and performance.
7. Review of key policy and legislative issues.

Amongst other things, this Workshop established the Ethics and Coordination Committee to implement reforms in the industry – including the drafting and enforcement of a Code of Ethics and Best Hunting Practice for sustainable hunting in Zimbabwe.

2.2. CAMPFIRE Stakeholders Review

At its inception in the 1980s, the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) was a world leader in Community Based Natural Resource Management (CBNRM) allocating natural resource user and stewardship rights to communities at local level. In recent years there has been growing acknowledgement that CAMPFIRE is falling somewhat short of both its conservation and community development objectives – especially as they relate to community capacity, decision-making and beneficiation.

In recognition of this the Government of Zimbabwe has initiated a “National CAMPFIRE Stakeholder Review”, mandated - by the Ministry of Environment, Ministry of Rural Development, Ministry of Tourism, Zimbabwe Parks and Wildlife Management Authority (ZPWMA) and the CAMPFIRE Association - to derive improved models and institutional frameworks for sustainable CBNRM in Zimbabwe. The Review is due to begin in April 2016 and is funded by the European Union.

The ongoing Wildlife in Livelihood Development (WILD) Programme (www.wild-africa.org) – also funded by the European Union – seeks to pilot improved and professionalised holistic CBNRM models based on robust

and accountable governance structures that empower communities to participate more centrally in, and benefit more fully from, conservation enterprises, tourism and other sustainable Natural-Resource-based opportunities appropriate to semi-arid regions of Zimbabwe. It is intended that models piloted under WILD will help to inform the National CAMPFIRE Stakeholders Review.

2.3. Other recent or ongoing initiatives

These are by no means the only steps that Zimbabwe has taken to redress issues of ecological sustainability, ethics and community beneficiation from conservation. For example:

2.3.1. National Elephant Management Plan

Following the National Elephant Census in 2014 the National Elephant Management Plan for Zimbabwe was comprehensively overhauled through a series of broad-based consultative processes during 2015 - incorporating the input of local and national stakeholders and international experts in each of the four key wildlife eco-regions of the country. The National Elephant Management Plan has been approved, adopted and published as of March 2016.

2.3.2. Lion age restrictions and adaptive quota setting

In 2013 a system for improved regulation of lion hunting was introduced – driven primarily by Panthera.org – one of the most highly respected, science-based wild felid conservation organisations in the world.

The improved system is designed to heavily penalise hunting of young male lions in their prime (2.5 to 6 years) - which has severely detrimental effects on cub survival and population size and dynamics – and to incentivise hunting of lone mature males past their breeding prime (i.e. >5 years – shortly to be increased to 6 years). The initiative has also driven the complete abolishment of “fixed quotas” on lions and precludes any hunting of lionesses across the country.

After just 2 years of implementation the age of male lions hunted in Zimbabwe has increased by an average of 3 years with enormously beneficial effect on cub survival rate and population growth. In 2015, 47 lions were hunted from an overall population of between 2,400 and 2,600 – equating to a 2% off-take.

A recent paper – by Bauer et Al 2015 (2) – has shown that Zimbabwe is one of just 4 African countries in which Lion populations are stable or increasing in number.

2.3.3. Leopard age restrictions and adaptive quota setting

In March 2016 a workshop was held in Harare to introduce measures for sustainable hunting of leopard with similar guidelines to those already successfully implemented for lion – with appropriate species-specific modifications.

From leopard research done on Save Valley Conservancy and Bubye Valley Conservancy, both hunting areas, leopard populations have been shown to remain stable if male leopard of 4 years or older are hunted. Based on this research, Zimbabwe has implemented a system to encourage the hunting of male leopard of 4 years or older, and penalties are imposed if young male leopards are hunted.

Further recommendations include that quotas are to be limited to 75% of utilization and female leopards are not to be hunted at all. Hunters are now required to record and report more species specific, geospatial and hunt data to enable adaptive management and fine-tuning of the system in the future.

3. INTERNATIONAL RECOGNITION OF HUNTING AS A CONSERVATION TOOL

Legal hunting is regarded as an important and effective conservation tool by a number of important conservation agencies and governments around the world.

3.1. European Union

The European Union's "Habitats Directive" (92/43/EEC) aimed at conserving EU's most threatened mammal species and natural habitats, along with the "Birds Directive" (2009/147/EC) lie at the heart of EU nature policy and together form the cornerstone of the EU's vast network of protected areas under *Natura-2000*.

Both of these directives recognise the role of sustainable hunting, while specifying limitations with regard to which species can be hunted, when hunting can take place and which methods and tools can be used.

According to the website of the European Commission (3):

> *"Hunting is an activity that provides significant social, cultural, economic and environmental benefits in different regions of the European Union."*

The webpage goes on to say that:

> "*In 2007, the annual meeting of the Parties (Standing Committee) to the Convention on the Conservation of European Wildlife and Natural Habitats (Bern, 1979), adopted the European Charter on Hunting and Biodiversity. This charter is meant to reinforce the implementation and coherence of global and European biodiversity instruments such as the Convention on Biological Diversity and the European Community's Birds and Habitats Directives, and is fully supportive of the EC's Sustainable Hunting Initiative"*

If hunting is a legitimate and legal practice in the European Union and, moreover, one that is recognised as an effective and important conservation tool contributing to the social, cultural, economic and environmental wellbeing of Europe – then how is it legally or morally justified that European lobby groups would seek to effectively ban hunting in third world countries that lack capacity for proper regulation?

3.2. The United States Fish and Wildlife Service

On their website (4) the US Fish and Wildlife Service make an eloquent argument in favour of hunting, trapping and fishing as legitimate and sustainable activities which are both compatible with and complimentary to biodiversity conservation within wildlife refuges in the US. The webpage reads as follows:

> "*Hunting, trapping and fishing are considered by many to be a legitimate, traditional recreational use of renewable natural resources. The National Wildlife Refuge System Administration Act of 1966, other laws, and the Fish and Wildlife Service's policy permit hunting on a national wildlife refuge when it is compatible with the purposes for which the refuge was established and acquired.*
>
> *National wildlife refuges exist primarily to safeguard wildlife populations through habitat preservation. The word "refuge" includes the idea of providing a haven of safety for wildlife, and as such, hunting might seem an inconsistent use of the National Wildlife Refuge System (Refuge System). However, habitat that normally supports healthy wildlife populations produces harvestable surpluses that are a renewable resource.*
>
> *As practiced on refuges, hunting, trapping and fishing do not pose a threat to the wildlife populations, and in some instances, are actually necessary for sound wildlife management. For example, deer populations will often grow too large for the refuge habitat to support. If some of the deer are not harvested, they destroy habitat for themselves and other animals and die from starvation or disease. The harvesting of wildlife on refuges is carefully regulated to ensure an equilibrium between population levels and wildlife habitat.*"

3.3. International Union for Conservation of Nature (IUCN)

IUCN is the world's oldest and largest global environmental organisation with primary focus on valuing and conserving nature, ensuring effective and equitable governance of its use, and deploying nature-based

solutions to global challenges in climate, food and development. IUCN supports scientific research, manages field projects all over the world, and brings governments, NGOs, the UN and companies together to develop policy, laws and best practice.

> *"IUCN has long recognized that the wise and sustainable use of wildlife can be consistent with and contribute to conservation, because the social and economic benefits derived from use of species can provide incentives for people to conserve them and their habitats."* (5)

3.4. United Nations Convention on Biological Diversity (CBD)

The Convention on Biological Diversity (CBD) is a multilateral treaty under the United Nations Environment Programme. The Convention has three main goals:

i. Conservation of biological diversity (or biodiversity);
ii. Sustainable use of its components; and
iii. Fair and equitable sharing of benefits arising from genetic resources

One hundred and ninety-five states, including Zimbabwe and the European Union are parties to the convention and all UN member states—with the exception of the United States—have ratified the treaty (6).

The Addis Ababa Principles and Guidelines for the Sustainable Use of Biodiversity, published by the CBD, consist of fourteen interdependent practical principles, operational guidelines and a few instruments for their implementation that govern the uses of components of biodiversity to ensure the sustainability of such uses.

The under item 2 the Addis Ababa principles recognise that:

> "*Sustainable use is a valuable tool to promote conservation of biological diversity, since in many instances it provides incentives for conservation and restoration because of the social, cultural and economic benefits that people derive from that use. In turn, sustainable use cannot be achieved without effective conservation measures. In this context, and as recognized in the Plan of Implementation of the World Summit on Sustainable Development, sustainable use is an effective tool to combat poverty, and, consequently, to achieve sustainable development*." (7).

3.5. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

CITES is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival.

By its very nature, CITES recognises the legitimacy of safari hunting as a conservation tool and itself seeks to provide international regulation, checks and balances to ensure that safari hunting, amongst other trade channels, remains sustainable and non-detrimental to source populations.

4. BENEFITS OF HUNTING TO CONSERVATION AND LIVELIHOODS

Well-regulated and ethical hunting can be a positive tool for conservation by increasing the value of wildlife and the habitats on which they depend – providing benefits and revenues that can motivate and enable sustainable resource management. Specific benefits include:

i. **Generation of incentives for land-owners & communities to restore and conserve wildlife on their land.**
   In Zimbabwe, policies enabling land-owners to benefit from sustainable use of wildlife on their land - in conjunction with natural resilience and productivity of multi-species wildlife populations and the relatively favourable financial return in $/hectare by comparison to traditional livestock and crop production - led to the conversion of large tracts of private and community-owned land being rehabilitated from cattle and crop land back to wildlife in the 1980s and 1990s.

ii. Generation of revenue for wildlife management, anti-poaching and conservation.

Contrary to popular belief, wildlife management and particularly anti-poaching is costly and requires active technical management, ongoing security and maintenance – including payment of wildlife managers, scouts and rangers, maintenance, admin and tourism staff; purchase of vehicles and equipment; purchase and maintenance of communications equipment, road networks, maintenance facilities, admin offices, staff accommodation, workshops, tourist accommodation and other infrastructure; resource research, monitoring and management; fire management; provision of water for wildlife, etc.

In Zimbabwe, over 75% of all conservation land under private, community and state tenure is entirely dependent on safari hunting revenues to fund these activities and of particular importance it is the hunting operators and the anti-poaching patrols that they directly employ which mitigate and reduce poaching.

iii. **Devolution of decision making, stewardship and user rights to communities and land-owners.**

As well as being the cornerstone enabling financial benefit to accrue to communities and land-owners, the ability of communities to participate directly in decision-making and management of natural resources is an oft-underestimated aspect influencing community acceptance, understanding and support for wildlife and resource management and is separate and distinct from financial benefits and incentives.

iv. **Increased tolerance for living with wildlife, reduced effects of human-wildlife-conflict and reduced retaliatory and other illegal killing of wildlife.**

Where wildlife poses significant cost and threat to people, livestock and crops and there are no legal means of benefiting from it or where benefit streams are inadequate, retaliatory killing, local poaching and integration of locals into international syndicated poaching increases. This is particularly true in the case of dangerous wildlife species such as elephant and lion which respectively destroy crops and livestock and which both pose real threats to human life.

Revenues from trophy hunting can also increase local tolerance of lions and elephants, and thus reduce persecution resulting from the threat that these species pose to livestock, livelihoods and human life (8).

In Africa cattle are the single most important cultural and financial asset to communities. Recently there have been several, well-publicised examples of cattle-raiding lions being poisoned across the length and breadth of Africa. Relations become even more strained in the case of threat or insult to human life and in more serious cases of conflict compounded by poor benefits, communities become more susceptible to involvement in syndicated poaching and trafficking.

CASE STUDY

The much publicised incident involving the poisoning of over 80 elephants in Hwange National Park in 2013 illustrated all three points listed above as sketched in the interview with local headman Owen Dladla paraphrased below (9):

- "*We are starving here. For the past five years we have not harvested anything from our fields because of erratic rains and our crops being destroyed by elephants," headman Owen Dladla from Vukuzenzele Village in whose jurisdiction the jailed reside, said.*
- *"Since 2010 elephants have been a problem to us. We have been reporting … about the elephant menace, but we received no joy. No one came to our rescue."*
- *He said criminals then took advantage of the villagers' plight and brought in cyanide to poison the elephants and get ivory for a fee.*
- *"Because of that, cyanide found its way into the area and our people were so receptive because they had no one to cry to or help them since everyone seemed to shy away from them.*
- *"They then took things into their own hands hence this catastrophe," Dladla said.*

- *"However, you should understand that most of these people here are unemployed so to get money they had to engage in these criminal activities.*
- *"Our people are not criminals but are taken advantage of because of their circumstances."*
- *Another villager who spoke on condition of anonymity said the collapse of Campfire in the area also contributed to the problem.*
- *"Campfire money was not being remitted to the people as before. So people were left with no option but to kill the elephants," he said.*

As revealing as the incident was as to causal factors, the efficacy and positive attitudinal shifts brought about by under-reported remedial actions - implemented by a new and proactive hunting operator in conjunction with the CAMPFIRE Association and Local Authorities - and which eventually brought the situation under control are equally informative.

What is little known about this incident is that whereas disaffection towards a defunct CAMPFIRE programme in the area was largely to blame, this was largely the result of very poor performance and ethics on the part of the erstwhile hunting operator who was replaced by Lodzi Hunters in 2013. Shortly after taking over the concession, and evidently inheriting negative sentiments and ramifications of the poor management and discordant relationship between the previous operator and the local community, Lodzi Hunters soon discovered the extent of elephant poaching in the concession and neighbouring National Park and brought it to the attention of conservation authorities and the media.

Subsequent criminal investigations and prosecution as well as in-depth consultation with the Community hinted at disaffection and causative factors and Lodzi Hunters, in conjunction with the CAMPFIRE Association, Local Authorities and National Parks quickly turned the situation around through prompt identification and implementation of remedial actions emphasising reconciliation with the Community and recognition of their primary rights to benefit from their natural resources.

Amongst other changes and community outreach initiatives, Lodzi Hunters introduced a new revenue sharing model which sees significantly higher percentages of hunting revenue being realised by the community – especially for elephant. The operator has also taken their community outreach and consultation activities very seriously and have contributed significantly to rehabilitation of community boreholes, dams, schools, roads and recreational facilities as well as contributing directly to food security through distribution of food-aid and livestock fodder during times of drought and failed harvests in the District (10).

The results have manifested in verifiably reductions in poaching as well as reductions in conflict situations, human wildlife conflict and reversal of human and livestock encroachment into the concession and neighbouring National Park.

5. PROPOSAL TO BAN VERSUS SUPPORT FOR REFORM: IS IT LEGALLY OR ETHICALLY CONSISTENT?

Given that hunting is recognised as a legitimate conservation tool by the European Union itself, we have to question the legitimacy of the proposed ban over import of hunting trophies into the EU and what the real motives might be.

At first glance it might seem that anti-hunting lobby groups are taking an ideological and emotive swipe at weaker nations while ignoring the fact that hunting is an integral part of their own conservation ethos in the first world. This assessment is admittedly an oversimplification of the more probable one which is that this motion is a reflection of the urbanised populations in the developed world having an increasingly protectionist and anthropomorphised view of wildlife without understanding the real costs and dangers of living with wildlife and the costs associated with protecting wildlife or setting aside land for it.

On the other hand – lobbyists for the proposal might also recognise that hunting is a legitimate conservation tool but one that needs highly competent, accountable and rigorous science-based regulation, and which embraces the principles of sustainability, transparency and objectivity. This latter view is most definitely a position shared by ourselves. However, if this is the case and the protagonists have genuine concerns relating to regulation and sustainability and how these relate to iconic species and biodiversity conservation then their motion should speak more directly to measures to rectify these same causative issues. Rather, these groups should be furthering motivations to provide, with appropriate checks and balances, active technical and

financial support for African Nations and poverty-stricken communities to implement and comply with principles of science-based management, regulation, accountability, good governance and best conservation practice.

Unfortunately the language used in couching the emotive and non-scientific arguments contained in the motion to restrict trophy imports into the EU – some verging on the disingenuous - would indicate that the motives for the motion are of the former variety and are being brought with little appreciation for the realities of conservation in Africa and what life is really like when living in very close proximity to dangerous wildlife that present real and present dangers to personal safety and livelihoods.

Regardless of motive, it is nevertheless ironic that hunting is so widespread in Europe and the US and is a fundamental part of those cultures – but doesn't come under anywhere near as much scrutiny as it does in Africa. Although part of the reason for this might be that our wildlife and wilderness are more charismatic and although part of it might be that we are less effective in communication and defence of sustainable use as part of our conservation culture and ethic, we also have to acknowledge and admit that a large part is in fact due to our own underperformance in regulation, ethics and sustainability and that this has to be rectified.

Nevertheless, it is neither legally nor morally consistent for the first world to apply pressure to effectively ban a practice in a developing country for want of effective means and capacity for regulation when that same practice is perfectly legal and acceptable in the developed world. Consistency would argue in favour of assisting developing nations to develop their capacity and regulatory framework to acceptable international norms and standards.

According to a 2015 report by the European Environment Agency, in Europe "*a high proportion of protected species (60%) and habitat types (77%) are considered to be in unfavourable conservation status, and Europe is not on track to meet its overall target of halting biodiversity loss by 2020, even though some more specific targets are being met.*" (11). Should we therefore conclude that the conservation tools, regulations and efforts in Europe are inappropriate and should be scrapped or would it be more appropriate to focus on identification and remedy of specific failings and weaknesses within the system?

6. HUNTING VERSUS POACHING

It is unfortunate that some parties most outspoken in driving the motion against hunting are apparently confused, or intentionally confusing, about the vast difference between illegal poaching and legal safari hunting – both in terms of their respective legality and effects on wildlife and biodiversity conservation.

As a first point of distinction, poaching is an illegal, non-regulated activity whereas safari hunting is both legal and regulated so as to sustainably manage, utilise and pay for conservation.

Poachers are indiscriminate. They kill animals of all genders and of any age for ivory. They kill to sell. They kill what does not have ivory in order to not have to follow that track again. They take other protected species with them such as pangolin. They use poison that kills not only elephant but species at almost every level of the food chain and which persists in the environment for years on end – long after they have gone. They are incredibly hard to find in vast swathes of wilderness.

Poaching results in a net loss of wildlife without financial recompense accruing to protection and management of the source population or benefit to associated communities or conservation stakeholders. Indeed the major cost of conservation, and funded in many areas by safari hunting, is directed towards anti-poaching activities.

Poaching in Africa varies from low-level subsistence poaching for bush-meat, that itself varies from subsistence to large scale commercial operations, through to very high level organised crime and international wildlife trafficking (IWT) of high value animals and animal parts. IWT has reached epidemic proportions and has fast become one of the most lucrative trades of choice for well-organised international crime syndicates, being the

fourth most lucrative trans-national crime after drugs, arms and human trafficking (12) and estimated to be worth between GBP6 Billion (13) and GBP15 Billion (12) annually.

In many cases, demand for wildlife products originates in Asia and the principle beneficiaries of the massive revenues are not local communities or even poachers but rather international crime syndicates. IWT has long been used to finance civil wars in Africa – including the current unrest in Mozambique and Sudan, and, more recently is reported to be increasingly financing terror groups. According to an online video bulletin by TIME Magazine - entitled "TIME Explains: the link between wildlife trafficking and terrorism" (14), up to 40% of revenue to al Shabaab, al Qaeda's affiliate in Somalia, is derived from IWT.

Across Africa, this highly organised syndicated poaching has resulted in the extermination of almost two hundred thousand elephant and three thousand rhino since 2013. Over the same period, safari hunting in Zimbabwe has accounted for the legal harvesting of some 600 elephant (of an overall population of around 80,0000), bringing in gross revenues of around US$36 Million into the general and conservation economies of the country.

On the other hand, in most cases it is only safari hunters and the anti-poaching units that they fund who provide any effective mitigation to poaching on the ground. Based on actual figures provided by a hunting operator in 2015, the cost of operating a 42 man anti-poaching unit covering 600 km^2 is around US$170,000 and is three times this amount (ca. US$600,000) to protect the same acreage against poachers once high value species such as rhino are involved. These are actual costs being covered by hunters in Zimbabwe.

On the subject of poaching – it is important to realise that a key premise at the heart of community based natural resource management and sustainable utilisation is the concept of "beyond enforcement" in which wildlife and resource protection is achieved primarily through partnerships and involvement of local communities and incentives provided by sustainably commercialised resource utilisation. This is a departure from the traditional enforcement model of anti-poaching and resource protection which relies purely on punitive enforcement measures.

7. IMPACT OF HUNTING ON WILDLIFE POPULATIONS

Ethical and well-regulated hunting should have no deleterious on wildlife populations. Quota setting guidelines in Zimbabwe provide for a sustainable legal quota of 0.75% of overall population in elephant and around 2% off-take in most other species.

Off-takes of past-prime male animals at these levels have been scientifically proven to have no detrimental effect on source populations nor trophy quality and hunt effort (which are very good indicators of overall sustainability and non-detriment at population level) (15), (16).

In this matter the motion brought to the EU parliament claiming under point 2, that "*Trophy hunting contributes to the loss of iconic species, and claims that proceeds from trophy hunting benefit conservation and local communities have been debunked by scientists*" is in the first half of the sentence selectively simplistic and thereafter simply untrue.

By the very essence of safari hunting it is the older male animals with charismatic, worn trophies that are targeted – those animals that are past their prime, past breeding age and which have fulfilled their reproductive role in the population.

Furthermore, breeding success in any given polygamous species – which the vast majority of African wildlife are – breeding rate and population growth is determined primarily by the number of reproductively active females in the system with far fewer males being required for maximal biological reproduction. The normal breeding-male to female ratio in most species ranges between 4% and 25% - meaning that harvesting of non-breeding male specimens past their prime has absolutely no effect on population breeding and performance.

The obvious proviso here is that it is indeed the old, past prime and non-breeding males that are targeted and this is a matter of hunter experience and ethics and, moreover, of proper and effective regulation.

The sustainable quota off-take levels given above are prescribed over-and-above natural mortality rates. Problems due to over-harvesting have undoubtedly arising when downward adjustments in quota calculations are not made for various unusual natural or unnatural losses through poaching, drought, habitat loss, disease, fire, etc. as well as in instances in which ecological monitoring and data collection has been deficient and where "fixed-quotas" are imposed or quotas have been artificially inflated in an effort to boost revenues.

Improved ecological monitoring, data collection and reporting in respect of source populations; improved monitoring and regulation of safari hunts; improved inspection, recording and monitoring of harvested trophies; improved transparency and methodology in science-based adaptive quota setting; effective prevention of quota transfer; issuance of quotas at population or ecological level as opposed to "farm level"; consideration of special permits, quotas, poaching and other losses and abolishment of "fixed" quotas were all important recommendations of the Stakeholder Workshop for Review and Reform of the Hunting Industry in June 2015. Systems are also required to ensure that only the best-performing operators are allowed stewardship of hunting blocks and that those who do not adhere to minimum conservation investments and practices are prevented from operating.

These are nevertheless recommendations which require finance, technical expertise and capacity to implement and it is therefore necessary to assist State, Private and Community stakeholders to re-build technical, logistical and financial capacity to upgrade and exercise existing tools for ecological and hunt monitoring, recording, reporting, adaptive management and quota setting for improved industry regulation, accountability and sustainability.

8. THE IMPERATIVE OF FINANCIAL SUSTAINABILITY

Like any other enterprise or land use, financial sustainability is fundamental to success and continuation of wildlife-based land use and biodiversity conservation in Africa.

To draw an analogy, beef cattle are so numerous world-wide simply ***because*** they are profitably harvested for meat. If slaughter of beef cattle for sale were to be prohibited by law then it is beyond doubt that their numbers would plummet around the globe as farmers removed beef cows to make space for alternative revenue generating activities.

In similar fashion, private conservancies and communities, or for that matter even state conservation authorities cannot be expected to subsidize or justify the existential value of dangerous wildlife such as lion and elephant without a financial recompense. Dangerous game animals, particularly elephant and lion need large home ranges and their single biggest threat is in habitat loss and human encroachment, compounded by ever escalating commercial poaching and IWT.

Setting land aside for these animals represents significant opportunity cost in terms of alternative land uses for impoverished communities. In this regard, visiting safari hunters contribute directly to biodiversity and wilderness conservation by providing financial value to wildlife – particularly dangerous wildlife like lion and elephant - and allow communities to offset crop and stock losses as well as risk via income from hunting quotas.

Experience has demonstrated that if the means of generating income from these species were to be removed through banning of safari hunting, then wildlife would simply be exterminated to make way for other land uses. In the case of subsistence communities these alternative land uses will be environmentally devastating communal livestock production and slash-and-burn cultivation. In the process communities tend to capitalise on poached wildlife as a source of subsistence protein and for income generation through bush-meat trading as well as through international wildlife trafficking (IWT) of ivory, lion bone, rhino horn, pangolin and other high value wildlife products. This not only undermines ecological resilience and diversification of community

livelihoods but so too does it seriously undermine governance and community security as communities become increasingly infiltrated by organised crime syndicates and corrupt officials involved in IWT.

9. ECOLOGICAL CONSIDERATIONS

The conservation of wildlife is not simply a function of conserving a single species or even group of species, such as elephant, lion, rhino or leopard. Conservation is the protection of the natural environment and all the components of a natural environment, the entire ecosystem that begins with land and habitat itself.

9.1. AMOUNT OF LAND UNDER CONSERVATION AND SAFARI HUNTING IN ZIMBABWE

Notwithstanding the recognised problems within the hunting industry, aside from designated National Parks, wildlife based land use under communal, state-hunting and private land tenure in Zimbabwe is almost exclusively funded, financially justified and protected through revenue generation from Safari Hunting.

The total area under wildlife based land use and conservation in Zimbabwe amounts to some 10.7 Million hectares[1] (table 1) - or a massive 27% of the total land area of the country (ca. 39 million hectares). Of this, some 7.9 Million hectares, or 75%, falls under safari hunting as the primary source of revenue.

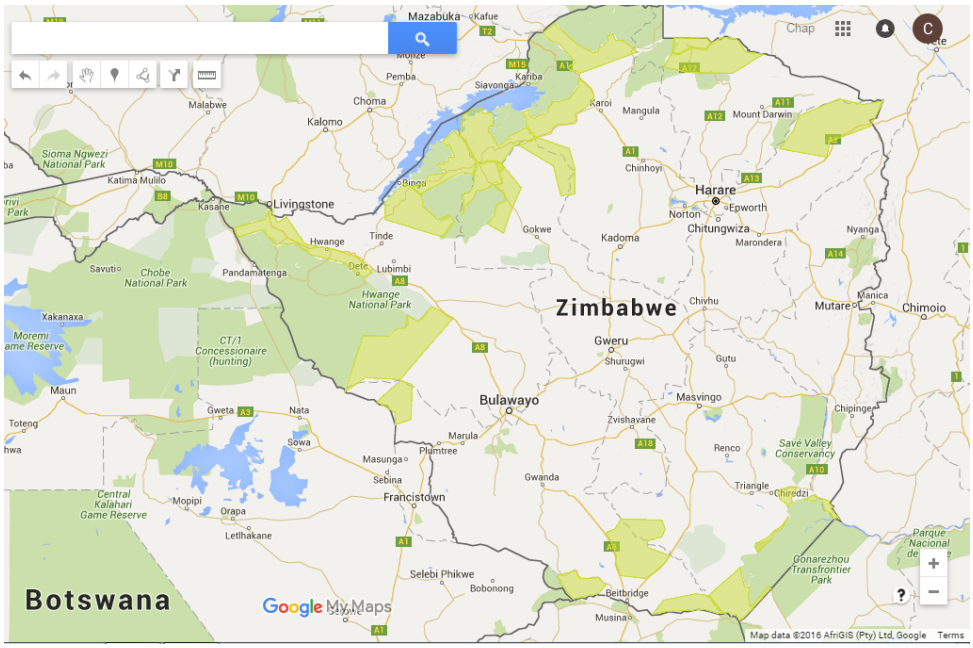


Figure 2: Google Map® of CAMPFIRE and other hunting areas (light green) in relation to National Parks and State Safari Areas in Zimbabwe.

At 27%, the percentage of land set aside for conservation and wildlife-based land use in Zimbabwe is significantly higher than in most developed countries which, in the case of Europe, is typically around 2% of total area being under conservation.

In sub-Saharan Africa, hunting areas encompass at least 1.4 Million km^2 – or an area the size of Germany, France and Spain combined.

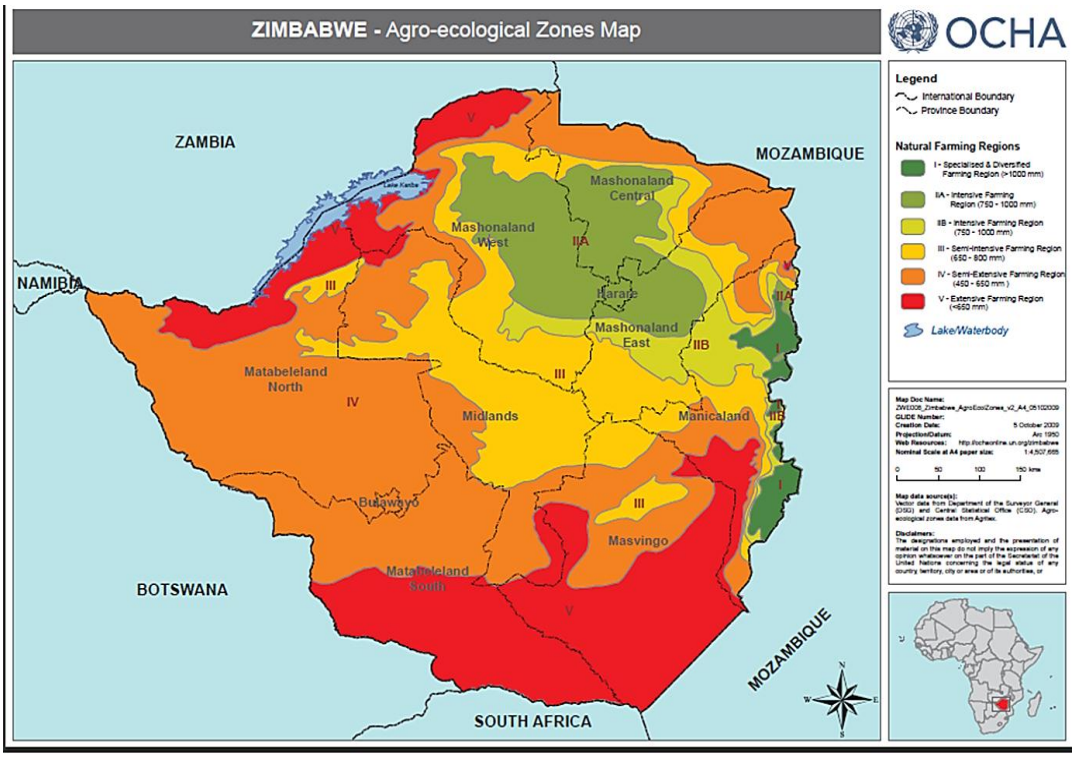
[1] Or larger in extent than Portugal (9.2 million hectares)

Table 1: summary of land under conservation and hunting in private, community and public sectors in Zimbabwe

		Hectares	km2	Approx. Carbon offset Credits
National Parks (non-hunting)				
	Subtotal	2,628,460	26,285	26,284,600
National Parks on Rhodes Estate (non-hunting)				
	Subtotal	89,550	896	
Safari Areas on Parks and Wildlife Land				
	Subtotal	1,896,300	18,963	18,963,000
Safari Areas on State Forestry Land				
	Subtotal	655,615	6,556	6,556,150
Safari Areas on Communal Land				
	Subtotal	4,800,000	48,000	48,000,000
Safari Areas on Private Conservancies				
	Subtotal	590,000	5,900	5,900,000
	Total Conservation Land	10,659,925		
	Total under Safari Hunting	7,941,915		72,863,000
	% of conservation land under Safari Hunting	75%		

9.2. TYPE OF LAND UTILISED

Although safari hunting generates revenues across a greater diversity of land tenures – including state, private and community land (16), hunting areas in Zimbabwe are typically found in hot, arid regions that are not suitable for agriculture.



The properties and desirability of wildlife land as eco-tourism destinations are not uniform across all wilderness areas. Across Africa, there are large tracts of wilderness that are unsuitable for non-consumptive ecotourism by virtue of any combination of the following:

- Remoteness and poor access
- Lack of attractive scenery, features and aesthetic value

- Low wildlife densities
- Presence of livestock and people
- Real and perceived threats re. security and political stability
- Disease risks – e.g. Malaria, sleeping sickness and Ebola
- Discomfort factors – such as very high ambient temperatures, humidity and insect infestation

Research has shown that eco-tourists seldom visit these areas whereas hunting clients are less concerned with these factors and so hunting tends to be more important and more resilient as a generator of revenue to maintain and conserve such areas (17).

Thus, within any given country or even within a single wilderness area – some areas lend themselves to eco-tourism and others to hunting and for wildlife-based land-use to be sustainable and financially justifiable as the primary land-use it is necessary to diversify and develop all activities and revenue streams compatible with wildlife and habitat conservation.

9.3. ECO-SERVICES PROVIDED UNDER WILDLIFE-BASED LAND USE

Bio-diverse, heterogeneous systems are more proficient at provision of multiple eco-services such as water filtration, detoxification and purification; water retention within sponges, wetlands and river catchments; air filtration and oxygenation; promotion of improved soil structure and fertility; erosion control; carbon trapping and retention; nutrient recycling; waste decomposition and detoxification; pollination; temperature and climate amelioration; mitigation against droughts and floods and the like which are all fundamental processes absolutely vital to the continuation of life on earth but which we all-too-often take for granted.

As an indication, based on an average of 10 carbon offset credits per hectare of intact forest / woodland (which is somewhat less than the average woody + soil carbon sequestration of the registered Kariba REDD+ Project in northern Zimbabwe), conservation areas under trophy hunting in Zimbabwe provide the basis for some 80 Million carbon offset credits per annum and it is hunting that generates the income to conserve and protect these areas. Having said that, alternative revenues – e.g. from carbon credits and REDD+ need to be added to the overall income generation for conservation and community benefit.

It is the conservation of animals and plants within these ecosystems which, through tourism, sustainable harvesting and utilisation by public and private enterprise, natural-resource credits (e.g. carbon and water credits) and donor support, provides the financial means to sustain and maintain such systems in an ecologically robust state. It should therefore be obvious that removal of the primary, and in most cases the only, form of sustainable income will undermine all ecological and conservation sustainability – not only of iconic species, but of wilderness and biodiversity at large.

9.4. BUFFERING BETWEEN PROTECTED AREAS AND COMMUNITIES

Once the pre-eminent model for community-based natural resource management in Africa, CAMPFIRE was established to derive mutual benefit for National Parks and neighbouring communities, through community-managed buffer zones. These buffer of “utilization zones” were meant as a means to translate potential value of wildlife and natural resources inside protected areas into realisable benefit and value for neighbouring communities.

Under this model communities derive tangible benefits from mitigation of human wildlife conflict and sustainable revenue generation through consumptive and non-consumptive tourism and harvesting enterprises, providing livelihood opportunities, which in turn incentivise sustainable management and build local support for conservation.

In the same way that marine reserves, sustain commercial fisheries in neighbouring waters, National Parks provide the source populations, critical ecological mass and tourism potentials, from which communities benefit, and the Parks in turn benefit from socio-political good-will, improved fire management, resource

protection, expansion of effective habitat, reduction of poaching and geographic buffering resulting from wildlife and habitat management in the peripheral CAMPFIRE areas.

Unfortunately, in certain areas, CAMPFIRE has become less effective in meeting its conservation and community development objectives and, in certain instances, this failure has been underscored by dramatic upturns in poaching. The poisoning of hundreds of elephant in Hwange National Park by disaffected CAMPFIRE Communities since 2013 is a very pertinent and graphic example of what can transpire when financial incentives to conserve become insufficient. In other areas, the dwindling of CAMPFIRE revenues has been reflected in increased human encroachment, habitat destruction, increasing conflict between communities, conservation stakeholders and authorities and, in the most extreme cases, even overt invasion and settlement inside National Parks and other Protected Areas.

It is a fact that, due to limited resources and manpower, the ZPWMA is not able to provide adequate coverage of security and protection through anti-poaching activities even within designated National Parks let alone Safari Areas, CAMPFIRE Areas and Conservancies. Many of these areas rely on anti-poaching activities and wildlife management inputs from hunting operators albeit with limited and inadequate resources, manpower and mandate in most cases. Removal of the hunting industry would consequently render most hunting areas totally exposed without any management or anti-poaching effort whatsoever – with devastating consequences on wildlife populations and habitat integrity.

This is not to say that hunters are providing or are able to provide adequate wildlife management and security and much more needs to be done – both in terms the statutory and contractual obligations and incentives for hunting operators to reinvest in resource protection and management as well as in terms of defining their mandate and ability to do so. These are additional issues requiring redress as recommended by the Stakeholder Workshop for Review and Reform of the Hunting Industry in Zimbabwe (June 2015).

9.5. ECOLOGICAL AND MIGRATORY CONNECTIVITY BETWEEN PROTECTED AREAS

Many community and state-owned safari hunting areas are very important conservation areas in the context of preservation of intact, functional habitats and natural forests and, moreover, in provision of ecological and migratory connectivity between wildlife populations in other protected areas.

Without these corridors and linkages, many protected areas and National Parks would otherwise be completely isolated with consequent susceptibility to a variety of edge & fragmentation effects and external pressures including encroachment, poaching, disease, diminishing genetic variation and the inability to migrate and so ameliorate the effects of drought and climate change.

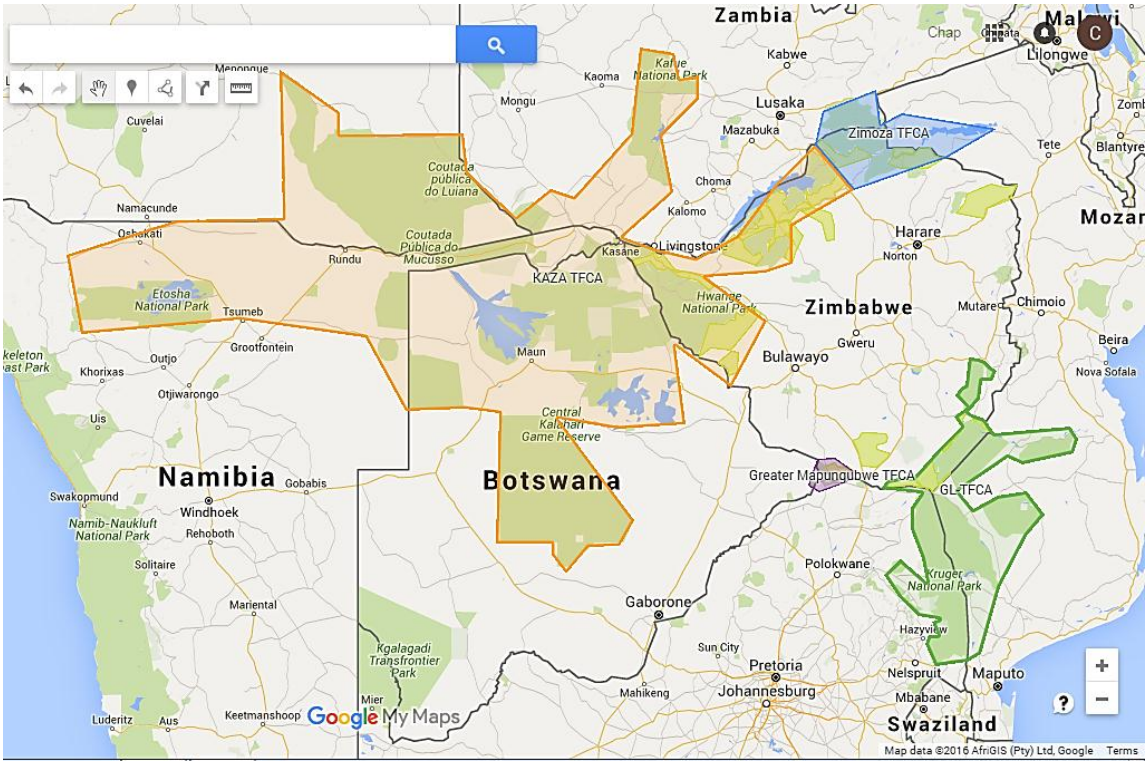


Figure 3: indicative map of the four major Trans-Frontier Conservation Area (TFCA) initiatives in which Zimbabwe is involved. These areas provide vital connectivity and contiguity between important conservation areas across international boundaries.

This principle of ecological and migratory connectivity lies at the heart of the trans-boundary conservation area (TFCA) initiative linking large protected areas across international boundaries (see map above) and providing the space for enormously important populations of wildlife – including for example:

i. The largest contiguous population of elephant in the Kavango-Zambezi (KAZA) TFCA - linking conservation areas in Zimbabwe, Botswana, Zambia, Namibia and Angola and spanning some 52 Million Ha. Many of the corridors within KAZA are provided by hunting areas on communal, private and state land which justifies wildlife and nature based enterprise as the primary land use.

ii. The second largest contiguous population of elephant and the largest populations of black and white rhino (including 3 of the remaining 10 IUCN key 1 populations of endangered black rhino) in the Great Limpopo TFCA (GL-TFCA) – linking important Protected Areas between Zimbabwe, Mozambique and South Africa and in which hunting areas provide vital corridors between Gonarezhou National Park in Zimbabwe and Kruger National Park in South Africa through the Sengwe Tchipise Corridor in Sengwe Communal Safari Area.

Without revenue from hunting, or alternative income to incentivise conservation, these corridors would be closed down and put to traditional crop and livestock production and already, the USFWL ban on imports of trophy hunted ivory is having a negative impact on the financial justification of wildlife based land use as the primary land use option in these areas – and if hunting is marginal then ecotourism is even more so in the context of the Zimbabwe tourist industry.

9.6. RHINO, LION AND ELEPHANT CONSERVATION IN ZIMBABWE: EXAMPLES OF HUNTING AS AN IMPORTANT AND EFFECTIVE CONSERVATION TOOL.

Despite private conservancies accounting for less than 10% of all conservation land in Zimbabwe, over 94% of all rhino in Zimbabwe reside on 3 private conservancies – including 3 of the last 10 IUCN Key 1 Populations of endangered black rhino remaining in the world today.

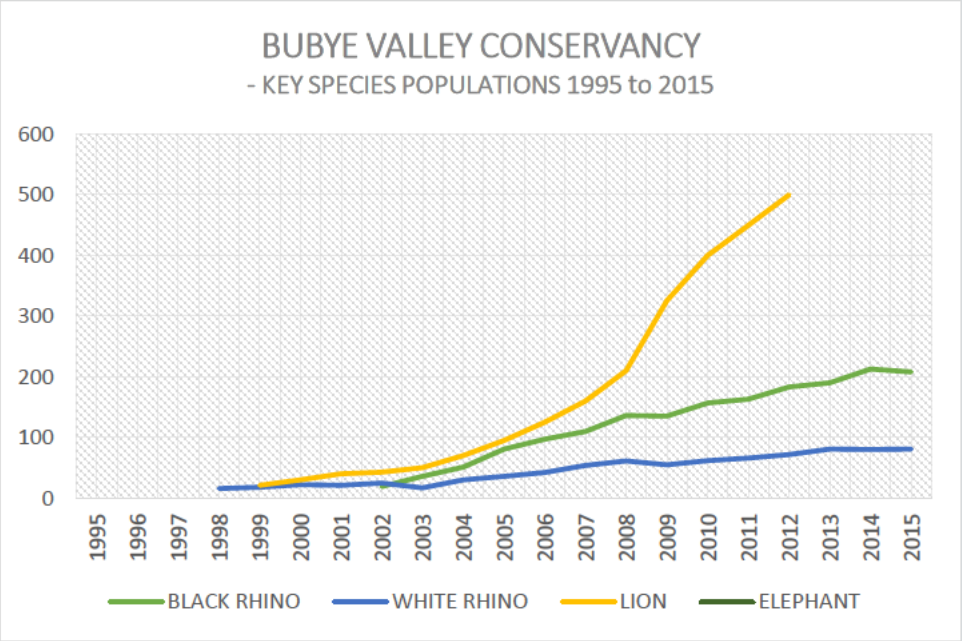
Aside from Malilangwe, the conservancies are reliant almost exclusively on well regulated and sustainable Safari Hunting to sustain their conservation activities. This includes protection of their rhino populations – despite the fact that the conservancies are not able to earn any revenue from rhino as it is not permitted to hunt rhino at all in Zimbabwe – and furthermore these animals ostensibly belong to the state even though they are hosted and protected on private land.

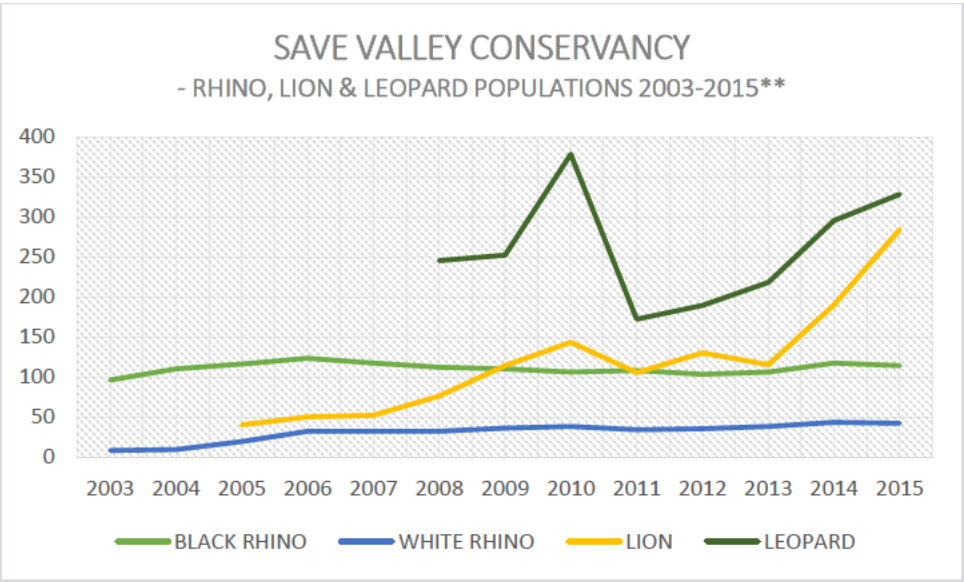
The private, community and state-owned hunting and conservation areas also provide protection for a full range of other endangered species that are not hunted by safari hunters – such as African Wild Dog, Cheetah, Roan Antelope and others which have benefited from the provision of conservation land, anti-poaching and other inputs provided by safari hunting. Savé Valley Conservancy has one of the highest densities of African Wild Dog in the wild.

Examples such as these support IUCN recognition of well-regulated safari hunting an important and legitimate conservation tool. Well regulated hunting is a massive industry and conservation tool in developed countries in North America and Europe – which illustrates that it is not hunting *per se* that is the problem but poor, non-transparent and non-science-based regulation.

CASE STUDY

Since establishment of Savé and Bubye Valley Conservancies in the 1990s, populations of elephant, lion, rhino and other wildlife have increased significantly on the back of hunting revenues. Between them SVC and BVC may host as much as 4% of the world's wild lion population and each hosts an IUCN key 1 population of endangered black rhino – of which only 10 such populations remain in the world.
Key species population trends are presented for BVC (18) and SVC (19) in the figures below.





**Population fluctuations on SVC have been occasioned primarily by poaching and loss of land area under the fast-track land reform - compounded by periodic drought and loss of contiguity with other wildlife areas in the GL-TFCA.

9.7. POPULATION MANAGEMENT & MITIGATION OF HUMAN WILDLIFE CONFLICT

As human populations have grown, wildlife populations have become increasingly restricted to the extent that natural migration, which would ordinarily alleviate the effects of local overpopulation and resource denudation, has been undermined.

It is common practice throughout the world, including Europe and USA, to use hunting and other lethal means of population control to mitigate human wildlife conflict and maintain ecological balance between land and vegetation resources, herbivores and carnivores.

The restriction of wildlife populations to maintain ecological balance is all the more important when dealing with very-high impact species such as elephant and lion. It is well-documented that lion tend to exceed their "carrying capacity" – which, in fenced reserves necessitates population management and in unfenced reserves, leads to spill-over and conflict with neighbouring land uses and, along with poaching and other impacts, contributes to the documented underperformance of lion populations in unfenced areas by comparison to fenced areas (20).

9.7.1. A COMMENT ON CONTRACEPTION AS A METHOD FOR POPULATION CONTROL IN FREE-RANGING WILDLIFE

The enormous technical and logistical challenges and, moreover, the growing evidence of appreciable bio-physiological, health, behavioural and social disruption caused, all preclude extensive use of contraception as a tool for effective management of large, free-ranging wildlife populations.

10. FINANCIAL CONSIDERATIONS

10.1. RELATIVE SIZE OF THE HUNTING INDUSTRY IN AFRICA

Commercial safari hunting occurs legally in most European Countries, in all North American Countries, in around half of the 54 countries in Africa, several countries in Asia and South America, Australia and New Zealand (21).

Continent-wide, the hunting industry in Africa is estimated to have a value of some US$200 million per annum (22) of which, at gross revenues of US$24 Million in 2015 (23), Zimbabwe accounts for some 12.5%. Despite being relatively small, this income is nonetheless vital in the absence of alternative revenues and support for conservation and wildlife based land use.

By comparison, the hunting industry in the United States, the largest in the world, had, in 2011, an estimated 13.7 Million hunters, spending a total of some 38.5 Billion dollars per annum, supporting 680,300 jobs and generating some US$11.8 Billion in tax revenues. (24)

10.1. RELATIVELY LOW-CLIENT THROUGH-FLOW AND CAPITAL OUTLAY

By comparison to eco-tourism, safari hunting operates on much higher income per tourist with much lower tourist through-flow and total bed-nights and also requires far less capital outlay for accommodation and hospitality infrastructure (16).

Not only are these extremely important considerations in the context of the poor socio-economic and political climate for investment and tourism in Zimbabwe, but also result in fewer disturbances, lower use of fossil fuels and GHG emissions and lower environmental impact than large eco-tourism developments (16).

10.2. RELATIVE RESILIENCE OF SAFARI HUNTING TO SOCIO-POLITICAL DISTURBANCES, SECURITY THREATS AND HEALTH RISKS.

Public health scares such as Ebola, terrorism, political unrest and social disturbances have had demonstrably serious impact on tourism traffic to different parts of Africa (17) and is especially true of non-consumptive ecotourism which is far more sensitive to such deterrents than is consumptive trophy hunting – with safari hunters being empirically more willing to venture into remote and relatively risky or unstable areas than eco-tourists.

It is also interesting to consider the impact of these issues on tourism within the context of the developed world's own culpability in underlying factors that cause socio-political disturbances, livelihood vulnerability and security threats in the first place, as well as the distorted public perception of security, political and health risks in Africa resulting from ignorance and compounded by sensationalist, non-contextual reporting by the media.

11. SUSTAINABLE UTILISATION: COMMUNITY LIVELIHOODS, USER RIGHTS AND STEWARDSHIP

The Zimbabwe Parks and Wildlife Act of 1975 [Chapter 20:14] confers Appropriate Authority (AA) status to legal occupiers of any land for the purpose of managing and utilization of the wildlife resources therein.

This legislation led first to the advent of game ranching and wildlife-based land use on private land which proved both profitable and sustainable and set the example for similar land-use changes to follow on community-owned land under the CAMPFIRE programme.

Under CAMPFIRE, net revenues paid by the hunting operator are apportioned between the Beneficiary Community, Local Authority and the CAMPFIRE Association.

11.1. CRITICISMS AGAINST LACK OF EQUITABLE COMMUNITY BENEFITS

Lack of equitable community benefit is a commonly cited criticism of safari hunting. This is a very valid and serious criticism but is as true for poorly regulated diamond mining, oil/gas exploration, timber harvesting and all other forms of natural resource exploitation.

It is also worth pointing out that community benefit is a buzz-phrase that has been closely associated with justification of hunting but is less closely linked to non-consumptive eco-tourism which, in many cases fail to translate revenues to meaningful community benefit simply because there is less awareness and pressure on them to do so – even though the impact of non-consumptive ecotourism on community access to their conservation land, stewardship and natural resource user-rights may be as significant or even greater than that of safari enterprises.

The issue is about governance, not hunting and emphasis has to be placed on improved resource management, governance, community stewardship and user rights rather than prohibition of hunting or extraction of any other natural or mineral resource.

11.2. ANNUAL CONSERVATION INCOME

According to the minutes of the AGM of the Safari Operators Association of Zimbabwe (SOAZ), gross National revenues from safari hunting amounted to some US$24 Million compared to gross earnings of US$102 Million generated by the non-consumptive tourism sector (both wildlife and non-wildlife-based) in 2015 (23).

11.2.1. CAMPFIRE INCOME 2014

In 2014, the Community Areas Management Programme for Indigenous Resources (CAMPFIRE) generated a total net hunting income of US$2,102,007 in 13 districts of Zimbabwe.

The hunting income to CAMPFIRE disaggregated by district as well as the portion contributed by elephant hunting is shown in Figure 4 below. Bubi district recorded the lowest hunting income of US$21,270 whilst Mbire district generated the highest income of US$519,893. In 2014, elephant hunting contributed some 54% of hunting revenues averaged over all 13 CAMPFIRE Districts.

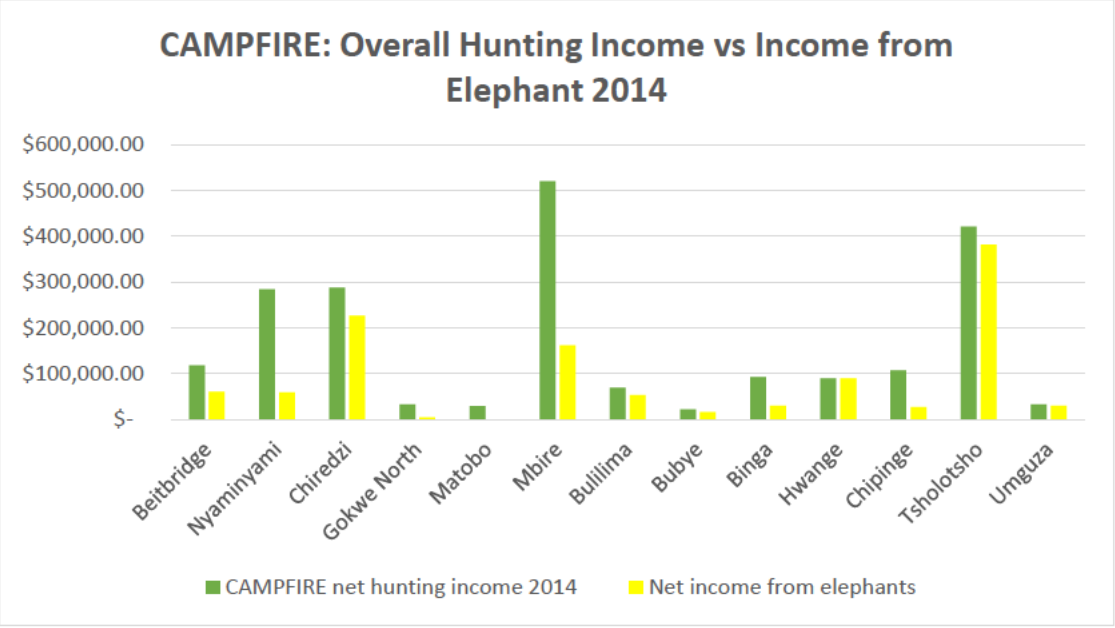


Figure 4: Overall CAMPFIRE revenue from hunting vs. income from elephant hunting in 2014.

Elephant hunting has increasingly made disproportionally high contribution to overall revenue generation in CAMPFIRE areas. This is mainly ascribed to the overall lack of species diversity in the majority of CAMPFIRE

areas, which is in turn due to lack of active management and protection. This lack of ecological diversity and over-reliance on elephant is a key weakness of CAMPFIRE and one that needs active redress through improved funding, management and diversification – both in terms of species conserved and hunted as well as through initiation of other, non-hunting enterprises which are compatible with biodiversity conservation. This issue has also meant that the 2014 USFWL ban on hunted ivory from Zimbabwe has had far reaching consequences on community revenues and conservation.

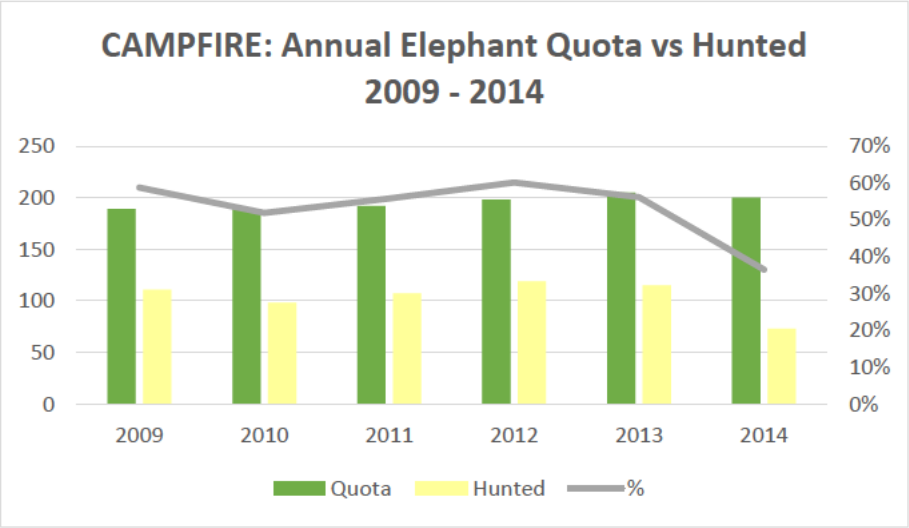
In Figure 4 above, the high revenue generation for Mbire District in combination with the relatively low proportion of income derived from elephant as a trophy species is strongly suggestive of a species-diversified CAMPFIRE model which is in turn suggestive of a comparatively well-managed and protected wildlife resource in that area. Indeed the area does in fact boast an array of very positive factors contributing to successful CBNRM - including visibly robust and transparent community based organisations enabled by good traditional leadership and governance from local authorities and supported by an innovative partnership with a proactive hunting outfitter prepared to invest in wildlife restocking, management and protection.

Table 2 below shows that elephant quotas have remained relatively steady over the period under consideration and that harvests have typically ranged between 52% and 60% of quota - with the exception of 2014 in which only 37% of the elephant quota was harvested.

Table 2: Summary of elephant hunting in CAMPFIRE Areas between 2009 and 2014.

ELEPHANT HUNTING IN CAMPFIRE AREAS: 2009 - 2014[2]						
	Quota	Hunted	%	HWC Reports	PAC	Poached
2009	189	111	59%	277	38	13
2010	189	98	52%	325	66	46
2011	192	107	56%	363	27	42
2012	198	119	60%	223	29	23
2013	205	115	56%	310	30	19
2014	200	73	37%	492	48	14
TOTALS	1173	623	53%	1990	238	157

With around 75% of elephant hunting clients originating in the USA, there is little doubt that this decrease in % harvest was precipitated primarily by the USFWL ban on import of safari-hunted ivory from Zimbabwe and Tanzania in that year.



The unintended consequences of unilateral trade bans are discussed elsewhere, but in the context of industry sustainability this issue has further illustrated the risk of having an undiversified product being sold to an

[2] Elephant quota, hunt, HWC, PAC and Poached data extracted from CAMPFIRE Workshop Proceedings 2014 (29)

undiversified market – leaving the industry and conservation funding exposed to external risks – including bans. In 2016 this has been further compounded by plunging oil prices and disposable income in the US so reducing US demand for other species as well.

KEY SPECIES - NATIONAL HUNTING OFFTAKES 2010-2015 (Source ZPWMA)							
Species	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	SUBTOT
Elephants	134	274	247	258	151	ND	1064
Leopards	219	173	194	241	222	108	1157
Crocodiles	ND	ND	91	53	ND	ND	144
Cheetah	3	1	1		1		6
Lions				29	42	47	118

In addition to addressing issues of ecological sustainability, governance and revenue distribution it is imperative that CAMPFIRE diversify revenue streams as a matter of urgency.

12. WHERE THE MONEY GOES – COSTS OF CONSERVATION.

Conservation in Africa is not cheap, especially in areas hosting species such as elephant, lion and rhino which are all highly valued by poachers and IWT syndicates and which require extensive ranges for breeding success and population growth.

Anti-poaching, manpower, water provision and infrastructure maintenance remain the most costly aspects of conservation and these costs vary between US$200 and US$1000 per km^2 depending on local conditions and species present.

CASE STUDY: THE FINANCES OF LION HUNTING AND RE-INVESTMENT IN THEIR CONSERVATION ON BUBYE VALLEY CONSERVANCY (18)

Break-down of income from a typical lion hunt on the Bubye Valley Conservancy:

- Lion Trophy fee: US$ 42,000
- Lion Hunt Daily rate: US$ 2,950 /day with a minimum lion hunt duration of 18 days equating to a total daily rate of US$ 53,100 per lion hunt.
- Additional costs including ZPWMA scouts to accompany the hunt, cost of observers, bait, other trophy species taken during the lion hunt, etc. amounting to an average of approximately US$ 6,500 per lion hunt.

Bubye Valley Conservancy - Lion Sport-Hunting Revenue Generated (2015):
((18 days x US$2,950 per day) + US$42,000 trophy fee + US$6,500 additional costs) x 12 lions per annum = US$ 1,219,200 representing 33.9% of total annual revenues (including post-hunt meat and hide sales).

All of the revenue generated from lion sport-hunting on the Bubye Valley Conservancy has gone back into the running costs of the Conservancy, including *inter alia*:

- Anti-poaching and fence monitoring and maintenance - approximately US$ 506,000 per annum,
- Research - approximately US$ 34,700 per annum (excluding client and sponsor donations), and
- Community support assistance of approximately US$ 210,000 per annum.

NOTE: No profit after costs has been declared, nor dividends taken by shareholders since the Bubye Valley Conservancy was formed in 1994. All revenue generated to date has been spent on running costs, improvements and restocking.

13. ALTERNATIVE REVENUE STREAMS

13.1. DIVERSIFICATION

It is acknowledged that notwithstanding all the evidence in favour of safari hunting as a conservation tool the industry is vulnerable to socio-political pressure and economic vagaries which can severely undermine the conservation initiatives that hunting supports.

In addition, ***hunting as a stand-alone enterprise is in many areas financially marginal*** – generating between $138-1,091/km^2 in gross income (2015 figures) (25) from which running costs, including anti-poaching, fees and profit are deducted – sometimes leaving little to cover costs of land and wildlife management and protection ranging between US$200 and US$1000/km^2 depending on local factors and species present.

It is therefore imperative that additional and diversified revenue streams are established for improved revenues and resilience of conservation in Africa. If hunting is "break-even" in covering necessary inputs for resource protection and management then "profit" needs to be found through **additional** (as opposed to alternative) revenue streams - rather than cutting costs and corners in resource management.

To reach adequacy in most cases, investment in management and protection of the resource base will require a combination of diversified revenue streams, payments for eco-services and conservation services and subsidies through philanthropic donations from the wider hunting and conservation community.

13.2. ECO-TOURISM AS AN ALTERNATIVE REVENUE STREAM

For reasons mentioned elsewhere, non-consumptive ecotourism can be a viable alternative to hunting, but only in a limited number of cases (1) as determined by global demand, local conditions, cost, ease and desirability of the destination amongst other factors.

Highly competitive eco-tourism requires ease of access, solid infrastructure, outstanding landscapes, high wildlife densities, political stability, lack of security and disease threats and good value for money. It also requires high throughput and high start-up costs. Many of these factors are absent in many developing states and it is under these circumstances that hunting becomes more important as a means of financing wilderness and biodiversity conservation.

Eco-tourism, which in Zimbabwe was at its zenith in the 1990s, has declined enormously in recent decades. The industry operates at well under 50% of operational capacity even though many establishments have either closed their doors or downscaled significantly. If eco-tourism, occupying approximately 25-30% of conservation land in Zimbabwe, cannot fill its current beds and potential then it certainly cannot be expected to replace hunting as the dominant income generator for conservation overnight.

Even in South Africa, which enjoys an overwhelming dominance of the tourism industry in Africa, much of the private wildlife estate and state PA's do not attract sufficient regular tourism to be viable.

While it is vital that Zimbabwe energetically promotes eco-tourism wherever possible, hunting increases the contexts in which wildlife is a competitive land use and the two industries are not mutually exclusive but can and should be complimentary so as to add value to wildlife across as broad an array of circumstances as possible.

13.3. WILDLIFE AND ECO-SERVICE OFF-SET CREDITS

Payment for eco-services (PES) such as carbon sequestration and off-set credits, wildlife corridor services and conservation incentive schemes including REDD+ projects, is an emergent concept with considerable potential to augment or even overtake hunting and other revenue streams as the primary means of funding sustainable conservation of wildlife and wilderness.

The main challenge is to grow the scope, scale and objective accountability of such schemes and to ensure that revenue flows will be reliable and sustainable over the long term.

14. FIRST WORLD VS. DEVELOPING WORLD BASE-VALUES

As so graphically depicted in the photo on the cover page of this document, the reality of living and coping with dangerous wildlife is far removed from the idealistic concepts of conservation that apply in the developed world.

It is totally inaccurate to assume that conservation and animal welfare ideologies of western societies are in any way reflected in those of impoverished communities in the developing world. In the context of a subsistence communal farmer, elephant, lion and other dangerous game are a serious threat to livelihoods and personal safety and wildlife in general represents a source of protein. In this context wildlife conservation is a burden and an opportunity cost and this equation changes only when communities are fully recognised as the rightful custodians, decision makers and stewards of their wildlife and natural resources and, moreover, are adequately remunerated through employment, development and financial rewards for conservation and tolerance of wildlife.

14.1. UNILATERALISM VS. CONSULTATION

It has been said, and not by us, that the proposed ban is an attack on the sovereign rights of African Peoples.

It is also increasingly said - by many of our fellow Zimbabweans of all backgrounds – that it is unfortunate that the EU or any other trade partner would choose to impose their ideology from afar without consulting with the very people who are most affected and who are dealing with the day to day problems of living and coping with wildlife.

This motion will in effect remove “user rights”, self-determination and stewardship-incentive from communities who will now see very little, if any, value in setting aside land for wildlife which will simply become a net liability – both financially and physically.

In this regard it is unfortunately true that 1st world decisions are often made with very little regard or understanding of 3rd world conditions and consequences.

It is also by no means the first time that conservation in Africa will suffer this insult. For example in the 1980s the Zimbabwean Veterinary Services were encouraged and supported (read “obliged”) by the EU to extirpate buffalo from much of their former range in order to satisfy overly protectionist phyto-sanitary barriers to international beef trade. The disastrous ecological effects of EU-endorsed game fencing to control foot-and-mouth disease (FMD) in Botswana and elsewhere in Africa is another very well documented example.

From colonial legacy to trade bans and barriers, Europe has a responsibility to Africa and to conservation on this continent and such responsibility requires just that – objective, consultative and collaborative responsibility.

14.2. AFRICAN WILDLIFE AS A GLOBAL ASSET

Africa has set aside vast PA’s, which, as illustrated above, represent much greater contributions to habitat and wildlife conservation in terms of % of land area under conservation than is the norm in most developed countries.

It has also been illustrated in this paper that conservation is costly and escalating exponentially, especially in the face of poaching driven by illegal demand for wildlife products. The simple fact is that developing countries in Africa are not able to meet the costs of conservation and wildlife management of these very large PA networks at the levels required to stave off immense poaching pressures and at levels to meet international

standards of best practice. Moreover, African wildlife and wilderness is a global asset and one which requires global effort and contribution if it is to be conserved.

It is estimated that Africa's PA's require approximately US$1 Billion per annum to meet their conservation and community development objectives of which they are perhaps realising about a quarter. The developed world, which has largely depleted its own wildlife and wilderness resources, needs to help. This is especially so in the context of vital eco-services and global wildlife assets provided to the world by third world PA's, but at present all steps seem to be taken to reduce Africa's ability to generate income from and for wildlife – without concomitant steps to increase external funding. In this regard, industrialised nations have never fulfilled agreements made at the 1992 Rio Summit to allocate US$2Billion a year in international conservation aid (26).

14.3. COUNTER-PRODUCTIVITY OF UNILATERAL BANS

Following the 2014 USFWL ban on importation of ivory from legally hunted elephant in Zimbabwe the market for elephant hunts by US citizens – who formerly accounted for between 75% and 85% of legal elephant hunting in Zimbabwe - has predictably declined, along with revenues.

Coinciding with an escalating demand for ivory and other animal products from the Far East, over the same period elephant poaching in the Zambezi Valley – a world heritage wilderness of outstanding importance and home to the globally-renowned Mana Pools National Park – has escalated exponentially.

It is not possible to say to what extent, if any, the ban has contributed to the escalation in poaching, but what is true is that the ban has certainly not averted the poaching and unsustainable loss of elephants and other species in this magnificent landscape.

What we do know, from actual financial data and employment records, is that hunting operators around Mana Pools National Park have had to cut back on their previous levels of anti-poaching manpower and effort as a result of reduced income – and this is at least partly attributable to the ban – through reduced number of elephant hunts being sold as well as reduction in price per hunt.

We also know that one of the unintended consequences of the ban was the prompt shift by a number of operators in marketing of elephant trophies to less discerning market less concerned with principles of fair-chase, ethics and sustainability.

As the industry pivots away from US (and potentially now EU) markets towards clientele from less discerning countries, this not only forgoes opportunity for leverage towards good governance and management but also reduces relevance of the US and the EU in the dialogue in favour of sound natural resource management and conservation in Africa.

In Kenya, safari hunting was banned completely in 1977. This deprived the National Parks and Protected Area network of important buffer areas and wildlife populations plummeted by 70% over the next decade. The hunting ban certainly did not mitigate the wholesale slaughter of wildlife or loss of conservation land.

In Botswana, cessation of safari hunting has resulted in many former hunting areas now lying idle (25) and neglected with some having been converted to livestock farming areas and, in the process, communities formerly reliant on hunting income have been disenfranchised.

Trade or hunting bans have not only proved counter-productive in Africa. Research in North America has shown that US trade bans for hunting of polar bears in Canada – in response to climate change and diminishing sea ice - has failed to decrease total harvests but has reduced revenue generation and the proportion of quotas taken by sport hunters from specific populations. The researchers found that "*consequently, the import ban impacted livelihoods of Arctic indigenous communities with negative conservation — reduced tolerance for dangerous fauna and affected local participation in shared management initiatives*" to the detriment of the conservation of this species (27).

As is the case in the emotive motion brought to the EU parliament – this latter example, seeks to use trade-bans to address non-trade challenges, being climate change in the case of the polar bear and poor regulation and habitat destruction in the case of many other hunting nations.

Rather than imposing unilateral bans – from which there is no realistic chance of reprieve and which effectively reduce revenues for conservation, it would be far more effective for developed countries to work with conservation stakeholders in the developing world in support of efforts to improve regulation and management of hunting, management and funding of hunting blocks and other conservation areas – understanding that African wildlife and wilderness are global assets requiring more to secure them than hunting can generate. In this it would of more beneficial for the US and the EU to provide financial and technical support and collaboration in re-building scientifically sustainable hunting programmes, monitoring and adaptive management systems, to assist in bolstering PA management and to identify and strengthen alternative revenue streams.

14.4. COMMENT ON "NON-DETRIMENT"

While we would agree that "non-detriment" on free-ranging wildlife populations is crucially important, the term as it is most frequently interpreted under CITES – which is that a given transaction will have no detrimental effect on the *survival* of the species concerned – we believe that it is of limited value without any dimension relating to the conservation of the species within context of the broader ecosystem.

For example, if "non-detriment" or "conservation success" is to be measured merely in terms of number of animals and population sustainability, then under this definition a canned-hunting lion farm containing 500 captive-bred lions on 500 hectares in South Africa is equivalent in its conservation value and "sustainability" to a population of 500 free-ranging wild lions on the 3,400,000 Hectare Bubye Valley Conservancy – which is clearly nonsense.

14.5. ACCOUNTABILITY OF LOBBYISTS AND PRESSURE GROUPS

The example cited in the Introduction – regarding the lack of follow-up from anti-hunting groups in response to Bubye Valley Conservancy's donation of 200 lions looking for a new home – is a classic case of not putting your money where your mouth is.

Unfortunately this is one of the main tragedies of this entire issue - that lobby groups, NGOs, officials and individuals – who raise huge amounts of money on the back of misinformed public sentiment and who are agitating to outlaw hunting without presenting a single financially sustainable alternative are gambling with a wildlife heritage, wilderness and natural resource that does not belong to them and for which they cannot be held truly accountable.

Once it is lost it will be lost for good, and it is us Africans who will be the losers.

15. CONCLUSION

The Ethics and Coordination Committee for Ethical and Sustainable Hunting in Zimbabwe continues to support the legal, controlled and sustainable consumptive utilization of wildlife in Zimbabwe as a revenue generation tool for the preservation of intact habitat and wilderness as the basis to ensuring that wildlife, including key species such as elephant, rhino, lion and leopard can continue to exist in the wild in Zimbabwe.

We are furthermore in agreement with the need to comply with international requirements of best conservation practice and findings of non-detriment but acknowledge our current inability to deliver in this regard. We therefor appeal, in the first instance for a grace period, and in the second instance, for technical and financial support and cooperation to assist the rehabilitation of cost effective, institutionally robust, scientifically rigorous, credible and accountable systems for sustainable management of hunting and conservation in Zimbabwe.

We urge the European Union to use openly available facts to formulate their polices in relation to wildlife conservation in Zimbabwe and to engage and work with Zimbabwe in its continued efforts in both private and public sectors to improve regulation and sustainability of conservation and to generate much needed revenue through both consumptive and non-consumptive tourism. The signing of this position paper would amount to an act of neo-colonialism and an attack on the sovereignty of Zimbabwe.

Banning safari hunting without providing an effective alternative source of revenue for the conservation of wildlife in hunting areas is not a clever solution to these problems because it leaves a void that is rapidly filled by destructive activities such as poaching, habitat destruction and human encroachment. It is far better to assist to strengthen and enforce the industry's regulatory and governing frameworks to achieve minimum standards of best international practice.

Decisions for restriction of hunting, if any, should not be indefinite without reasonable expectation of resumption of normal trade in time. They should also be highly specific and targeted to reform specific concerns; be based on sound scientific fact; be cognisant of adverse impacts on biodiversity and iconic species conservation; be cognisant of adverse impacts on community livelihoods; be based on consultation with affected range state governments, communities and conservation stakeholders; avoid undermining local approaches to conservation, and, moreover, should only be taken after identification and implementation of sustainable and fully funded alternatives backed up with requisite commitment to both technical and financial support.

The challenge for those who cannot, under any circumstances, tolerate trophy hunting on ethical grounds is to come up with an effective and practical alternative to generate the desperately needed revenue for the conservation of wildlife in hunting areas. However, despite many decades of anti-hunting sentiment, lobby groups have failed to come up with alternatives, possibly because no viable options exist, apart from philanthropy, for the marginal types of landscapes where trophy hunting is currently practiced. Philanthropy on a large scale may work, but experience has shown that most anti-hunting groups fall silent when asked to back their words with money, leaving hunting as the only, albeit imperfect, land-use option for wildlife areas that are unsuitable for ecotourism. Payments for eco-services and performance incentive schemes are promising but need to be more fully developed, more widely accepted and more adequately funded.

16. ACTION PLAN

1. Endorse and implement recommendations of the June 2015 Workshop for Review and Reform of Hunting in Zimbabwe.
2. Endorse and support the EU-funded CAMPFIRE Stakeholder's Review and ensure that the process is broadly consultative and reconciliatory with stakeholder communities and their Traditional Leadership.
   To this end it is agreed that the National Council of Chiefs will be represented on the Steering Committee of the CAMPFIRE and NR Steering Committee (in addition to representation on the ECC).
3. Constitute and mandate the Ethics and Coordination Committee for Ethical and Sustainable Hunting in Zimbabwe to:
   a. Draft and enforce an updated Code of Conduct and Best Hunting Practice.
   b. Establish and capacitate a National Secretariat for the ECC to undertake data collection, data management, annual reporting, communication, coordination, fund-raising, marketing and advocacy for the industry.
   c. Develop cost-effective, practical and scientifically robust tools for monitoring key parameters – trophy quality & ages, ecological trends, revenues, tourism, community dividends & development, wildlife management, law enforcement, etc.
   d. Establish Technical Committees in each of the 4 eco-regions – Zambezi, Sebungwe, Hwange & lowveld – to undertake:

i. Data Collection - Ecological, hunt, tourism, revenue, community – using simple scientifically designed methodologies
ii. Trophy Monitoring – age and quality
iii. Adaptive Science-based Quota Setting
iv. Draft and enforce locally appropriate by-laws
v. Operator selection, monitoring and evaluation

e. Undertake comprehensive data collection and management.
f. Publish annual reports and Non-Detriment Findings.
g. Inform adaptive science-based quota setting.
h. Undertake funding and fund-raising activities; coordinate communications and public relations; advocacy, marketing etc.

4. Review policies – such as SI 26 of 1998 - that are counterproductive to conservation and contradictory to the basic conservation principles and assumptions of the primary Parks and Wildlife Act.
5. Develop and implement NDF frameworks and systems for all outstanding CITES Appendix I and II species.
6. Develop a phased 5 and 10 year strategy for diversification and strengthening of a full array of NR-based revenue streams.
7. Develop and endorse a proposal under the Ethics and Coordination Committee seeking a grace period as well as technical and financial assistance in implementing the abovementioned reforms from the 11th EDF and other donors and trade partners.
8. Support and communicate positive developments and initiatives – including sanction brought against illegal or unethical behaviour or otherwise aimed at improved inclusivity management, accountability and sustainability of hunting and conservation in Zimbabwe.

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Republic of Zimbabwe

Enhancement and Non-Detrimental Findings for

Panthera leo in Zimbabwe

Zimbabwe Parks and Wildlife Management Authority



October 2016

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1 INTRODUCTION

The United States Fish and Wildlife Service (USFWLS) made a ruling in terms of its Endangered Species Act of 1973 (ESA) that the status of the southern and eastern African lion subspecies (*Panthera leo melanochaita*) is threatened (see http://www.regulations.gov). This ruling, which came into effect on January 22, 2016, now requires that the importation of all trophy lion from Zimbabwe will require an import permit. The decision whether to issue an import permit will in future be based on a Non-Detrimental Finding (NDF) that takes into consideration four main factors outlined under 50 CFR 17.22 and 17.32. These are:

- What direct and indirect impacts would occur on the wild population?
- Would issuing a permit conflict with any known programs intended to conserve the species?
- Would the purposes of the permit reduce the threat of extinction facing the species?
- What are the opinions of experts?

In addition to these factors USFWLS will also take into consideration the IUCN Species Survival Commission (SSC) *Guiding Principles on Trophy Hunting as a Tool for Creating Conservation Incentives, Ver. 1.0* (IUCN/SSC 2012). This document identifies five guiding principles of a hunting program that creates "*incentives for the conservation of species and their habitats and for the equitable sharing of the benefits of use of natural resources*" and recognizes that trophy hunting can contribute to biodiversity conservation and the conservation of the hunted species.

These are:

- **Biological sustainability** i.e. the hunting program:
    - Cannot contribute to the long-term decline of the hunted species
    - It should not alter natural selection and ecological function of the hunted species or any other species that share the habitat
    - It should not inadvertently facilitate poaching or illegal trade in wildlife by acting as a cover for such illegal activities
    - It should also not manipulate the ecosystem or its component elements in a way that alters the native biodiversity.

- **Net Conservation Benefit** i.e. the biologically sustainable hunting program should be:
    - Based on laws, regulations, and scientifically based quotas, established with local input, that are transparent and periodically reviewed
    - It should produce income, employment, and other benefits to create incentives for reducing the pressure on the target species
    - It should create benefits for local residents to co-exist with the target species and other species

- **Socio-Economic-Cultural Benefit** i.e. a well-managed hunting program can serve as a conservation tool when:
    - It respects the local cultural values and practices
    - It involves and benefits residents in an equitable manner
    - It adopts business practices that promote long-term economic sustainability

- **Adaptive Management: Planning, Monitoring, and Reporting** i.e. can the hunting programme enhance the species when it is based on appropriate resource assessments and monitoring (e.g., population counts, trend data), upon which specific science-based quotas can be established. Resource assessments should be objective, well documented, and use

the best science available. Adaptive management of quotas, based on the results of resource assessments and monitoring, is essential

- **Accountable and Effective Governance** i.e. a biologically sustainable trophy-hunting program should be subject to a governance structure that clearly allocates management responsibilities. The program should account for revenues in a transparent manner and distribute net revenues to conservation and community beneficiaries, and take steps when needed to eliminate corruption and ensure compliance with national and international requirements and regulations.

To address the points raised above, a systematic review of the status of lion in Zimbabwe has been undertaken with the full cooperation of stakeholders from the Government, Private Hunting Sector, Community NGOs and research organisations to demonstrate that the lion populations in Zimbabwe are being managed sustainably for benefit of both the conservation of the species and that the management programme is also providing economic incentives for local communities to protect and expand lion habitats. In doing so this assessment addresses the following issues:

- That the Zimbabwe hunting industry is based on sound scientific information and identifies mechanisms that would arrest the loss of habitat or increase available habitat (where feasible) and ensuring adequate protection from human encroachment.
- Demonstrate that there are government incentives in place to encourage habitat protection by private landowners and communities and incentives to local communities to reduce human-wildlife conflicts.
- Demonstrate that hunting concessions are managed to ensure the long-term survival of the listed species and its habitat.
- That trophy hunting provides financial assistance to the Zimbabwe Parks and Wildlife Management Authority, including the communal CAMPFIRE programme and private sector, to carry out various wildlife management programmes. It will also highlight how local communities directly and indirectly benefit from the presence of lion in their areas.
- Finally, this document will demonstrate how the participation of U.S. hunters in the Zimbabwe hunting industry contribute to the overall management of lion within the country.

2 Status and Distribution of Lion in Zimbabwe

Bauer et al (2015) summarise time series data for 47 lion populations across West, Central, East and Southern Africa where regular survey data are available. Using a Bayesian state space model to estimate growth rate-λ for each population, this study concludes that lion populations are declining everywhere across Africa, except in four southern countries (Botswana, Namibia, South Africa, and Zimbabwe). The population models indicate a 67% chance that lions in West and Central Africa will decline by one half, while estimating a 37% chance that lions in East Africa will also decline by one-half over two decades. It is concluded that almost all lion populations that historically exceeded ~500 individuals are declining, *but lion conservation is successful in southern Africa, in part because of the proliferation of reintroduced lions in small, fenced, intensively managed, and funded reserves.* This statement reflects the situation in Zimbabwe where lion populations in the conservancies have flourished under sound management regimes. They have also recovered rapidly in instances where appropriate actions have been taken to arrest unsustainable practices (i.e. Hwange) and where protected areas are receiving adequate funding (i.e. Gonarezhou).

2.1 The extent of lion distribution in Zimbabwe

The Zimbabwe Parks and Wildlife Management Authority (ZPWMA) is responsible for managing one of the largest estates in the country which constitutes approximately 5 million hectares of land or 13%

of the Zimbabwe's total land area (see Table 1 below). The bulk of Zimbabwe's wildlife occurs within the Parks Estate which includes 11 national parks, 16 safari areas, 16 recreational parks, 6 sanctuaries, 12 botanical reserves and 3 botanical gardens, all spread across the country, among other wildlife tourism related activities (Parks and Wildlife Act 2001 Chapter 20:14).

Wildlife populations also occur on the state Forest Areas, Communal CAMPFIRE areas and private conservancies dedicated to wildlife-based land use (Figure 1). Table 1 below provides a summary of these different categories, and whether they support lion populations (see Annex 1 for the details of each area).

Table 1. Summary of the National Parks Estate, CAMPFIRE, Forestry and Conservancies where lion populations are resident

Land Category		**Presence of Lion**				**Total (ha)**	**Total (km^2)**
		Yes (ha)	**%**	**No (Ha)**	**Migratory (Ha)**		
Parks Estate	National Parks	2,608,710	96	61,850	47,150	2,717,710	27,177
	Safari Area	1,745,300	92	146,600	-	1,891,900	18,919
	Botanical gardens	-	-	2,069	-	2,069	21
	Sanctuary	-	-	18,980	-	18,980	190
	Recreational	-	-	357,161	-	357,161	3,572
Forestry		436,165	47	491,701	-	927,866	9,279
CAMPFIRE		8,953,700	36	5,435,100	10,319,000	24,707,800	247,078
Private Conservancies		758,200	66	243,500	150,897	1,152,597	11,526
Matetsi Farms		-	-	-	155,627	155,627	1,556
Total Ha		**14,502,075**		**6,756,961**	**10,672,674**	**31,931,710**	**319,317**
Total km^2		**145,021**		**67,570**	**106,727**	**319,317**	
Percentage		**45%**		**21%**	**33%**		

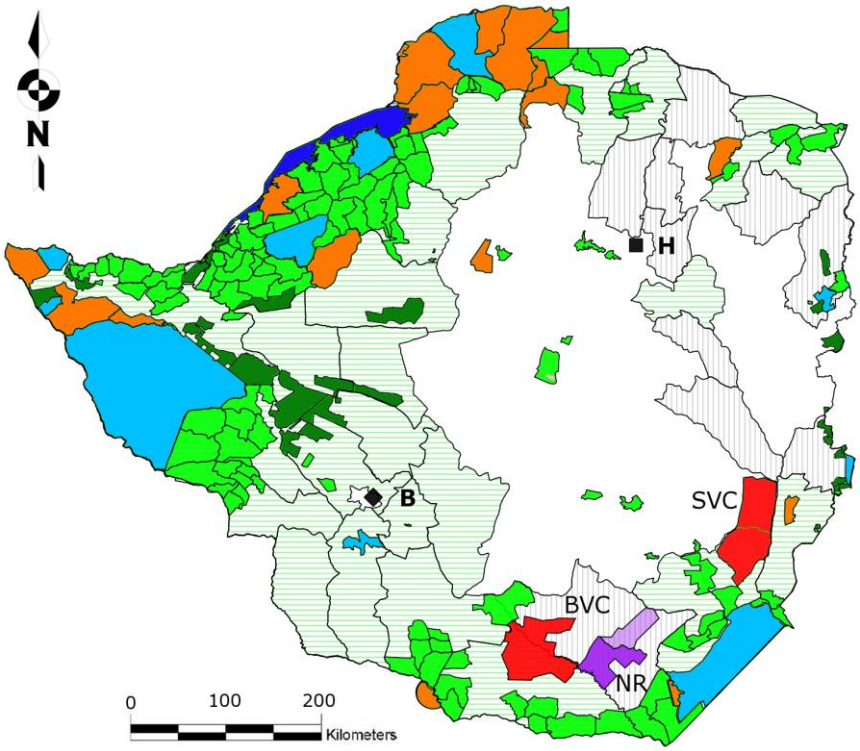


Figure 1: Map of Zimbabwe's main wildlife areas: [i] National Parks are represented in light blue; [ii] Safari areas are represented in orange; [iii] Forestry areas are represented in dark green; [iv] Community and Private wildlife areas are represented in light green; [v] Communal Land (CAMPFIRE Areas) in which sport-hunting may occur is represented by light green horizontal stripes; [vi] Communal Land in which sport-hunting does not occur is represented by grey vertical stripes. [vii] The Bubye Valley [BVC] and Savé Valley [SVC] Conservancies are represented in red. [viii] The Nuanetsi Ranch [NR] on which sport-hunting takes place is represented in dark purple (light purple represents the Nuanetsi Ranch cattle area); [ix] Lake Kariba is represented in dark blue. Harare (the capital city) is represented by a black square and letter '**H**'. Bulawayo is represented by a black diamond and letter '**B**'. Sport-hunting may occur in areas: ii, iii, iv, v, vii & viii (from du Preez, B. Groom, R., Mufute, O., Mandisodza-Chikerema, R. and Booth, V. (2016).

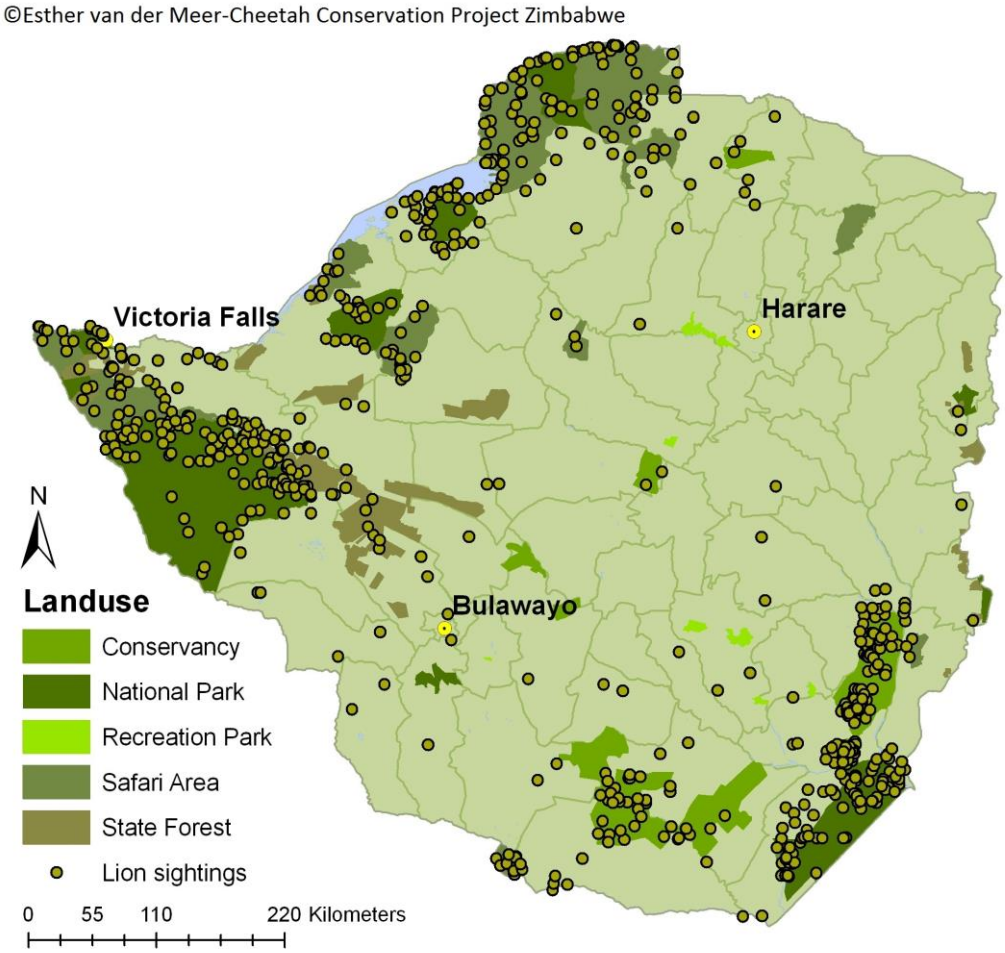


Figure 2: Range of African Lion Distribution in Zimbabwe

There are approximately 319,317 km^2 of land where some form of wildlife based land use is practiced in Zimbabwe. Lion occur permanently in 45% of this available range (c. 145,00km^2), with the majority occurring in State protected national parks (96%) and safari areas (92%). Lion also occur permanently in 47% of the State forest areas and 66% of privately owned Conservancies. The CAMPFIRE areas comprise approximately 247,000km^2 and lion occur in 36% of these areas. Lion are transient in CAMPFIRE, Conservancy and resettled areas adjacent to the major protected areas, and move across the border into Zambia, Mozambique, South Africa and Botswana (Figure 2).

There are two established Transfrontier Conservation Areas (TFCAs), the Great Limpopo Transfrontier Park (GLTP) which includes Gonarezhou National Park, and the Limpopo/Shashe TFCA. Other TFCAs that are at various stages of development are the Kavango-Zambezi (KAZA), Lower Zambezi-Mana Pools, Zimbabwe-Mozambique-Zambia (ZiMoZa) and Chimanimani.

2.2 Minimum population of lion in Zimbabwe

The minimum number lion that occur in approximately 51,642km^2 of land where reliable survey data are available is estimated to be c.1,917 (range 1,800 – 2,000) and is summarised in Table 2. The Western sector of the country dominated by Hwange National Park and the surrounding safari areas, forest areas, communal areas and private conservancies supports c.737 lion (or 38% of the overall population). The Southern sector dominated by the two major conservancies (Save and Bubye) and

Gonarezhou National Park supports c. 896 lions (48%) while the Central and Northern sectors of the country support c.284 lions (15%).

Table 2: Estimated minimum population of Wild Lion populations in Zimbabwe – September 2016 (Data compiled from a variety of reports)

REGION	AREA	AREA (km^2)	Estimated Number of Lions	Percentage
Western	Hwange NP	14,900	559	38%
	Matetsi Units 1-5	1,934	59	
	Matetsi Units 6-7 and Zambezi NP	1,585	67	
	Kazuma Pan NP	313	20	
	Kazuma Forest	240		
	Panda Masuie Forest	355		
	Matetsi ECA	1,556	15	
	Ngamo and Sikumi Forest	1,386	6	
	Gwaai Conservancy	927	22	
	Hwange Communal Land	392	2	
	Tsholotsho buffer adjacent HNP	1,275	7	
Subtotal		**24,863**	**737**	
Central	Chizarira NP	1,948	31	4%
	Chirisa SA	1,713		
	Omay	1,865	10	
	Matusadona NP	1,427	31	
Subtotal		**6,953**	**72**	
Northern	Chewore North and South	1,648	45	11%
	Dande	1,155	21	
	Hurungwe (Nyakasanga and Rifa)	1,709	32	
	Charara/Mukuti	1,692	20	
	Mana Pools	1,287	94	
Subtotal		**7,491**	**212**	
Southern	Gonarezhou National Park	5,053	125	48%
	Malilangwe	400	37	
	Bubye Valley Conservancy	3,440	450	
	Save	3,442	284	
Subtotal		**12,335**	**896**	
Overall Total		**51,642**	**1,917**	

2.2.1 Captive Breeding Facilities

Currently there are only two properties registered as captive lion breeders (Lion and Cheetah Park, and Antelope Park) and < 10 non-registered captive lion breeding operations (Table 3). Most of these centres keep lions for non-consumptive tourism and environmental education purposes with only a few keeping lions as pets. Altogether there are 345 lions held in captivity.

Table 3: Record of lions held in captivity – September 2016

Property	TOTAL
Doddieburn	13
Lion & Cheetah Park	40
Sentinel	2
Vhuka	5
Antelope Park	114
Safari Par, Masuwi Lodge (Lion Encounter)	4
Mhondoro Game Park	2
Chedgelow Farm	9
Chengeta	5
Turk Mine	6
Bally Vaughan	8
Mwanga Lodge	8
Masvingo	17
Karoi	2
Oscro	10
Simply Wild	19
Sondelani	9
Ruwazi	7
Imire	2
Makado Ranch	2
Chipangali	32
Crocodile Farm, Victoria Falls	1
Kuimba Shiri	2
Pamuzinda	6
Shearwater	10
Inyathi Ecogame Park	10
Total	**345**

3 Conservation and Management

3.1 Policy And Legislation

The Ministry of Environment, Water and Climate has a comprehensive suite of policies and legislation that provides the Zimbabwe Parks and Wildlife Management Authority (ZPWMA) with a mandate to conserve and protect all fauna and flora in the country.

The legal framework is enshrined in the National Legislation and associated Regulations that are informed by the Wildlife Policy (1992) that seeks to maintain a protected area network for the conservation of the nation's wild resources and biological diversity. Amongst others it seeks to create

economic activity to enhance rural development and encourages the conservation of wild animals and their habitats outside the protected areas.

The ZPWMA is established by the Parks and Wildlife Act of 1996 (Chapter 20:14) as amended by Act Number 19 of 2001 which came into operation on the 1st of June 2002 through a Statutory Instrument 144C of 2002. The Act provides for the:

- Establishment of a Parks and Wildlife Board;
- Confers functions and imposes duties on the Board;
- Establishment of national parks, botanical reserves, botanical gardens, sanctuaries, safari areas and recreational parks;
- The preservation, conservation, propagation or control of wildlife, fish, and plants of Zimbabwe and the protection of her natural landscape and scenery;
- Conferment of privileges on owners and occupiers of alienated land as custodians of wildlife, fish and plants;
- Giving of certain powers to environment committees (formerly intensive conservation area committees); and matters incidental to or connected with the foregoing.

The Act that was originally passed by Parliament in 1975 was unique in that it provided a legal basis for the devolution of Authority to private landowners over all wildlife on their land which resulted in in the rapid development of the country's wild life industry. It also paved the way for the partial extension of this principle to the Communal Lands through the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) in the 1980s that granted Appropriate Authority Status to the communal areas to manage the wildlife resources for their own benefit.

The Act was subsequently revised in 1996 and 2001 with the latest revision paving the way for the establishment of the current Parks and Wild Life Management Authority to replace the former Department of National Parks and Wild Life Management.

The legal and regulation framework applicable to the conservation and protection of lion and all other species includes:

- Parks and Wildlife Act; Chapter 20:14 (1996) as amended in 2001.
- Environmental Management Act; Chapter 20:27.
- Forest Act; Chapter 19:05.
- Statutory Instrument 362 of 1990: Parks and Wildlife (General) Regulations, 1990.
- Statutory Instrument 76 of 1998: Import and Export of Wildlife Products.
- Statutory Instrument 40 of 1994: Parks and Wildlife Act (General) Amendments.
- Statutory Instrument 26 of 1998: Parks & Wildlife Act (General) Amendment.
- Statutory Instrument 92 of 2009: Compensation Values for Wildlife.
- Statutory Instrument 93 of 2009: Compensation Values for Trapping of Animals.
- Trapping of Animals Control Act 20.16.

A summary overview of these instruments is provided in Annex II.

3.2 The Zimbabwe Parks and Wildlife Management Authority

The Parks and Wildlife Management Authority is mandated by the Parks and Wildlife Act [Chapter 20:14] with the responsibility of conserving Zimbabwe's wildlife heritage through effective, efficient and sustainable protection and utilisation of natural resources for the benefit of present and future generations. The Authority was established to allow it to retain the revenue that it generates for

funding its operations and thereby reducing its dependence on Treasury. This entailed introducing a commercial dispensation and putting in place effective revenue generation and financial management systems.

The ZPWMA has the mandate to manage the entire wildlife population of Zimbabwe, whether on state, private and communal land. Vision, mission and core values of ZPWMA are as follows:

Vision: *To be the world leader in sustainable conservation*.

Mission: *To conserve Zimbabwe's wildlife heritage through effective, efficient and sustainable utilisation of natural resources for the benefit of present and future generations and stakeholders*

Core Values: Teamwork, Commitment, Transparency, Professionalism, Integrity, Accountability, Fairness, in harmony with nature.

While private landowners may utilise the wildlife on their land, they are still accountable to the ZPWMA for the welfare of the wildlife in terms of Statutory Instrument 26 of 1998, which, among other things, states that "*No person shall permit any person who is not ordinarily resident in Zimbabwe to hunt on any land for which he is the appropriate authority any animals other than those entered on the authority to hunt…*'

3.3 Conservation Strategy and Action Plan for Lion

A *Conservation Strategy and Action Plan for the Lion (Panthera leo) in Zimbabwe* was prepared in 2006 by the ZPWMA, local and international NGOs. This was in response to the proposal submitted by Kenya at the 13th Conference of the Parties to the Convention on International Trade in Endangered Species of Flora and Fauna (CITES) calling for the transfer of the lion population from Appendix II to Appendix I. The Parties recommended a detailed examination of the issues surrounding the conservation of the African lion, through a series of regional workshops.

IUCN responded to this and together with other key stakeholders, organised the first workshop in 2005 which involved the 14 West and Central African lion range states. The second workshop brought together 15 lion range states from Eastern and Southern African in January 2006 (Bauer, Chardonnet and Nowell, 2005). Each workshop included the Directors of Wildlife Conservation Departments and their technical advisors, safari operators, community leaders, non-governmental organisations involved in conservation, as well as researchers on the African lion.

The workshops came up with several recommendations which included:

- The need for African lion range States to follow up the workshops by developing and implementing national lion management plans.
- The need for a Pan African Conservation strategy to form the basis of a region wide collaboration in the conservation of the lion and which would also form the basis for the management of other wildlife species on regional scale.

Responding to the first recommendation, the ZPWMA, together with IUCN, convened a workshop in November 2006 to develop a national lion conservation strategy and action plan for Zimbabwe attended by conservation NGOs, the private sector, and Rural District Councils (RDCs), as well as ZPWMA and IUCN (Conservation Strategy and Action plan for the Lion (*Panthera leo*) In Zimbabwe, 2006).

The deliberations of this workshop identified the following issues related to lion conservation in Zimbabwe:

- Management and research including technical advice, policy formulation and management interventions
- Capacity needs as reflected by adequate human, financial and material resources
- Mitigation of human-wildlife conflict
- Socio-economic costs and benefits of long-term lion conservation
- Communication and information dissemination for key decision makers at different levels
- Framework for captive breeding of lions
- Trade and regulations to ensure non-detriment findings related to trade in all lion related products
- Regional collaboration to strengthen bilateral and regional lion conservation strategies

The analysis of these issues led to the formulation of the conservation strategy whose vision is that *Lions (*are*) conserved and managed sustainably for their aesthetic, cultural and ecological values, and the socio-economic development of Zimbabwe*. The immediate objective of this strategy is *to secure and where possible, restore as many viable lion populations as possible in Zimbabwe whilst mitigating their negative impacts and enhancing their value for the benefit of people through sustainable use*.

Three broad targets were identified to achieve this objective:

1. Ensure the persistence of key lion populations and other important populations including those of doubtful viability;
2. Human and livestock loss reduced, and
3. Optimize wildlife conservation-related net benefits to local communities

Table 4 summaries the progress with achieving the results identified in the strategy:

Table 4: Summary of implementation progress of the 2006 lion conservation strategy.

Output 1. Lion Management - Lion populations, their habitats and wild prey effectively conserved and managed in collaboration with local stakeholders	
Target 1.1 Establish a baseline survey and monitoring programme for identified lion populations and their range inside and outside the Parks & Wildlife Estate	Baseline surveys have been completed for the Parks Estate using monitoring protocols for key variables (populations, habitats, prey). Selected surveys undertaken of areas outside National Parks in conservancies and some communal land and forest areas.
Target 1.2 Maintain and strengthen capacity for lion conservation, management, monitoring and research within PWMA and amongst other key stakeholders	Carnivore research programmes undertaken by NGOs (Mana, Matusadona, Gonarezhou, Zambezi and Hwange NPs, Matetsi, Chirisa SA) and research institutions (Bubye and Save Conservancies) in various parts of the country. Personnel trained in data collection and capture, management, lion aging and analysis.
Target 1.3 Identify and implement best management standards and practice for all trophy hunted lion populations, ensuring their viability and sustainable, equitable and adaptively managed trophy quotas	Quota setting methodology reviewed and annual quotas and offtakes analysed considering population changes, trophy quality and levels of PAC over time. Trophy hunting database in place and in process of being refined to provide cost-effective system for collation, entry, analysis, reporting and feedback to key stakeholders in the wildlife industry (ZPWMA, RDCs, SOAZ, ZPHGA, conservation NGOs, Researchers etc.). System of fixed and optional quotas reviewed and age-based criteria for male trophy animals in place and functioning.
Target 1.4 Develop and implement a national lion captive breeding management policy	Policy in place (see discussion below).
Target 1.5 Develop and implement co-management frameworks for wildlife management	Collaborative national lion action plans to co-management lion populations in place for NW Matabeleland and SE Lowveld, including three conservancies (Bubye Valley, Save and Malilangwe).
Target 1.6 The geographic distribution range of the lion population expanded	Conservancies and neighbouring communities are working together to maintain existing geographic distribution of lion populations. Zimbabwe proactive in the KAZA and GLTFCA programmes.
Output 2. Lion Research - Information for effective and adaptive lion conservation management generated	
Target 2.1 Initiate targeted research on lion ecology, management and mitigation of conflict	Extensive research programmes focussing on lion ecology and biology undertaken in Hwange, Bubye, Save, Malilangwe, Matusadona, Chizarira and Chirisa. ZPWMA have cooperated with NGOs, such as Panthera, to develop cost-effective age determination methods for lions. Key threats to lion populations, with focus on human-lion conflict, snaring and poisoning, undertaken and continually monitored.
Output 3. Mitigation - Human-lion related conflicts minimized and, where possible, eliminated	

Target 3.1 Develop and establish databases on lion/human conflict	Data on Problem Animal Control (PAC) reports on lion related problems collated.
Target 3.2 Identify and implement methods to reduce and mitigate livestock losses and lion attacks on humans	Approaches to mitigate livestock losses and lion attacks on humans being tested and implemented in Hwange. Methods to mitigate lion attacks on livestock being implemented as appropriate at selected sites (e.g. Tsholotsho).
Target 3.3 Trained and properly staffed PAC Units established to conduct rapid response, restrained and precisely targeted problem animal control	PAC Units at ZPWMA field station and/or RDC levels partially established.
Target 3.4 Incidents of human-lion conflict reduced by at least 30% in 5 years while also reducing retaliatory killing	Specific awareness and education package on lion conservation and management developed and implemented in Matusadona, Hwange and Gonarezhou regions.
Output 4. Socio- Economic - The costs and benefits of long-term lion management equitably distributed	
Target 4.1 Complete an inventory of stakeholders directly affected by lion conservation	Stakeholder groups (e.g. local communities, CAMPFIRE RDC representatives, commercial safari hunting operators (SOAZ, ZPHGA), tourism operators (ZATSO) identified. Financial impacts of lion conservation and extent and magnitude of socio-economic impacts on each stakeholder group completed.
Target 4.2 Deliver appropriate training and capacity building to prioritised stakeholders	Representative stakeholder groups in some regions identified (Hwange, Matusadona, Gonarezhou). Limited training undertaken. Implement adaptive programme across four wildlife regions
Target 4.3 Agree and implement collaboratively developed area-specific lion management plans with identified stakeholder groups in each wildlife region within 5 years	In progress. Hwange NP Management Plan approved.
Target 4.4 Implement transparent mechanisms to equitably distribute lion-related/generated income to identified stakeholders (groups and/or communities)	Scale of income generated from lion conservation reviewed and use of funds to encourage protection of lion populations reach local stakeholders undertaken (see CAMPFIRE generated revenues)
Output 5. Regulations - Effective regulation of consumptive lion utilisation ensured	
Target 5.1 Implement approved policy and practice at national and local levels regarding problem animal control (PAC) of lions within 2 years	Current policy and practice regarding problem animal control of lion reviewed, at national and local levels. PAC offtakes reconciled with trophy hunting quota offtake to ensure that the overall offtake (i.e. total quota) is sustainable.
Output 6. Communication, Awareness and Information Dissemination	

Target 6.1 To carry out awareness programmes in 50% of the districts in Zimbabwe within the next three 3 years	Awareness programmes initiated at a national level, with professional hunters, communities and NGO community. Awareness campaigns being carried out by the Extension and Interpretation Unit in all the regions.
Target 6.2 Create lion conservation and management information units within one year	Databases established at some key research centres using dedicated external research programmes (e.g. WILDCRU).
Output 7. Regional and Trans-Boundary Collaboration	
Target 7.1 Undertake an inventory of national strategies for lion management	Done.
Target 7.2 Encourage the development of national lion conservation strategies where these are missing &/ or incomplete	National lion conservation strategies discussed at AWCF (meeting held under auspices of KAZA).
Target 7.3 Develop an integrated and harmonised lion management strategy for Transfrontier Conservation Areas (TFCAs)	Lion conservation strategies for SADC discussed at AWCF meeting held under auspices of KAZA.
Target 7.4 Implement lion conservation strategy and management plan	Strategy under review.

3.3.1 National Lion Captive Breeding Policy

A target of the Conservation Strategy and Action Plan for the Lion in Zimbabwe was to develop and implement a National Lion Captive Breeding Management Policy. This was achieved in 2011 when the ZPWMA met with lion breeders, keepers and animal welfare organizations to define the purpose of breeding and keeping lions; identify and discuss issues related to breeding and keeping of lions in captivity and to chart the way forward on the breeding and keeping of lions in captivity.

The objectives of the policy are to provide a national approach and minimum standards to all aspects relating to the management of captive bred lions including the role of captive bred lions upon reaching maturity and regulate the import and export of captive bred lions. The policy also defines the measures to protect the genetic integrity of indigenous lion populations. The use and welfare of captive bred lions is monitored by a captive lion inspection team.

In terms of this policy, lions that are kept in captivity for species conservation and commercial purposes are subject to the following conditions:

1. No permit for the keeping of lions in captivity will be issued before the facility has been inspected and approved by ZPWMA as a Captive Lion Holding Facility.
2. Lions may not be allowed to breed in captivity unless the holding facility is registered as a Captive Lion Breeding Centre. If a breeding permit is not issued, it is the responsibility of the owner to ensure that the animals do not breed. If breeding occurs without a permit the owner will be fined and the animals are subject to confiscation and possible destruction by ZPWMA.
3. Lions may not be captured from the wild population and kept in captivity unless the animal is orphaned or injured and is captured with the purpose of rehabilitating the animal and returning it to the wild within as short a time as possible.
4. Captive bred lions may not be released into the wild or transferred from the facility without prior permission from ZPWMA, and are subject to an approved release plan.

No lion can be transported without the necessary internal and national permits and without being micro-chipped, and all transportation of live animals must comply with CITES Resolution Conf. 10.21(Rev. CoP 14). To safeguard the integrity of the indigenous gene pool, no import permits will be issued for non-indigenous lions. Any lion that are to be transported must be issued a certificate of health by a competent veterinarian confirming that the premises of origin has been free from anthrax, panleukopenia and canine distemper for six months, and that each predator is free from diseases such as FIV, BTB or any other disease which may threaten local populations. The animal should also have been vaccinated for rabies and treated with a broad spectrum de-wormer and acaricide.

It is an offence to export lions from Zimbabwe without a ZPWMA export permit, and all export permit will only be considered if the exporting facility holds a current permit to keep captive lions. Moreover, an export permit will only be issued if the importing facility, in the country of import, conforms to regulations laid out in this policy document.

4 Population Trend Data For Key Lion Populations In Zimbabwe

Zimbabwe has in recent years taken proactive actions to enhance the conservation of lion populations both inside and outside the protected areas. These have included implementing moratoriums on hunting, reducing quotas, implementing an age-based hunting regulation and undertaking independent monitoring programmes conducted by international research institutions. Emerging from this is evidence that by implementing appropriate regulatory, management and monitoring actions, coupled with raising awareness, the lion populations respond rapidly and recover to near

former levels. The section below summarises the data from key range areas both inside and outside the National Parks Estate to substantiate this.

4.1 LION SURVEY TECHNIQUES

The population estimates of lions in Zimbabwe are determined through carnivore spoor surveys, systematic lion collaring and call-up surveys. With the strategy to maintain the wilderness values of most protected areas, there is low road penetration in the parks estates, however all suitable roads are used as transects, and in areas of suitable substrate, spoor surveys have shown to be an effective and efficient means to assess wildlife densities (Stander 1998, Fuston et al. 2001, Davidson and Romanach 2007). Patrol reports, field observations by ZPWMA rangers and other sightings by tour operators and tourists also contribute to the knowledge of the status of lions in Zimbabwe's protected areas. Similarly, the occurrence of lion in Safari Areas is recorded by resident safari operators, including those operating in CAMPFIRE areas.

4.2 RESULTS OF REGIONAL LION SURVEYS

Lion population surveys provide indices of abundance that can be used to determine spatial distribution, as well as temporal trends in population numbers. The results of the different survey methods are used to generate information for setting sustainable lion trophy hunting quotas and for population management.

4.2.1 Gonarezhou National Park

Spoor count surveys of the Gonarezhou National Park have been conducted since 2009 using the same methodology to obtain direct estimates of lion populations to compared actual lion densities with potential density estimates (Groom, 2009, Groom et. al. 2014). Table 5 below illustrates the growth of the lion population in the Park (Groom and Watermeyer, 2015).

Table 5: Population estimates of lion in the whole of Gonarezhou National Park (extrapolated from survey area) from 2009 – 2015 (Groom and Watermeyer, 2015).

2009	2010	2011	2012	2013	2014	2015
31	45	72	64	77	116	125

As with many lion populations anthropogenic factors can be key drivers of lion population dynamics, and in areas with high human impact lion numbers may be significantly lower than those predicted by prey biomass models. This was found to be the case in the Gonarezhou National Park. Groom et. al. (2014) concluded that high hunting quotas either within or around the protected area were the most likely cause of the low lion numbers, with quotas in some areas being as high as seven lions per 1,000km^2 in some years. Other factors included persecution, poisoning and problem animal control, as well as disease and competition with spotted hyaenas (*Crocuta crocuta*).

Following decisions to halt lion hunting, and reducing human-lion conflict, the lion population responded and steadily increased, reaching a density of 2.5 lions / 100km^2 in 2014 (as compared with 0.6 / 100km^2 in 2009). Relative to other populations (average over Kruger NP, Hwange NP, Selous GR and Serengeti NP = 9.6 lions / 100km^2) this is still low, suggesting the population could continue to increase further. Groom et. al. (2015) conclude that the lack of artificial water in Gonarezhou means that natural carrying capacity will be lower but based on prey biomass availability predictions of lion carrying capacity could support between 200 and 300 lions (Groom 2010). It is therefore still possible that the lion population in the park could at least double before reaching carrying capacity (especially because prey biomass is now greater than it was in 2010 – see Section 8.5 below).

4.2.2 Save Valley Conservancy

The African Wildlife Conservation Fund carries out an annual large carnivore spoor survey to assess population trends of the carnivores in the Savé Valley Conservancy (SVC) to aid management decisions. A standardised methodology is used to ensure consistency through time and comparability with other studies. Since 2008, the spoor surveys have been done using the same roads and the same observer. The results of these surveys are provided in Table 6 showing that the lion population has increased from 40 in 2005 to 284 in 2015 (Groom and Watermeyer, 2015, du Preez et al, 2016).

Table 6: Population estimates of lion in the whole of Savé Valley Conservancy from 2005 – 2015

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
40	50	52	76	114	143	105	130	115	182	284

The lion population has increased substantially in the last two years, and there are now an estimated 284 lions in the whole of the conservancy. This is a notable increase since the 2013 estimate of 115 lions and 2014 estimate of 182, and is perhaps a latent effect of no hunting for over several years. Of the 149 lion tracks encountered, 28% were big adult males with 53% identified as females/juveniles and 15% as young cubs (3% of tracks were unidentified). The number of lions in SVC equates to a density of 11.7 lions/100km². This is slightly higher than other population estimates of 9.6 lions/100km² (average over Kruger, Hwange, Selous and Serengeti).

4.2.3 Bubiana Valley Conservancy

After originally being eradicated by cattle ranchers in the area, 13 lions were reintroduced to the Bubye Valley Conservancy in 1999, and four young males broke into the Conservancy that same year. From the original 17 animals present in 1999, the Bubye Valley Conservancy lion population was estimated at approximately 280 individuals in 2009 when robust population surveys were initiated by a team from the University of Oxford Wildlife Conservation Research Unit (WildCRU), and this population has continued to grow. Today it is estimated that there are over 500 lions on the Bubye Valley Conservancy (Figure 3, du Preez et. al., 2016).

The exponentially increasing Bubye Valley Conservancy lion population currently exists at one of the highest densities in Africa (~0.190 lions/km^2: du Preez et al. 2015, du Preez et al. 2016), greater than that of the Serengeti, Tanzania (0.10 lions/km^2), Selous, Tanzania (0.080 – 0.130 lions/km^2: Creel and Creel 1997), Kruger National Park, South Africa (0.096 – 0.112 lions/km^2: Mills et. al. 1995), and Hwange National Park, Zimbabwe (0.027 lions/km^2: Loveridge et. al. 2007). This equates to the largest contiguous lion population in Zimbabwe.

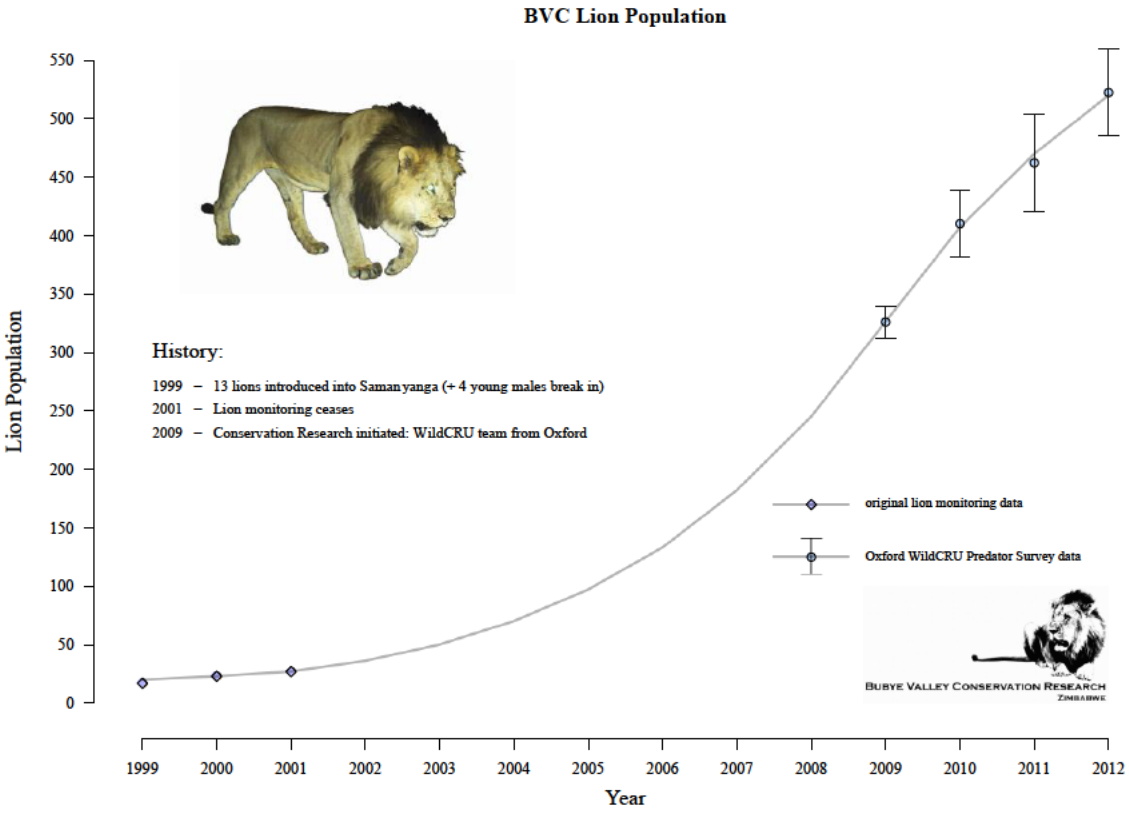


Figure 3: The Bubye Valley Conservancy lion population has increased exponentially since the original reintroduction of the species to the conservancy in 1999.

4.2.4 Mana Pools National Park

In conjunction with ZPWMA, Zambezi Society and the Cheetah Conservation Project, the Wildlife Conservation Research Unit (WILDCRU) based in Oxford (U.K.) conducted a camera trap and spoor count survey of Mana Pools National Park with the objective of:

- To undertake park wide surveys to estimate population density, distribution and habitat occupancy of common predator species in Mana Pools National Park.
- To contribute to Cheetah Conservation Project Zimbabwe's (CCPZ) cheetah monitoring protocol.
- To provide presence/absence data on all the larger mammal species.

A Facebook page was also created for the survey that was regularly updated on the progress of the survey (Facebook.com/Mana Pools Survey 2015).

The preliminary results of this survey identified 67 individual lions from the 267 images captured. When combined with the spoor count surveys, the population was estimated at 94 lions at a density of 4.5 lion/km^2 (Seymour-Smith and Loveridge, 2015),

4.2.5 Hwange National Park

The Hwange Lion Research Project undertaken by the Wildlife Conservation Research Unit (WILDCRU, Oxford University) works in association with the Zimbabwe Parks and Wildlife Management Authority. Since 1999 this project has identified over 600 lions and currently monitors approximately 15 prides and 12 male coalitions in a 5,000km^2 study area. This is one of the most intensive and long-term lion

projects in Africa. A key finding of this research programme has been to demonstrate that the way lion trophy hunting is managed can rapidly improve the status of lion populations by implementing a biologically sustainable system of allocating quotas. This project has also increase the understanding of human related impacts on lion populations (and vice-versa) along the park boundary. More recent research is focussed on understanding connectivity between Hwange NP and other areas such as parks in Botswana and in Zimbabwe.

This project was initiated because there was a perception that levels of sport hunting of male lions' in the hunting concessions surrounding the Hwange National Park were having a negative impact on the conservation of the population (Loveridge, et. al. 2007). Data collected between 1999 and 2004 suggest that this was indeed the case and this contributed to a suspension of sport hunting of lions in the area surrounding the Park between 2005 and 2009. This was a crucial shift in management policy for this species and an important step towards sustainable management and conservation of lions. Following the imposition of the hunting moratorium, lion densities increased (Figure 4).

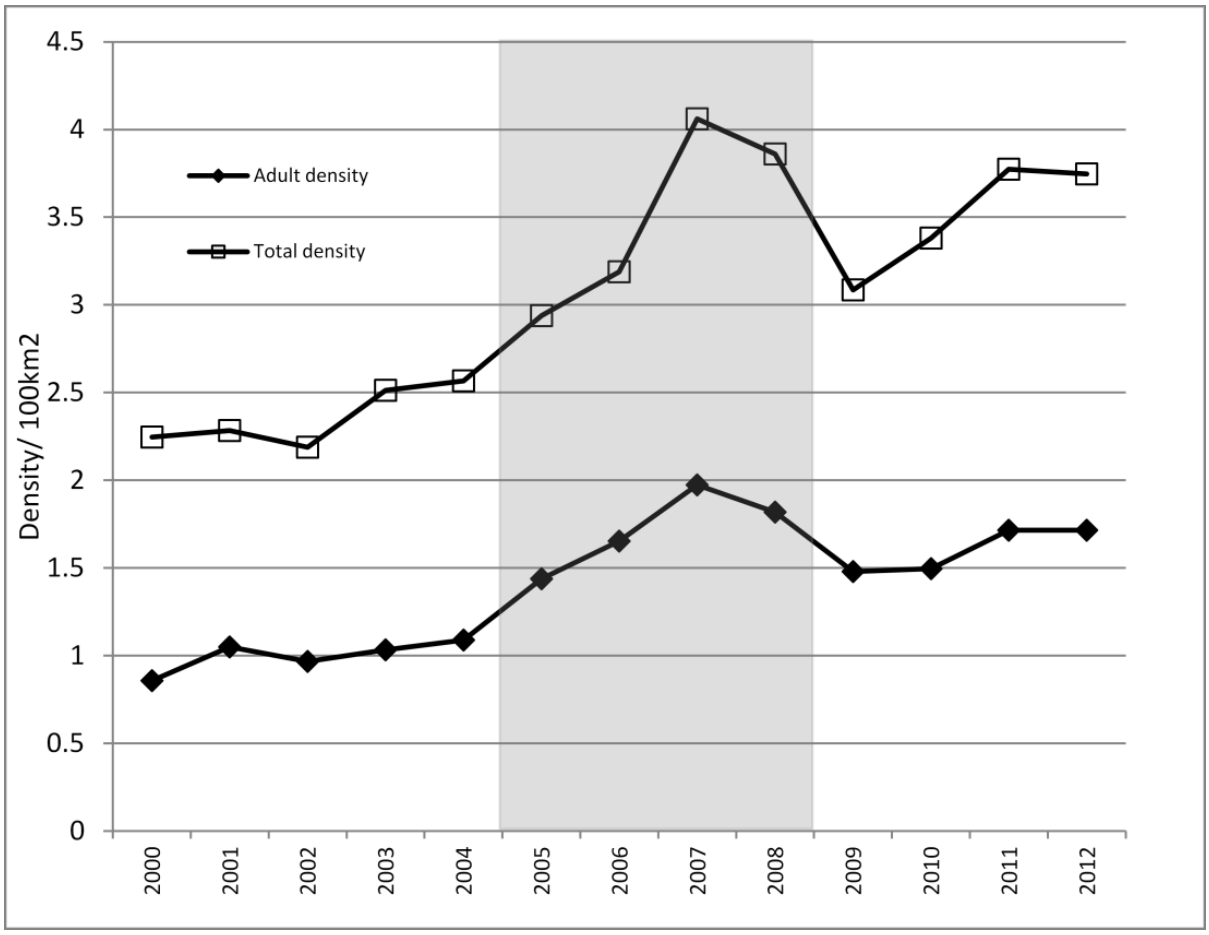


Figure 4: Lion densities in the Hwange area between 2000 and 2012

Following the lifting of the moratorium, and by implementing strict monitoring and hunting guidelines, the overall Hwange lion population has continued to show a positive trend, and is now estimated at over 550 animals.

4.2.6 Zambezi National Park and Units 6 and 7

Victoria Falls Wildlife Trust (VFWT) in collaboration with ZPWMA and the Hwange Lion Research Project has recently completed both spoor count transects and a camera trap surveys in Zambezi National Park, and Units 6 and 7 of the Matetsi Safari Area. The preliminary results of these surveys show that the lion population has increased since 2013 to approximately 67 (Rodger Parry, pers comm.).



Coalition males, Zambezi National Park, June 2016 (*Photo credit: Jessica Dawson, Victoria Falls Wildlife Trust)*

4.2.7 Chizarira National Park and Chirisa/Sengwa Safari Area

A survey was undertaken jointly by the Zimbabwe Parks and Wildlife Management Authority and the African Lion and Environmental Research Trust in September 2015 (Dr Norman Monks pers comm.). The survey area consisted of the 1,910 km^2 Chizarira National Park (a non-hunting area) and the adjoining 1,713 km^2 Chirisa/Sengwa Safari Area (a hunting area). No large carnivore counts using the call-up method had previously been conducted in these contiguous protected areas.

The survey method used the standardized protocol of audio broadcasts of a buffalo calf in distress. Spoor counts were not used for these surveys since previous research had shown that the call-up method was more precise, took less time, and was less costly to complete to achieve accurate results. Up to three stations were sampled nightly commencing just after sunset.

Twelve call-up sites were sampled. Response to the call-up stations by lions was low with only 2 of the 12 stations visited. The population abundance was estimated to be 31.6 (0.872 lion 100/km^2), suggesting a decline of 68.4% since 2004 when estimates of lion numbers were provided to Bauer and van der Merwe, (2004).

5 CONSERVATION IN ZIMBABWE

Zimbabwe Parks and Wildlife Management Authority (ZPWMA) falls under the Ministry of Environment, Water and Climate and it was established under the Parks and Wildlife Act of 1996 (Chapter 20:14) as amended by Act Number 19 of 2001. The rationale behind the establishment of the Authority was to allow it to retain all the revenue it generates to be ploughed back into conservation. The functions of the Authority are provided for in detail in section 4 of the Parks and Wildlife Amendment Act Number 19 of 2001. The Act gives the Authority power to control, manage and maintain Zimbabwe's wildlife resources.

Its **vision** is "*To be a World Leader in sustainable conservation*" and its **mission** is "*To conserve Zimbabwe's wildlife heritage through protection and sustainable utilisation of natural resources for the benefit of present and future generations*."

5.1 STAFF ESTABLISHMENT

The staff strength at the beginning of January 2015 was 2,043 and ended at 2,044 on 31, December 2015 (2015 Annual Report (unpublished). Fifty (50) rangers were recruited in 2015. The following is the staff status report as at 31st December, 2015 (Table 7).

Table 7: Summary Staff Establishment by Region

Position	Grade	HQ	VMU	Northern	Western	Southern	Central	Total
Executive	F & E	3	0	0	0	0	0	**3**
Department Managers/Sectional Heads	D3-D5	19	0	3	4	3	3	**32**
Ecologists/ Area Managers/Officers	D1-D2	11	1	19	19	13	4	**67**
Snr Rangers /Officers	C1-C5	29	6	64	89	49	34	**271**
Rangers/Clerical	B2-B5	33	12	507	461	310	197	**1,520**
Gen. Hands / Lodge Attendants	B1	2	2	30	66	33	17	**150**
TOTAL		**97**	**21**	**623**	**639**	**408**	**255**	**2,043**

The current remuneration levels have remained low with the lowest paid worker receiving a gross salary of $375 per month. The last salary increase of 23% was in January, 2014. A comparison with other Parastatals within the same parent ministry, shows that the Authority has the lowest salary scales.

5.2 TRANSPORT OPERATIONS

As indicated in Table 8, the total cost of operating the Parks transport fleet was is $1,547,172.82 (excluding insurance and licensing) in 2015. The existence of old and obsolete vehicles in the fleet increases costs as most of them require major component replacements thereby increasing vehicle downtime.

Table 8: Overall travel and fuel consumed by Region

Station	Km travelled	Fuel Consumed		Repairs & Maintenance Cost ($)	Total Cost ($)
		Litres	Cost ($)		
Head Office	1,489,294	190,644	272,620	136,419	409,039
Northern	1,429,260	149,577	213,895	147,113	361,007
Southern	1,075,077	110,111	157,458	59,548	217,006
Western	1,313,263	142,012	203,077	161,120	364,196
Central	392,885	47,995	68,632	127,288	195,920
TOTAL	**5,699,779**	**640,339**	**$915,684**	**$631,486**	**$1,547,172.**

Table 9 below summarises the status of the Authority's vehicle fleet as of 2015. Out of the fleet complement of 316 (including tractors and motor cycles), only 70% are in sound condition.

Table 9: Number of vehicles per region

Region	Runners	Non-Runner	Total	% of Non-Runner
Head Office	41	6	47	13
Northern	53	19	72	26
Southern	30	21	51	41
Western	80	39	119	33
Central	17	10	27	37
Total	**221**	**95**	**316**	**30**

The Authority also owns three aircraft: Bell Jet Ranger and Robinson R22 Beta 11 helicopters, and a Cessna 185. The Jet Ranger is based at Hwange National Park and is used for game capture and law enforcement. The remaining aircrafts are non-operational.

5.3 LAW ENFORCEMENT

A major component of the Authority's mandate is law enforcement. This has become increasingly more important with the escalation in illegal wildlife trade, particularly involving elephant and rhino. The Authority has an establishment of 2,146 rangers however by the end 2015, there were 1,448 rangers in post (67%). Of the 1,448 rangers in post, 1,004 are deployable for anti-poaching operations.

The level of effort of law enforcement over the last 3 year is summarised in Table 10. In 2015 there were 2,139 incursions detected, and arrest of 1,354 local and 129 foreign poachers. The number of armed contacts declined from 26 in 2014 to 23 in 2015, and number of poachers killed declined from 13 in 2014 to 11 in 2015. Recoveries made in the field included 25 rifles, 276 rounds of ammunition, 496 pieces of elephant ivory, 4 rhino horns and 5,133 wire snares.

Table 10: Detections, Arrests and Recoveries for 2013, 2014 and 2015

Year	No of Incursions	No of contacts		Number of poachers				Recoveries					Other recoveries and arrests		
				Killed		Arrested									
		Armed	Visual	Local	Foreign	Local	Foreign	Rifles	Ammunition	Ivory	Rhino horn	Snares	Gold	Poachers Camp	Dogs
2013	1842	27	344	9	0	1421	131	20	945	436	5	4415	93	264	180
2014	1571	26	362	10	3	4161	94	20	163	202	19	4864	221	186	272
2015	2139	23	356	6	5	1354	129	25	276	496	4	5133	134	339	167

5.3.1 Illegal Harvesting of Wildlife

Commercial wildlife poaching involving both local and foreign nationals continues to plague Zimbabwe, especially with respect to elephant and rhino located in the Zambezi Valley, Sebungwe, North-West Matabeleland, South-East Lowveld. The species targeted are shown in Table 11 and 12. Note that 21 lions were killed illegal between 2013 – 2015, with 6 animals killed through snaring in the area adjacent to Hwange National Park in 2015.

Table 11: Trends in wildlife poaching in the parks estate

Year	Illegally killed wildlife										
	Elephant	Buffalo	**Lion**	Kudu	Zebra	Impala	Warthog	Nyala	Eland	Crocodile	Waterbuc k
2013	293	65	**12**	65	21	67	22	5	6	2	15
2014	176	44	**2**	34	8	65	26	2	5	3	15
2015	317	78	**7**	76	21	92	46		9	17	6
2016*	101	23	**0**	23	22	54	12	1	4	1	5
Total	**807**	**210**	**21**	**200**	**72**	**278**	**106**	**8**	**24**	**23**	**41**

*To September 2016

Table 12: Illegally killed wildlife 2015 in the four regions

Region	Elephant	Buffalo	**Lion**	Kudu	Sable	Zebra	Croc	Impala	Eland	Warthog	B/Buck	waterbuck
Central	46	30	**0**	16	0	6	1	28	0	17	7	
Northern	75	6	**0**	6	0	0	0	0	0	0	0	0
Southern	65	38	**1**	42	0	9	4	31	4	25	1	6
Western	131	4	**6**	12	1	6	12	33	5	4	1	0
Total	**317**	**78**	**7**	**76**	**1**	**21**	**17**	**92**	**9**	**46**	**9**	**6**

5.3.2 Illegal trophy hunting – the "Cecil" effect

Professional hunter Theodor Bronkhorst was arrested for allegedly illegally hunting of a lion popularly known as 'Cecil' with a foreign client on Antoinette and Antoinette farm in Gwayi River Conservancy (which is adjacent to Hwange National Park). The same case involved Umguza Rural District Council in alleged illegal quota transfer[1]. At the time of writing, this case has not been brought before the court, and is still under judicial review[2].

The Authority immediately implemented the following measures in response to this incident:

- Hunting of lions, leopards and elephant in areas outside of Hwange National Parks required confirmation and authorization in writing by the Director-General of the Zimbabwe Parks and Wildlife Management Authority, and all hunts are to be accompanied by the Authority's staff whose costs will be met by the landowner.
- Bow hunting was suspended except with confirmation and authorization in writing by the Director-General of the Zimbabwe Parks and Wildlife Management Authority.
- Members of the hunting fraternity were reminded that it was illegal for quotas to be transferred from one hunting area to another. Any case of quota transfer would be regarded as poaching, and the Authority will not hesitate to arrest, prosecute, and ban for life any persons including professional hunters, clients and land owners who were caught on the wrong side of the law.

[1] This system facilitated the transfer of a quota from one property to another has since been suspended by the Authority.

[2] Note: This case has been dismissed by the court on 12th November 2016.

- 2015 hunting quotas and permits for Antoinette and Antoinette farm, Railway farm 33, Umguza Rural District Council and Kusile Rural District Council were suspended.
- Professional hunters' license for Theodor Bronkhorst was suspended.

5.4 Human Wildlife Conflict

The Authority is called upon to deal with human-wildlife conflict (HWC) issues across the country, and this continues to be a challenge. A total of 863 reports of problem wild animals causing threat to human life and property were received in 2015 compared to 1,637 reports in 2014 (Table 13). From these incidents, a total of 39 human fatalities by crocodiles, elephants, lions and buffaloes were recorded in 2015 compared to the 27 fatalities in 2014.

Table 13: Trends of Human and Wildlife Conflict Incidents

Year	Total Reports Received	People killed	People Injured	Cattle killed	Goats killed
2013	1 088	21	16	67	65
2014	1 637	27	24	217	129
2015	863	39	23	232	213
Total	**3 588**	**87**	**63**	**516**	**407**

The scale and species involved in HWC is summarised in Table 14. The authority received 200 problem lion reports and responded to 177. One person was killed by lion, and 206 livestock. The Authority elected to capture problem lion (6) rather than destroy the animals.

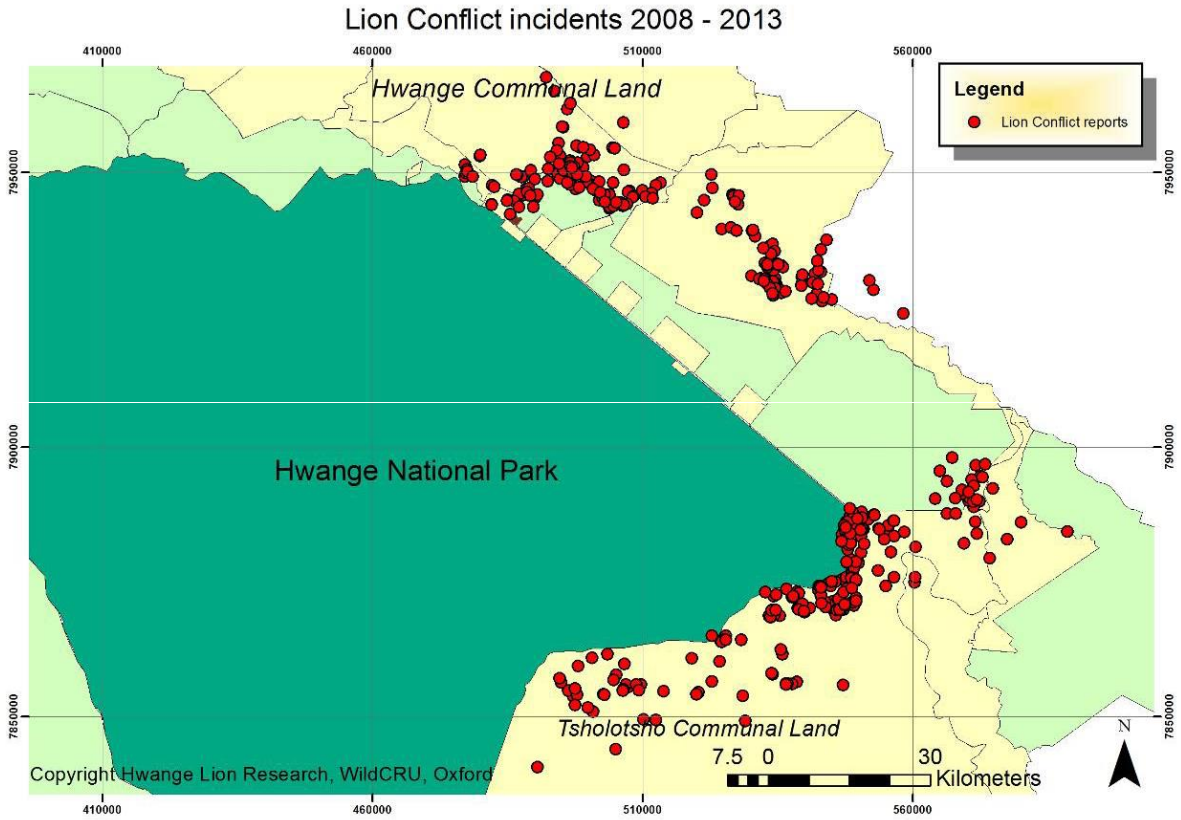
Table 14: Scale of countrywide human wildlife conflict in 2015.

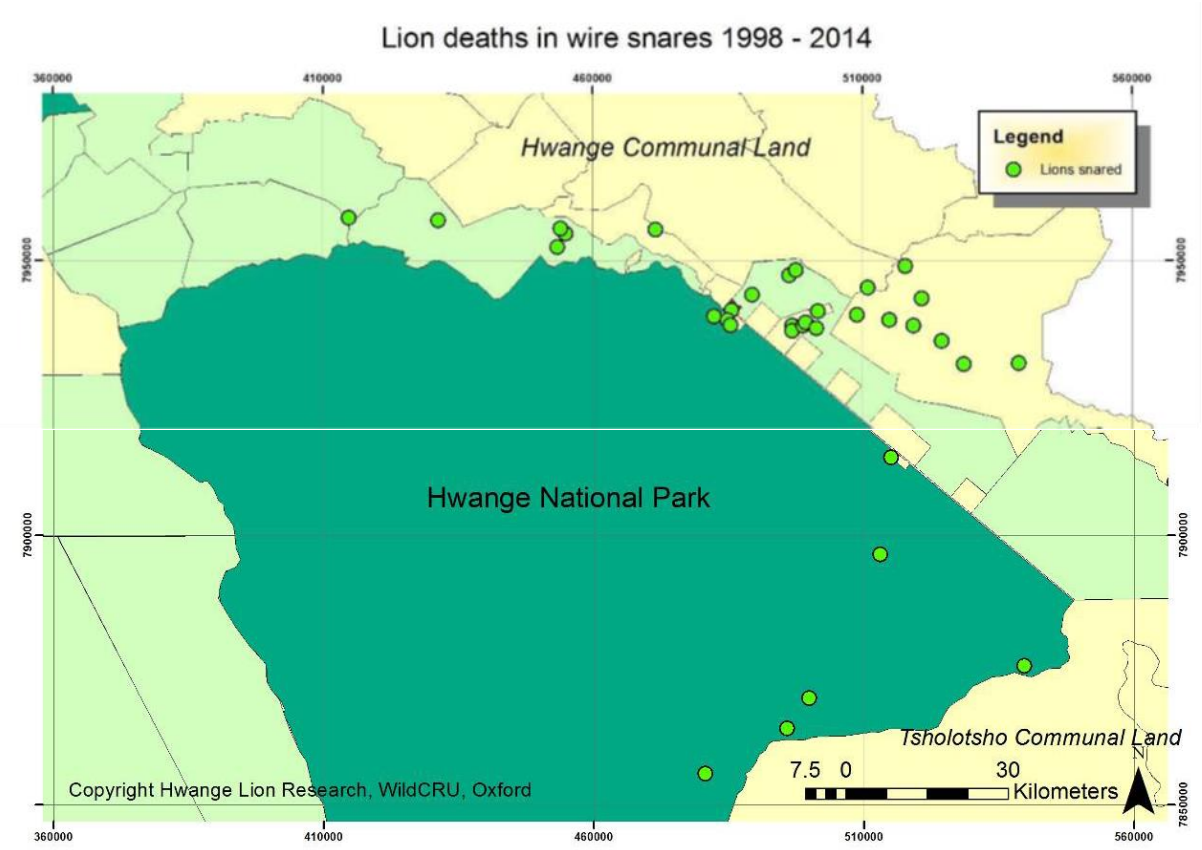
Species	Nature of problem	No of reports received	Reports attended	Number of animals eliminated		People		Livestock killed		
				Killed	Captured	Killed	injured	Cattle	Donkeys	Goats
Baboons	Damage to infrastructure, crop raiding, threat to humans	109	105	51	48	0	0		0	0
Buffalo	Threat to human life and crop raiding	46	40	0	15	2	1		0	0
Elephant	Threat to human life, crop raising, destroying property	216	177	0	38	4	5	0	0	0
Hippo	Threat to human life and crop raiding	131	87	0	34	0	0	0	0	0
Crocodile	Threat to human life and killing livestock	106	85	39	9	27	14	16	1	47
Hyenas	Killing livestock	36	18	0	7	0	0	68	2	54
Leopard	Killing livestock	19	11	0	1	0	0	32	0	33
Lion	**Threat to human life and livestock killing**	**200**	**177**	**0**	**6**	**1**	**0**	**115**	**12**	**79**
Total		**863**	**700**	**90**	**158**	**34**	**20**	**231**	**15**	**213**

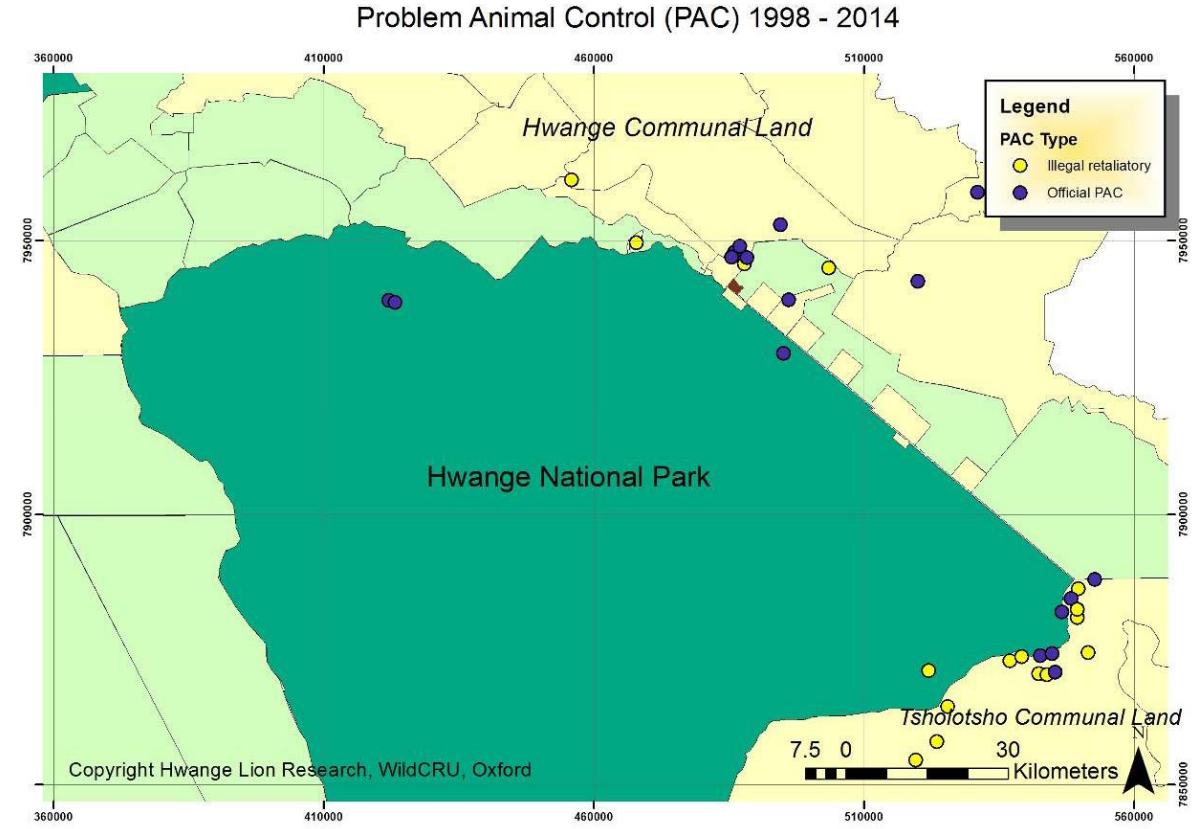
5.4.1 Case Study of Human- Lion Conflict from Hwange National Park

The following information has been extracted from the Hwange National Park Management Plan (ZPWMA, 2016) and is provided here to illustrate the challenges facing the management of lion populations residing adjacent to communal and commercial properties. Variations of the scenario described here apply to other areas of the country where hyaenas and lions are the most problematic carnivores in the communal areas adjacent to protected areas. Hyaenas are perceived to be more of a problem than lions as they account for large numbers of livestock (cattle, goats and sheep). The data presented here has been extracted from the WildCru Lion Research project in Hwange and considers only lions.

Since its inception in 2007 a significant component of the WildCru Lion Research project has focused on understanding the ecological and human socio-economic factors of conflict between the local agro-pastoralist people residing in Tsholotsho and Hwange Communal Land and lions. The project developed an intensive reporting system to record conflicts and has undertaken a detailed survey to record the baseline data on human wildlife conflict at the household level. Between 2007 and 2013 a total of 1,113 conflict incidents were recorded in the Hwange area in which 915 head of stock was lost to lions.







To mitigate this conflict, the project has initiated the "Long Shields Guardian Programme" whereby communities are notified of movements of collared into their areas via cell phone who then motivate the community to take appropriate action (i.e. moving the cattle, chase the lions etc.). In 2013 alone,

1,850 warnings were passed to the "Long Shields". In addition, the project is working on improving bomas and husbandry techniques as another way to lessen the conflict between lions and people, and although these actions may reduce the incidents of livestock marauding lions, cattle deaths still occur resulting in retaliatory killings or action on the part of National Parks to destroy the animals.

5.5 Trend in Financial Performance of the Authority

The average Income and Expenditure for the period 2010 – 2015 is shown in Table 15 that highlights the inability of the Authority to generate adequate revenue to cover both the capital and operating requirements. The average total income over this period is US$22.4 million (range US$16.5 – US$29.3 million). For the period ending December 2015, the Authority generated total revenue of $24,1million, which is 32% below the anticipated budget of $35.5 million. This includes a government grant of $716 000 and a donation of vehicles and equipment worth $2,1 million from the Government of China.

The average total expenditure for the period 2010 – 2015 is US$25.3 million (range US$18.1 – US$30.7 million). The Authority has thus incurred a loss of approximately US$2.8million/year. For the year ended December 2015, the Authority incurred a loss of US$5,4 million including depreciation.

The Authority is dependent on income from Conservation Fees (i.e. entry fees to Parks etc.) that accounted for 39% in 2015 (average 34%/year), hunting (13% in 2015) and leases (10% in 2015, Table 15).

Although individual salaries remained low, staff costs in 2015 were $20,7 million which is 71% of total revenue raised (average 64%). This is unsustainably high and leaves very limited resources for operation (16%), marketing (1%) and administrative expenses (7%, Table 15).

The major reasons for the budget deficits in the past six years can be attributed to:

- Declining income from hunting – this has been exacerbated by the recent bans imposed on elephant trophy imports into the United States by US Fish Wildlife Service (USFWS) and the much-publicised death of *Cecil the lion* that had a negative effect on revenue generated from hunting.
- Government Grant – The Authority has not received meaningful funding from the fiscus despite requests made by management that non-revenue generating activities which are of national nature be funded by Government.
- The Authority failed to dispose of its ivory stock pile due to the continued ban on ivory trade by CITES. The ivory stock which the Authority is currently holding exceeds 80 tons.

Table 15: Statement of Comprehensive Income for period 2010 – 2015 and the year ended 31 December 2015 (extracted from 2015 ZPWMA Annual Report).

Revenue	US$ 2015	%	Average 2010 - 2015	%
Conservation Fees Land	$7,879,987	33%	$6,506,508	29%
Conservation Fees River	$1,409,160	6%	$1,136,041	5%
Accommodation	$1,720,640	7%	$1,904,477	8%
Annual registration	$507,211	2%	$722,847	3%
Permits	$1,476,176	6%	$849,916	4%
Service and Facilities	$307,692	1%	$152,616	1%
Law enforcement (fines etc.)	$224,657	1%	$215,591	1%

Revenue	US$ 2015	%	Average 2010 - 2015	%
Hunting income	$3,256,698	13%	$5,049,089	22%
Fishing permits	$561,797	2%	$941,833	4%
Leases and rentals	$2,434,676	10%	$1,880,258	8%
Parks product sales	$623,084	3%	$767,347	3%
Examinations	$116,000	0%	$70,873	0%
Projects	$349,864	1%	$248,614	1%
Other income/donations	$2,555,729	11%	$907,169	4%
Government grant	$716,000	3%	$1,141,119	5%
Total	**$24,139,371**			
Expenditure				
Operational costs	$4,801,815	16%	$5,146,091	20%
Staff costs	$20,766,023	71%	$16,311,677	64%
Marketing and promotions	$212,406	1%	$147,334	1%
Administration costs	$2,056,681	7%	$2,631,019	10%
Depreciation	$1,531,000	5%	$1,069,138	4%
Total expenditure	**$29,367,925**		**$25,305,258**	
Operating surplice/deficit	**-$5,365,082**		**-$2,810,962**	

The Authority receives considerable support from many local and international NGOs who undertake a variety of routine management activities e.g. supply and maintain artificial game water supplies, provide logistic support to law enforcement operations. This is in addition to the support provided by hunting operators that hold concessions in the Safari Areas.

6 STAKEHOLDER INVOLVEMENT IN LION MANAGEMENT AND CONSERVATION

There are several private sector initiatives that are directly or indirectly involved with lion management and conservation both inside and outside the Parks estate. These stakeholders are represented by companies from the consumptive and non-consumptive sectors of the industry.

6.1 BENEFICIARIES OF WILDLIFE BASED LAND USE

Various forms of wildlife based land use occur in Zimbabwe that benefit different segments of the community depending on the authority for the land. Table 16 summarises these broad categories. The Authority is the direct beneficiary from the use of wildlife in National Parks and Safari Areas while the Forestry Commission is the beneficiary in Forestry Areas. In terms of the Act, Communal CAMPFIRE areas are the primary beneficiaries where the income generated from hunting is shared between the Rural District Council and Community Wards (see below). Similarly, private conservancies and land owners are the primary beneficiaries.

Collectively, these different management regimes contribute to the overall conservation of the wildlife both inside and outside the Parks Estate, and is supported through the existing policy and legal framework that facilitates incentives to promote wildlife based land use.

Table 16: Direct beneficiaries from Wildlife Based Land Use

Land category	Direct Beneficiary
National Parks and Safari Areas	Zimbabwe National Parks and Wildlife Management Authority
Forestry Areas	Forestry Commission
Communal Campfire Areas	Rural District Council and Wards
Private Conservancies	Private Landowners

6.2 CONTRIBUTION OF THE PRIVATE SECTOR

A questionnaire was circulated to all safari hunting operations to gather data on:

- Area and land category where hunting takes place
- Payments in terms of concession fees
- Number of people employed
- Approximate value of investment in assets
- Approximate costs of the hunting operations
- Hunter days generated through various packages
- Indication of the prey base

Data from 18 companies that have been allocated lion on quota and offer these trophies as part of their hunting packages is summarised below (Table 17). These data indicate that

- The average hunting concession covers 1,590km^2 and generates $178,488 in concession fees annually.
- Each company on average employs 109 people of which 24 are seasonal staff (22%). Law enforcement staff make up 26% of the staff complement.
- On average, each company has invested approximately $1.3 million in fixed and moveable assets (buildings, tents, vehicles, equipment etc.).
- On average, each company incurs approximately $1 million in expenses annually, with staff wages (24%) and operating expenses (27%) forming the bulk of these costs.
- Lion safaris contribute approximately 9% (126 hunter days) to the 3-year average number of hunter days generated (1,405) with the bulk of hunter days generated from buffalo safaris (see below for more details on the financial significance of this contribution).
- On average, each hunting area supports 2,000 large mammals, 3,000 medium sized mammals and 6,000 small sized mammals. However, there are large differences between state, forestry, CAMPFIRE and conservancies areas. State areas tend to support more large animals (buffalo, giraffe) while conservancies support greater numbers of medium and small animals.
- Observations on the status of lion populations indicates that each area supports on average 5 prides of 7 animals (i.e. 35 lions) although there is a wide variation in these numbers with more prides occurring in the conservancies than on Forest and CAMPFIRE areas. In these areas, the operators report that lion are transient/migratory rather than permanent.
- All areas report incidents of human-lion conflict, including incidents of snared animals.

Table 17: Summary of 18 hunting company statistics where lion hunting occurs

Companies (N=18)	**Total**	**Average**	
Total Hunting Area (ha)	2,872,932	159,607	
Concession fee	$2,141,860	$178,488	
Number people employed			
Owner/Manager	65	4	3%
Administration	59	3	3%
Camp Maintenance	308	17	16%
Safari operations	295	17	16%
Professional Hunters	82	5	4%
Skinners	59	3	3%
Trackers	138	8	7%
Law enforcement	449	28	26%
Seasonal/Casual staff	379	24	22%
Average Staff employed/company		**109**	
Approximate Asset Value (US$)	**$21,557,610**	**$1,347,351**	
Major Expense Items			
Central Government Licenses:	$415,700	$25,981	3%
ZNWMA Fees:	$1,932,472	$128,831	13%
Community Development:	$525,378	$35,025	4%
Law Enforcement:	$1,319,562	$87,971	9%
Staff wages & Welfare:	$3,601,439	$211,849	24%
Administrative costs:	$1,870,267	$116,892	13%
Operating expenses:	$3,986,619	$249,164	27%
Management and Marketing costs	$661,974	$41,373	4%
Any other costs	$411,693	$25,731	3%
Overall costs	**$14,725,104**	**$922,818**	
Hunter days generated over 3 years			
Lion	2,137	126	9%
Leopard	4,565	269	19%
Buffalo	10,344	608	43%
Elephant	3,131	184	13%
Plains game	999	59	4%
Total Hunter days	**25,294**	**1,405**	
Prey base status			
Large mammals (Buffalo, Giraffe)	28,190	2,014	
Medium mammals (Eland, zebra, kudu, waterbuck etc.)	53,273	3,552	
Small mammals (Bushbuck, warthog, impala)	82,297	5,878	
Status of lion population			
Number of prides	71	5	
Average pride size	80	7	

Companies (N=18)	Total	Average	
Number of cubs	243	19	
Number Coalition males	89	7	
Monitoring of lion population			
Natural deaths	4	1	
Reports of Human-Lion Conflict	33	5	
Incidents of infanticide recorded	6	2	

6.3 CAMPFIRE COMMUNITY PROGRAMMES

The right to exploit and benefit from wildlife was extended to communal areas through granting of Appropriate Authority Status over their wildlife resources to Rural District Councils in 1982. The intention was to return rights of access to natural resources through legislative change, devolve responsibility and economic empowerment. The CAMPFIRE model focuses on three main criteria:

- Voluntary interest in participation by communities and their Rural District Councils (RDCs),
- Presence of wildlife populations capable of producing sustainable and economically significant revenues.
- Benefit sharing for local communities based on:
    - The number of animals harvested within a local community's area each hunting season.
    - The extent of wildlife habitat present within a local community's area annually.

Currently 58 Rural Districts have been granted the Appropriate Authority status to manage wildlife resources in their areas, however only 16 are actively engaged in some form of wildlife based land use (see Figure 5).

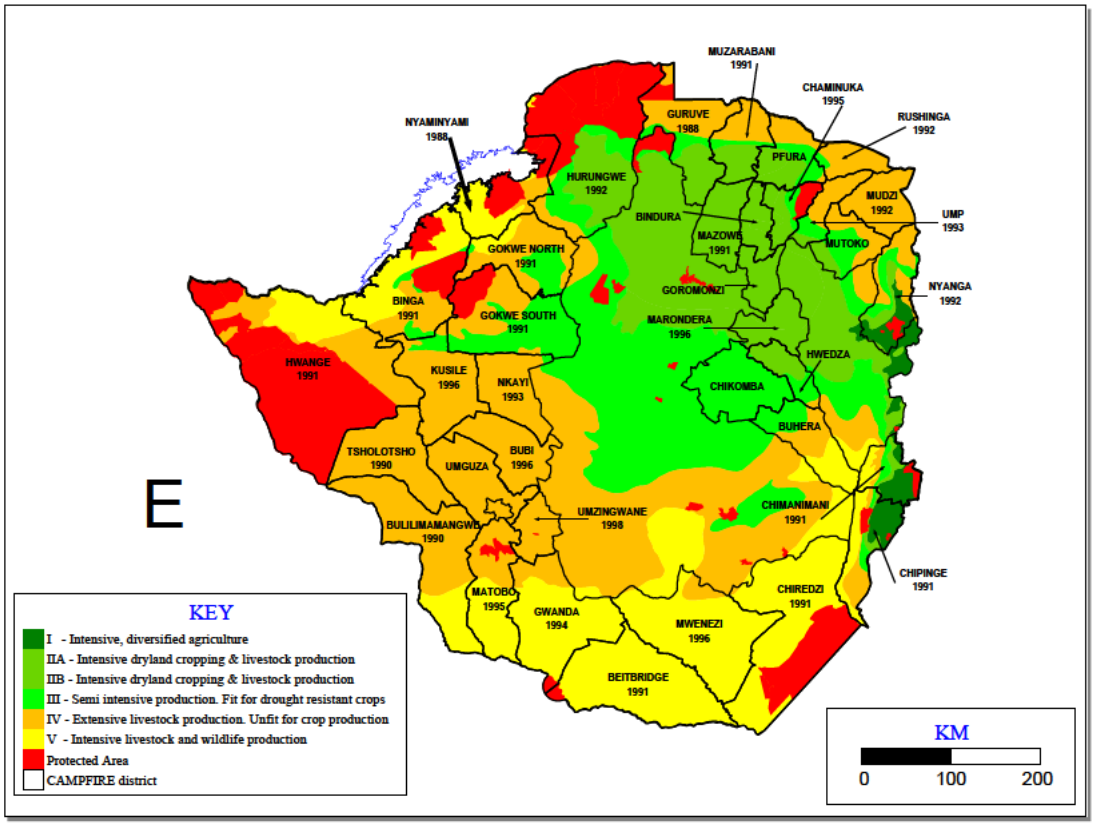


Figure 5: Map of Zimbabwe showing CAMPFIRE districts and year of establishment

The performance of ten key CAMPFIRE Districts is summarised below to illustrate the level of benefits that flow to RDCs, Wards and households, and the role that income from lion play in this process.

1. OVERALL QUOTA ALLOCATION, UTILISATION AND INCOME GENERATION FROM KEY SPECIES: All Districts: 2010 - 2015

	Elephant	Lion	Leopard	Buffalo	Hippo	Crocodile	Total
Quota	1,079	140	487	2050	602	471	
Offtake	655	45	193	908	270	305	
% Utilisation	61%	32%	40%	44%	45%	65%	
Total income N=6 years)	**$7,129,658**	**$240,000**	**$532,675**	**$2,263,150**	**$464,000**	**$441,903**	**$11,071,386**
Average/year	**$1,188,276**	**$40,000**	**$88,779**	**$377,192**	**$77,333**	**$73,651**	**$1,845,231**
Percentage	64%	2%	5%	20%	4%	4%	

The overall income generated over a 6-year period was US$11 million. An overall quota of 140 lions (average 23/year) were allocated to the CAMPFIRE programme over which 45 (32%) were utilised (8 per year). This generated US$240,000 or 2% of the overall income.

2. SOURCE OF CLIENTS AND GROSS INCOME TO SAFARI OPERATIONS:2010 - 2015

Origin of Clients	USA	Canada	South America	Europe	Asia	Middle East	Oceania	Africa	Total (N=6 years)
Total	**880**	**16**	**54**	**456**	**82**	**9**	**51**	**131**	**1679**
Percentage	51%	1%	3%	27%	5%	1%	3%	8%	
Total	**$8,624,059**	**$150,987**	**$543,003**	**$5,201,168**	**$550,062**	**$781,076**	**$394,208**	**$567,897**	**$16,812,459**
Average/year	**$1,462,508**	**$25,165**	**$90,500**	**$866,861**	**$91,677**	**$130,179**	**$65,701**	**$94,650**	**$2,802,077**
Percentage contribution	**51%**	**1%**	**3%**	**31%**	**3%**	**5%**	**2%**	**3%**	

Hunting clients from the USA are by far the most numerous (880 over 6 years) contributing 51% (or US$8.6 million) of the estimated US$16 million generated from hunting in CAMPFIRE areas from 2010 - 2015.

3. INCOME TO DISTRICTS: 2010 - 2015

	Hides (US$)	Trophy fees (US$)	Percentage of daily rate	Hunting concession fees	Photographic (lease fees/bed night levy)	Other (vehicle hire, grinding mill etc.)	Total	Average (N=6)
Total	$131,741	$10,618,127	$1,277,525	$862,721	$737,613	$731,218	$14,358,945	$2,393,158
Percentage	1%	74%	9%	6%	5%	5%		

The CAMPFIRE districts that benefit from hunting rely heavily on trophy fees (74%) as their primary source of income.

4. INCOME TO WARDS, VILLAGES AND HOUSEHOLDS: 2010 – 2015

Overall Income to CAMPFIRE Wards: 2010 - 2015						
	No Concessions	Area (ha)	Number Wards	Number Villages	Number Households	Gross Income
Total	**26**	**2,288,284**	**62**	**603**	**56,297**	**$5,946,370**
Income (n=6 YEARS)	**$228,706.55**	**$3**	**$95,909.20**	**$9,861.31**	**$105.6**	

Income generated at the District level is then disbursed to Wards. Since 2010, this is estimated to be approximately US$5.9 million. The available data shows that 62 wards representing 603 villages (or 56,297 households) received the equivalent of US$95,909/ward (or US$105/household).

These levels of income are not sufficient to make a significant impact at the individual level, and require that the Districts and Wards channel these revenues into activities that benefit the overall community. This is achieved through supporting several communal projects such as schools, clinics, water provisions etc.

5. DISTRICT EXPENDITURE AND COMMUNITY BENEFITS: 2010 - 2015

	Administration	Law Enforcement	Compensation	Management	Social Services	Other	Total
Total	**$2,486,268**	**$1,778,100**	**$67,600**	**$682,740**	**$1,084,779**	**$779,030**	**$6,878,517**
Average	**$414,378**	**$296,350**	**$11,267**	**$113,790**	**$180,796**	**$129,838**	**$1,146,420**
Overall costs	**$5,014,708**				**$1,084,77**	**$779,039**	
Percentage	**73%**				**16%**	**11%**	

At the District level, 73% of the revenues from hunting are channelled towards administration, law enforcement, compensation and general management while limited funds are used to support social services (16%).

6. WARD EXPENDITURE AND COMMUNITY BENEFITS

	Administration costs					Community Benefits				
	Meetings & Admin	Wages/salaries	Compensation schemes	Management activities	Project Management Costs	Social services	Food security	Direct cash benefits	Other	Total
Total	**$553,260**	**$815,639**	**$56,432**	**$312,178**	**$345,762**	**$2,468,216**	**$223,659**	**$216,077**	**$139,565**	**$5,302,709**
Overall costs	**$2,083,271**					**$2,907,952**			**$139,565**	
Percentage	**39%**					**55%**				

At the Ward level, where communities are directly involved, the tendency is to channel most the income towards community benefits (55%) rather than administration which is seen to be the responsibility of the local government. This means that the bulk of the income from hunting is used to support social services such as schools, clinics, irrigation schemes etc. where the impact at the community level (village, household) is far greater (Figure 6).



Figure 6: Bhemba Clinic in Ward 2 of the Tsholotsho Communal Area (top) and Masera Secondary School (Beitbridge, bottom) that are supported by funds generated through the CAMPFIRE programme

Lessons learnt

1. Quota utilisation of lion (32%) is low in CAMPFIRE areas, equating to 8 lion/year.

2. Trophy fees from key species (elephant, lion etc.) contributed $1,845,231/year to CAMPFIRE revenues:
    a. Elephant (64%) and buffalo (20%) are major contributors
    b. Lion and leopard contribute 7%

3. Income from the sale of safaris generate approximately $2,802,077/year
    a. Hunters from USA contribute 51% and Europe 31% of this income.

4. Income to Districts from a variety of wildlife related revenue streams is approximately $2,510,783/year:
    a. Trophy fees are responsible for 74% of this income, of which lion play a small role.
    b. Fees from photographic tourism are responsible for 5%.

5. Wards receive $5,830,244 (57%) from district trophy fees. These revenues are used to support a variety of social services that benefit a large proportion of the local community.

The cessation of import of lion (and elephant) trophies into the USA has had a significant impact on these revenue streams and consequently on the benefits reaching communities at the local level. These revenues cannot be replaced through alternative revenue streams.

7 Management and Administration of the Safari Hunting Industry in Zimbabwe

7.1 Performance of the industry

To fully account for earnings in the Hunting Sector, the Reserve Bank of Zimbabwe, in collaboration with all the relevant stakeholders, introduced the Tourism Receipts Accounting System (TRAS2) in January 2015. The TRAS2 is a web-based system which links Safari Operators, Zimbabwe Parks and Wildlife Management Authority, Taxidermists, Shipping Agents, International Marketing Agents and Reserve Bank for the purposes of authorizing hunts, capturing hunting data, monitoring hunting quota utilization and tracking hunted trophies.

On an annual basis, Exchange Control Division of the Reserve Bank of Zimbabwe attends the SCI Conventions to achieve the following objectives: -

1. To assess regional price differentials of same hunts at the SCI Convention and the reasons thereof;
2. To present Form TRAS2 systems updates to the users including international marketing agents;
3. To engage international marketing agents of sport-hunting (standardised international marketing agreements, payment arrangements and follow up on overdue export receipts);
4. To obtain relevant insights on governing of the hunting sector; and
5. To come up with an effective mechanism to fully account for export proceeds from the hunting sector.

7.1.1 Global earnings of the industry

The TRAS2 system was introduced in January 2014, and has since recorded a total of $44.6 million ($18.9 million in 2015 compared to $25.9 million in 2014) as shown in Figure 7. The figures are inclusive of daily rates, trophy fees and other incidental revenue. In line with other regional

countries offering safari hunting, the market is dominated by the USA (59%) and Europe (25%) with the remainder of the market taken by the Americas (Canada, Argentina etc.), Asia, Africa, Oceania and Africa (mostly South Africa). Appendix III illustrates the distribution of total hunting revenue by country of destination (Chitauro, 2016).

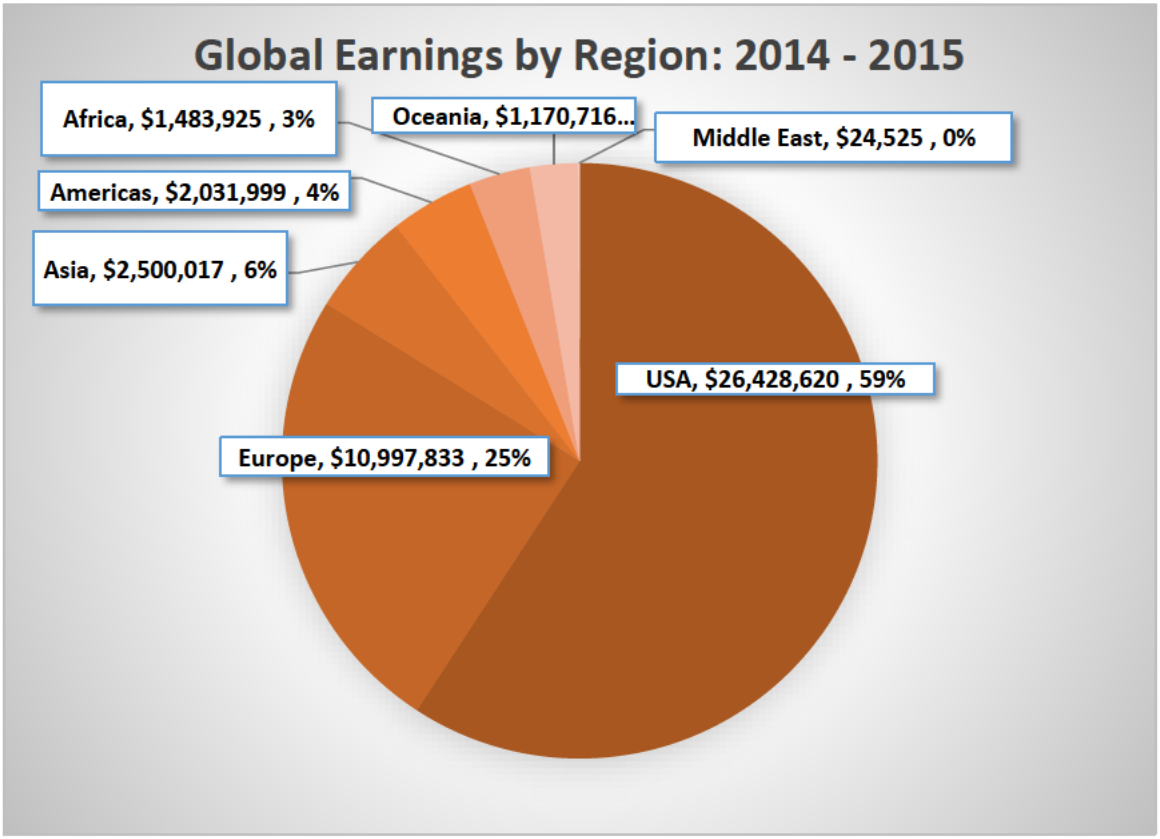


Figure 7: Breakdown of source of hunting income (2014 and 2015) from various regions in the world (adapted from Computerised Exports Payments Exchange Control System, CEPECS - TRAS2)

7.1.2 Quota allocation, Utilisation and Total Trophy Fees Earned

The total income from the sale of trophies in 2014 and 2015 is shown in Table 18. The income in 2015 (US$8.2 million) is less than that in 2014 (US$11.1 million) because of the import restrictions of elephant and lion into the USA.

Table 18 also provides data on the quotas allocated in 2015 and the number of level of utilisation. The complete list of species is provided in Appendix III (Chitauro, 2016). These data show that levels of utilisation for all species varies from 10 – 40% for most mammals and far less for birds etc.

Table 18: Summary of the revenue generated from the 11 most common species utilised for hunting, and the percentage utilisation in 2015 (adapted from Computerised Exports Payments Exchange Control System, CEPECS - TRAS2)

Species	2014	2015	Total	2015 Quota	Utilised	% Utilised
Buffalo	$2,528,559	$1,962,570	$4,491,129	1,635	482	29%
Elephant (Tusks)	$2,042,610	$1,447,090	$3,489,700	246	64	26%
Elephant (Tuskless)	$1,444,040	$229,860	$1,673,900	462	113	24%

Species	2014	2015	Total	2015 Quota	Utilised	% Utilised
Lion	**$630,950**	**$753,000**	**$1,383,950**	**82**	**49**	**59%**
Leopard	$714,100	$668,490	$1,382,590	530	151	28%
Zebra	$594,239	$555,744	$1,149,983	2,480	600	24%
Sable	$456,615	$309,260	$765,875	718	78	11%
Kudu	$341,092	$357,963	$699,055	2,503	289	12%
Waterbuck	$293,903	$256,133	$550,036	988	156	16%
Hippo	$310,321	$217,470	$527,791	303	83	27%
Impala	$277,198	$242,624	$519,822	8,594	1,261	15%
Other Species	$1,465,560	$1,287,845	$2,753,405			
Grand Total	**$11,099,187**	**$8,288,049**	**$19,387,236**			

7.1.3 Total trophy fees generated by land category

The ZPWMA allocated quotes to all owners and occupiers of land in terms of SI 26. Any person utilising wildlife on these properties is required to submit a TRAS2 form to process any export of trophies and other animal products. Approximately 262 companies/properties submitted returns in 2014 and 2015. From these data, it is possible to determine the income generated from trophy fees and daily rates per company. To protect the privacy of the individual companies, these data have been arranged to show the level of income generated by different land categories from trophy fees (Figure 8),

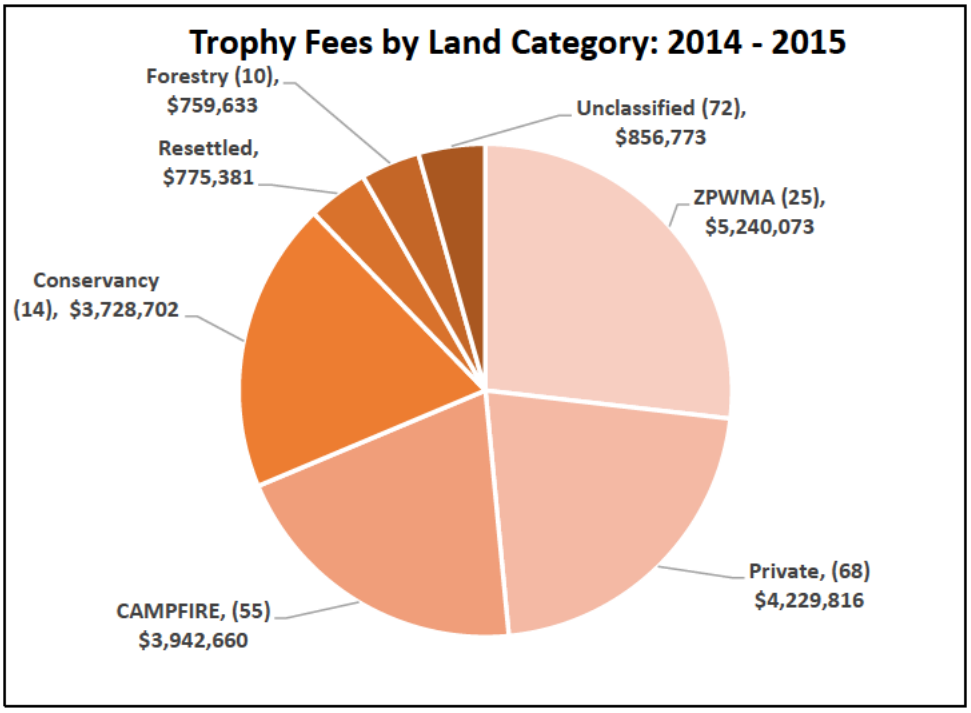


Figure 8: Hunting Trophy Fee Earnings by Land Categories (2014 - 2015). Note that from the description provided in the database, it was not possible to allocate some individual properties to a specific category. These have been recorded as unclassified (adapted from Computerised Exports Payments Exchange Control System, CEPECS - TRAS2).

Overall, approximately US$10.7 million was generated in 2014 and US$8.7 million in 2015 from the 62 species on offer. The ZPWMA represented by 25 properties that it either offers on tender to the private sector or operates as hunting areas itself generated the largest income from trophy fee sales

(US$5.2 million). The 14 Conservancies accounted for US$3.7 million while the 68 private properties are recorded as generating US$4.2 million. The CAMPFIRE areas (N=55) generated US$3.9 million.

Together with the income from daily rates (US$13,190,372 in 2014 and US$9,684,396 in 2015 (gross US$22,874,768), extracted from Computerised Exports Payments Exchange Control System, CEPECS - TRAS2), these funds are used to pay for several operational expenses including employment, law enforcement, administration and management.

7.5 Quota Setting Process

The process for quota setting follows procedures agreed to by all stakeholders (ZPWMA, 2014).

- Step 1: Allocate existing quota to each block/hunting area

The starting point for implementation of age-restrictions and adaptive quota management was to allocate existing lion quotas. This quota would then be managed adaptively in line with the age of lions hunted. In future, it is envisaged that fixed quotas for lions would fall away as quotas would be based on the age of lions hunted in the previous year.

- Step 2: Hunters complete and submit return forms and photos after each lion hunt

The data would be compiled into a database by a ZPWMA representative (currently Ms Roseline Mandisodza-Chikerema, Senior Ecologist, ZPWMA). Export permits for trophies will not be issued unless completed hunt return forms (all the required photographs and the first upper premolar) is provided to ZPWMA for aging and monitoring purposes. Furthermore, because the following year's quotas will be based on the ages of the lions hunted in the current year, operators must submit their lion hunt returns and photographs soon after the hunt. At the end of the season, all the teeth would be taken to a dentist to have x-rays conducted to allow for measurement of the size of the pulp cavity.

- Step 3: ZPWMA and Panel of experts assign an age value to each lion trophy

Lion trophies will be aged by ZPWMA, with input from lion scientists and representatives from the hunting industry at a trophy aging session. This is conducted at the end of each hunting season.

- Step 4: Calculate the next years' quotas based on a points system for the ages of lions hunted

A quota setting meeting is held where lion quotas are established for each area based on the age of lions hunted in those areas the year before. This programme commenced in 2014, and so the ages of lions hunted in 2014 will affect the lion quotas in 2015. Table 19 summaries the trend in lion quota allocations since 2002 while Table 12 provides a detailed overview of the lion trophies taken in 2015.

Table 19: Summary of lion quota allocations and offtake since 2002 (Data provided by ZPWMA)

Year	Lion Allocated Quotas	Female Offtake	Male Offtake	% Utilisation
2002	126	22	49	56%
2003	138	5	11	6%
2004	155	4	9	8%
2005	108	3	20	21%
2006	124	1	17	14%

Year	Lion Allocated Quotas	Female Offtake	Male Offtake	% Utilisation
2007	117	0	9	7%
2008	90	0	17	18%
2009	111	0	9	8%
2010	98	12	30	43%
2011	121	20	38	48%
2012	101	18	27	44%
2013	101	1	34	34%
2014	101	0	37	26%
2015	82	0	49	60%
2016	81	0	33	41%

Table 20: Analysis of lion trophies taken on various properties in 2015

Hunting Area Name	Sex	Killed Wounded	Grid Ref	Date Shot	Trophy Size
Sapi Area	M	KILLED	35l0783	03/06/2015	
Matetsi Safari Area - Unit 3	M	KILLED	307551	05/04/2015	61.31
Antoinette & Antoinette Extension	M	KILLED	187159	02/07/2015	26 7/16"
Tsholotsho District Area 2-South	M	KILLED	S1926181 E02652250	27/10/2015	25 6/8 inches
Hurungwe Safari Area - Rifa	M	KILLED	35K178113	10/05/2015	24.5
Deka Tail	M	KILLED	651 480	10/04/2015	60.38 cm
Hurungwe Safari Area - Nyakasanga	M	KILLED	s15.56.457 e029.15.584	07/06/2015	26
Msaise	M	KILLED	VN204700	14/05/2015	23
Mapari	M	KILLED	VN798124	09/06/2015	23SCI
Ngamo/Sikumi	M	KILLED	456923	09/05/2015	
Deka Safari Area	M	KILLED	278493	26/06/2015	61.5
Mbire (Guruve) South Area 2	M	KILLED	919056	09/08/2015	25.3
Bubye Valley Conservancy	M	KILLED	0194090 7625410	21/02/2015	25"
Bubye Valley Conservancy	M	KILLED	9337	29/03/2015	26"
Bubye Valley Conservancy	M	KILLED	31129	07/04/2015	25
Woodlands Farm	M	KILLED	644972	22/05/2015	25"
Bubye Valley Conservancy	M	KILLED	35K 453 159	10/05/2015	23.625
Bubye Valley Conservancy	M	KILLED	36K 908 852	25/04/2015	25"
Chewore Safari Area - North	M	KILLED	TT015643	05/06/2015	25
Bubye Valley Conservancy	M	KILLED	36K 227 593	12/05/2015	26"
Matetsi Safari Area - Unit 4	M	KILLED	4.05E+12	09/06/2015	24
Matetsi Safari Area - Unit 5	M	KILLED	865505	09/06/2015	25.25
Gunundwe	M	KILLED	822094	11/06/2015	
Bubye Valley Conservancy	M	KILLED	36K 004 971	24/06/2015	25.5625

Hunting Area Name	Sex	Killed Wounded	Grid Ref	Date Shot	Trophy Size
Bubye Valley Conservancy	M	KILLED	942 151	25/06/2015	12
Kusile District Area 1	M	KILLED	S185604.9 E0271547.4	02/07/2015	
Mokore Ranch	M	KILLED	VN110030	15/07/2015	15"
Bubye Valley Conservancy	M	KILLED	36K 229 607	29/07/2015	26"
Bubye Valley Conservancy	M	KILLED	191 623	25/07/2015	27.0625
Nyaminyami District Area 2 (Omay)	M	KILLED	657019PM	18/07/2015	24 1/8"
Matetsi Safari Area - Unit 5	M	KILLED	862 451	15/07/2015	25 8/16 inches
Matendere	M	KILLED	781021	26/07/2015	23.875
Matetsi Safari Area - Unit 1	M	KILLED	740726	13/08/2015	25
Bubye Valley Conservancy	M	KILLED	213 602	15/08/2015	15
Sango	M	KILLED	62691	23/08/2015	23.125
Sango	M	KILLED	320548	27/08/2015	
Dande Safari Area	M	KILLED	945352	13/10/2015	24in
Hurungwe Safari Area - Rifa	M	KILLED	35k062038	30/09/2015	25.25
Bedford	M	KILLED	190429	06/09/2015	
Ngamo/Sikumi	M	KILLED	456919	07/09/2015	
Bubye Valley Conservancy	M	KILLED	206 622	23/09/2015	26"
Hammond	M	KILLED	35k880103	17/10/2015	23.375
Kazuma/Panda Masuei	M	KILLED	s18.44144 & E025.64434	09/10/2015	
Nyaminyami District Area 1 (Omay)	M	KILLED	PM453354	13/11/2015	26"
Chewore Safari Area - South	M	KILLED	ST967260	25/10/2015	
Riverside Ranch	M	KILLED	35k227702	31/10/2015	24.78
Matetsi Safari Area - Unit 6	M	KILLED	18.06.55.68.25.22	03/12/2015	
Chewore Safari Area - South	M	KILLED	QN975310	06/12/2015	
Sapi Area	M	KILLED	Mtawatawa	11/06/2015	24"

7.6 POINTS SYSTEM FOR ADAPTIVELY MANAGING LION QUOTAS IN ZIMBABWE

The points system used to adaptively manage lion quotas has been developed following similar systems that have been implemented in Tanzania and northern Mozambique. The systems that are in place in Tanzania and Niassa differ slightly, but both lion quotas are set per the age of the lions harvested during the previous hunting season (Begg and Begg, 2008; Tanzania Wildlife Division 2013). The Tanzanian system is more punitive with significant quota reductions, trophy confiscation and fines for non-compliance, whereas the Niassa system is more accommodating but nevertheless can result in quota reductions if five-year-old lions are hunted. The latter was aimed at a means of accommodating the difficulty of telling five-year-old lions apart from four year olds.

After reviewing the Tanzanian and Mozambican age restriction systems and debating possible models for application in Zimbabwe, an adaptive quota management system for lion hunting based on the ages of lions hunted was agreed on in July 2013 in Harare, Zimbabwe, during a meeting hosted

by the Zimbabwe Parks and Wildlife Management Authority (ZPWMA) and an independent non-governmental conservation organisation. The approach adopted by Zimbabwe recognises four as opposed to three key age categories (Table 21).

Table 21. Proposed points system for lion age restrictions and quota setting in Zimbabwe

	≥6 years	**No trophy**	**5 years' old**	**4 years' old**	**<4 years**	**Failure to submit hunt return/incomplete hunt returns**
For quotas of 3/more	4	3	3	2	-3	0
For quotas of 2	4	3	3	2	0	0
For quotas of 1	6	3	3	2	0	0
Quota setting process	These points are added up and divided by 3 to yield the quota for next year					

During 2013, operators were requested to submit hunt returns and photos as a trial run to get the system up and running. In 2014 operators were requested to do the same but were informed that the age of the lions hunted in 2014 would determine their lion quotas in 2015. The 2015 lion hunt results would thus also determine the 2016 quota. The key distinction of the Zimbabwean system is that the quota will not be affected if they hunt animals that are five years old. This position was adopted after considering various the population models that suggested that the hunting animals of five years of age or older is predicted to be comparatively safe from a population perspective (Whitman et al. 2007). Moreover, after reviewing aging techniques, the consensus was that professional hunters could be distinguish between lions that are five or above. The system therefore rewards operators with increased quotas if they hunt animals of six years and older, but it does not penalize them if they hunt animals of five years. Neither are they penalised if they do not shoot a lion that they have on quota, however, the quotas will be reduced if they hunt animals younger than five years or if they failed to complete hunt returns.

Lions are aged by triangulating multiple different aging characteristics, including:

- The degree of facial scarring;
- The teeth colour and degree of wear;
- The mane development (particularly regarding the shape around the ear and the mohawk);
- Through post mortem analysis of the width of the pulp cavity of the second premolar (which becomes narrower with age).

7.6.1 Results of the Adaptive Lion Quota Management System: 2013 to 2016

In 2013, only 28% of the lions hunted were 5 years or older, in 2014 that figure had risen to 49% and in 2015 to 77.3% (Figure 5). The proportion of lions hunted that were less than 5 years of age dropped overall between 2013 and 2015 (Figure 9).

In 2015 the Zimbabwe national lion hunting quota was set at 82 lions. Of this 82, only 49 were hunted in 2015, and based on the resultant score from aging the trophies, and the fact that operators chose not to hunt lions of inadequate age (see Figures 9, 10 and 11), the recommended quota for 2016 was set at 81. In 2015 there was a marked increase in the age of lions hunted. Notably, only one lion of <4 years of age was hunted and the large majority of lions were 5 years or older (Figure 9).

As was agreed upon at the 2013 lion management meeting in Harare, the CAMPFIRE areas in which lions occur are currently exempted from the age restrictions. This approach was adopted as a means of ensuring that impoverished communities obtain the opportunity to benefit from the presence of lions, recognising the potential negative impacts the species has on the livelihoods of livestock farmers.

Using these figures and estimating the average value of a lion safari at approximately US$ 80,000 then a 50% offtake would generate approximately US$ 2,800,000 annually. If management costs are approximately $150 km^2, then the lion safaris alone can support 18,600 km^2 of wildlife habitat in Zimbabwe.

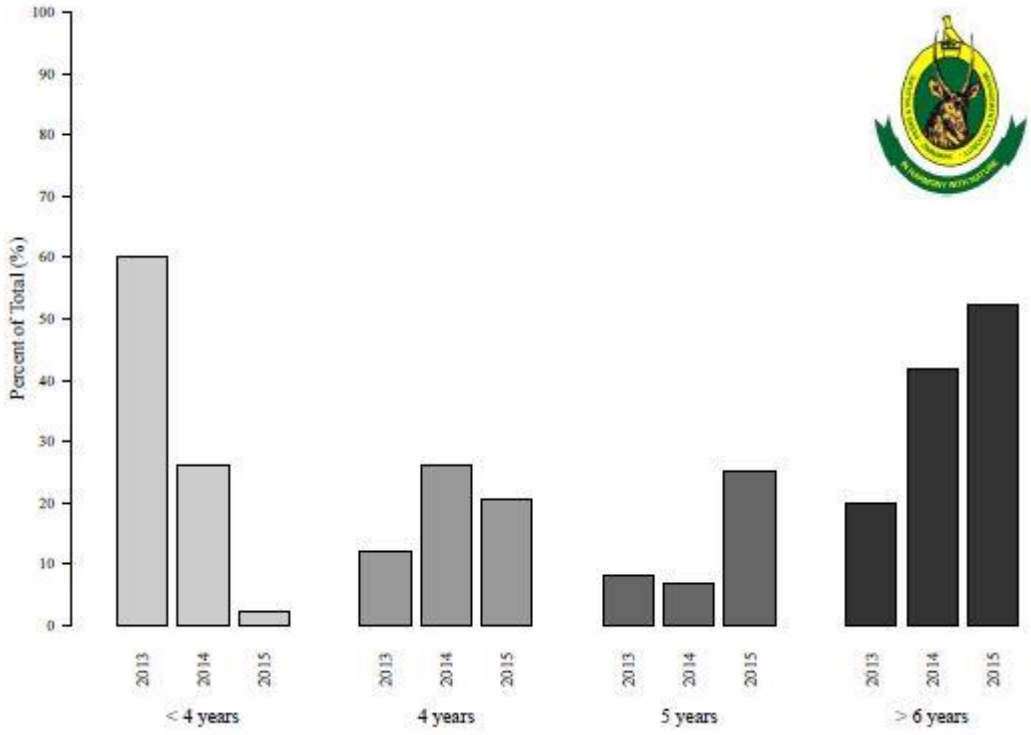


Figure 9: The percentage of lions hunted in each age class in 2013, 2014 and 2015 in Zimbabwe.

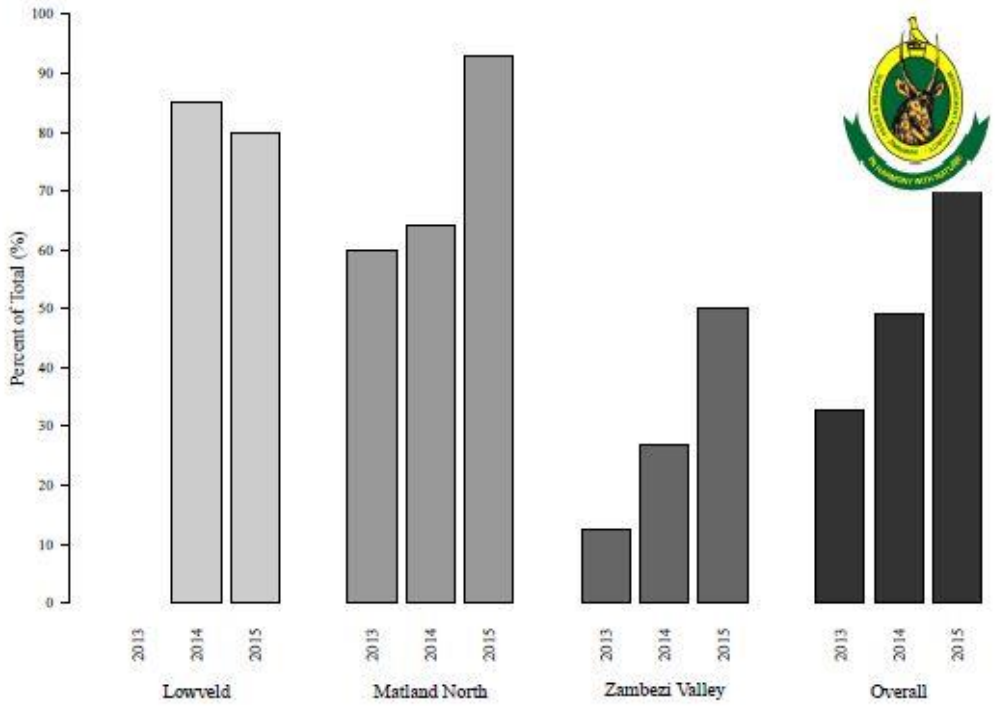


Figure 10: The proportion of lions hunted that were 5 years or older in the three main lion-hunting areas of Zimbabwe.

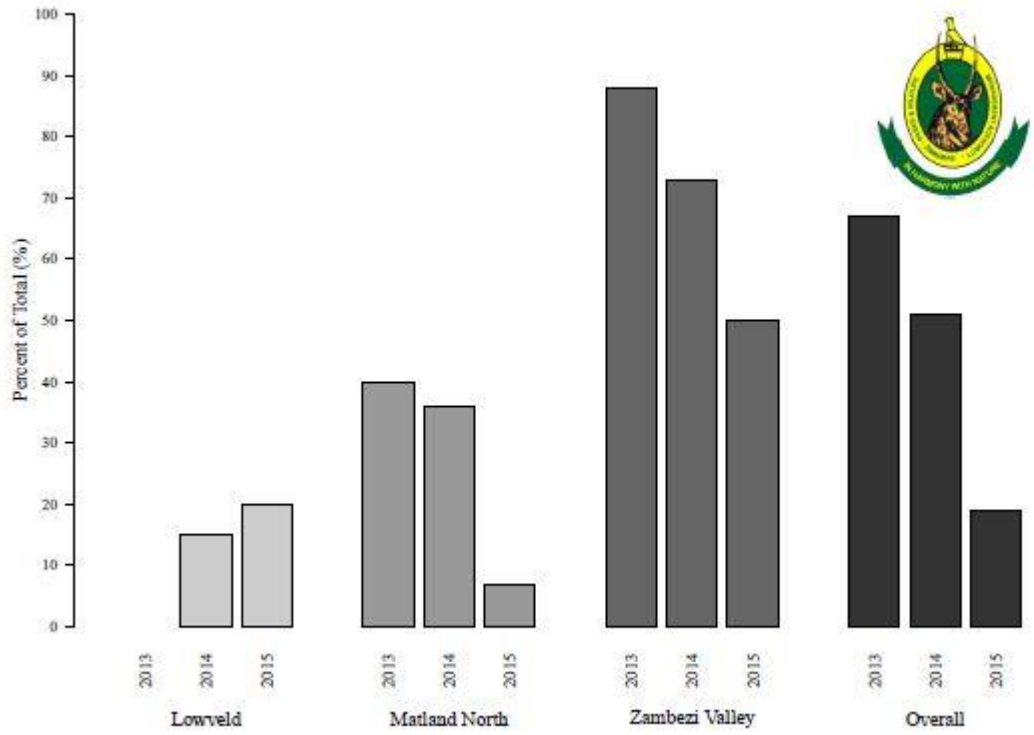


Figure 11: The proportion of lions hunted that were less than 5 years of age in the three main lion-hunting areas of Zimbabwe.

7.6.2 Case study: Safari Hunting surrounding Hwange National Park

The Hwange National Park is surrounded by hunting areas that fall under the Authority, Forestry Land, Private Land and Communal Land. The ZPWMA is responsible for setting and administrating quotas in conjunction with stakeholders for the safari areas, forestry areas, communal lands and private properties.

The Matetsi Safari Area to the north of Hwange National Park was established in the 1970s when several unsuccessful private sector mixed faming properties were expropriated, compensated and the resultant block of land turned over to safari hunting – a largely untried venture at that time on a large scale. An intensive monitoring system was set in place to gauge the effectiveness of the scheme and this continues to this day (Crossmary et al. 2013, Figure 12). The seven concessions (six given over to safari hunting) are leased on five year terms and concessionaires pay a 5 year "right to lease" fee, an annual rental, a fixed quota fee (payable if animals are shot or not) and a supplementary quota fee which allows additional animals to be bought as per need.

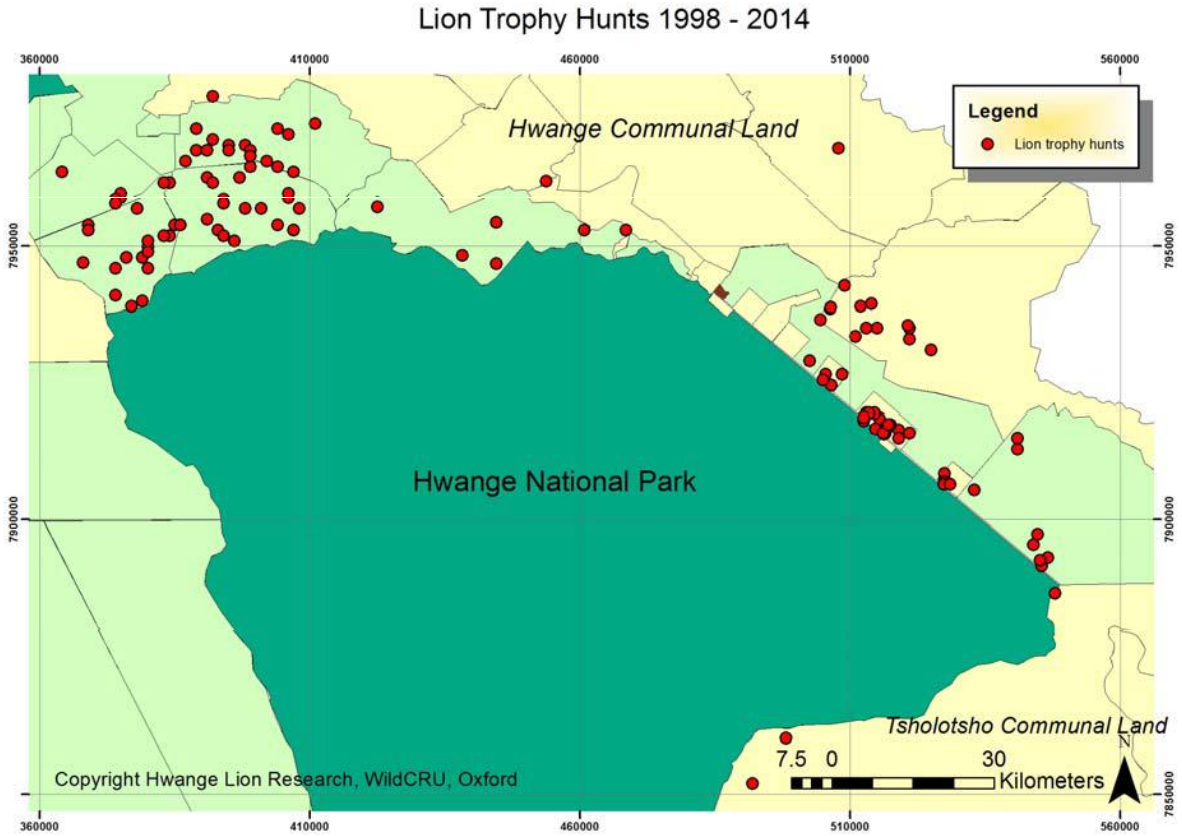


Figure 12: Record of where lion have been hunted on the land surrounding the Hwange National Park since 1998 (data extracted from the Hwange National Park Management Plan).

8 THREATS AND MITIGATION

The consensus of the scientific and animal welfare community is that the populations of lion in Africa has declined by 43% in the last two decades, with the greatest declines having occurred in west Africa. The exception to this are the populations of southern Africa, notably South Africa, Namibia, Botswana and Zimbabwe that are home to 24- 33% of the overall population has increased (Funston et. al. 2016).

Nonetheless, as is the case in other range states, the greatest threats to lion in Zimbabwe are from habitat loss, snaring and retaliatory killings where livestock are involved.

8.1 HUMAN-LION CONFLICT

The main source of illegal killing of lions is a result of Human-Lion conflict. The human population of Zimbabwe has increased since 1960 (estimated at 13 million). There is considerable pressure to convert land to agro-pastoral production, and the pressure is expected to increase. It is not unexpected therefore that the incidence of Human-Lion conflict will increase. ZPWMA records show that 200 attacks occurred on humans and 150+ on livestock (cattle, goats, sheep, dogs etc.) were killed in 2015 (see Table 13 above).

Retaliation for these livestock losses is usually done poisoning or hunting. The exact number of lions killed in this way is difficult to assess, but may number over 50/year. These indiscriminate killings pose the most significant threat to the species, and is of major concern to the management authorities. For example, the Area Manager for Hwange National Parks reported that 6 lions were killed on the Hwange National Parks boundary in 2016, and the Authority responded to several problem animal attacks on livestock.

In accordance with the Parks and Wildlife Act of 2001 when a lion attacks a human or kills livestock, it shall be eliminated. However, despite the numerous incidents reported across the country, less than 10 lions are killed through official "problem animal control" (PAC).

8.2 HABITAT LOSS

Zimbabwe supports substantial populations of lions outside of its protected areas and extensive conservancies. Moreover, despite its expanding human population, many of the protected areas are still intact however, the threat to lions from habitat loss exists in the Sebungwe and the South East Low Veld where the fragmented nature of the protected areas is compounded by an increasing human and livestock populations surrounding these areas. In these areas, habitat loss, reduction in prey populations and killing of problem lions are the major threats to long term lion survival.

Due to the large size of the protected area system in the Zambezi Valley and North West Matabeleland, threats are limited to lion range which extends into adjacent settled areas. The huge natural prey base in these protected areas, reduced killing of problem animals associated with lions preying on livestock in adjacent settled areas.

The potential and real loss of habitat and the fragmentation of range and conflicts with people in the absence of effective incentive mechanisms to maintain such habitat is probably the second greatest threat to lions after retaliatory killings. Increasing livestock numbers is reducing the available habitat in buffer areas adjacent to the protected areas, and increasing the incidents of human-lion conflicts. Lions are being more and more regarded as a liability and economic cost to rural communities. Reversing this trend is difficult under normal circumstances, and this has been made that much more difficult with the cessation of lion hunting. Integrating income from lions into rural economies, and demonstrating that lions contribute to the welfare and development of people is regarded as one strategy to mitigate against this. The involvement and empowerment of rural people in natural resource management through the CAMPFIRE programme that strives to provide economic and financial incentives through sustainable use, is one of the main driving forces behind changes in attitudes towards wildlife in communities where lion-livestock conflicts occur.

8.3 ILLEGAL TRADE IN LION PRODUCTS

Very few lions are poached in Zimbabwe (not to be confused with retaliatory killings). Records, mainly from anti-poaching reports, are for impoundment of body derivatives such as skins, teeth/claws, body

fats and bones. These may be sought after for local traditional medicinal use. Poaching mainly occurs along the boundaries of the protected areas where lions are incidentally snared as non-target prey.

The illegal trade in lions and their products (i.e. bone trade) is very insignificant. There are no records of people found in possession of illegally acquired lion specimens in Zimbabwe, and anyone found in possession of illegally acquired lion specimens is required to pay a fine US$5000 or faces a mandatory jail sentence. On conviction for lion poaching, courts may ask the accused to pay a compensation fee of US$20 000.

8.4 BUSHMEAT POACHING

Poaching for bushmeat is an important livelihood component of rural communities in Zimbabwe and a vast literature exists on this subject (see Lindsey et. al. 2015a and 2015b). Poverty stands as the major driver of illegal hunting, and the livelihoods of illegal hunters have been augmented considerably through revenue generated from bushmeat sales. Illegal hunters use bushmeat both for supplementing household protein and for economic gain.

Poaching for bushmeat does not seem to have impacted directly the overall lion's status in Zimbabwe, but more research is needed to fully understand its impact on lion. However, lions are often inadvertently caught in snares set for animals targeted by bushmeat poachers. Where possible, lions caught in snares are captured and treated (Figure 13).





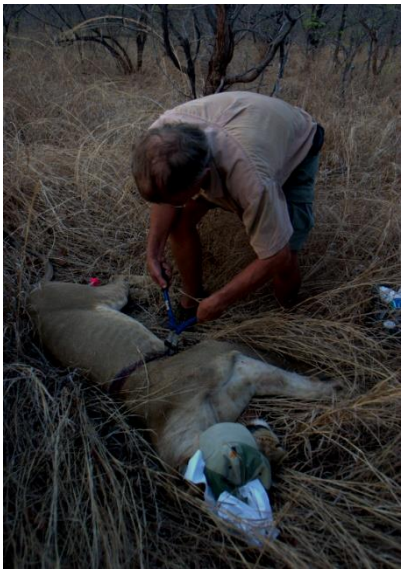




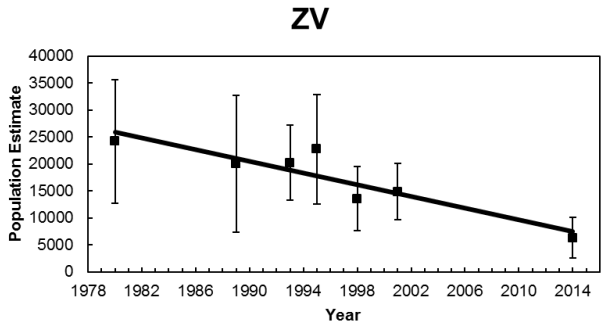
Figure 13: Young lioness being treated by the Victoria Falls Conservation Trust after a snare was removed from around the chest (Source: S. Edwards)

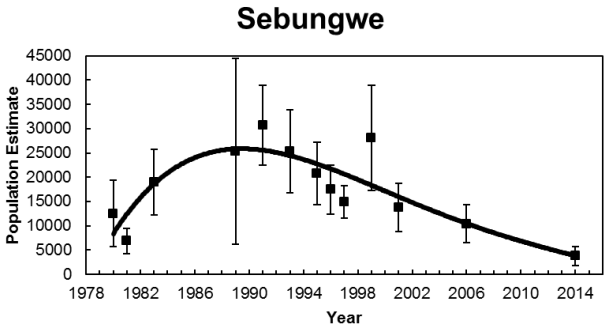
8.5 PREY ABUNDANCE

The extent to which bushmeat poaching outside of the Parks Estate is depleting lion's prey is not known. Prey abundance is still high in all protected areas where lions occur, and as abundance of prey species is highly correlated with lion density (Hayward et al 2007), data on the main prey species for lion, extracted from the 2014 aerial surveys of elephants and other large herbivores (Dunham et. al., 2015, 2015a, b, c, d) are shown in below (ZV = Zambezi Valley, NW Mat = North West Matabeleland).

The overall long term trends show that most population status of most prey species has declined in recent years. There are many possible explanations for these declines, but probably the most critical factor has been droughts, especially that experienced in 2005.

Buffalo


ZV
Population Estimate
40000
35000
30000
25000
20000
15000
10000
5000
0
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year


Sebungwe
Population Estimate
45000
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1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
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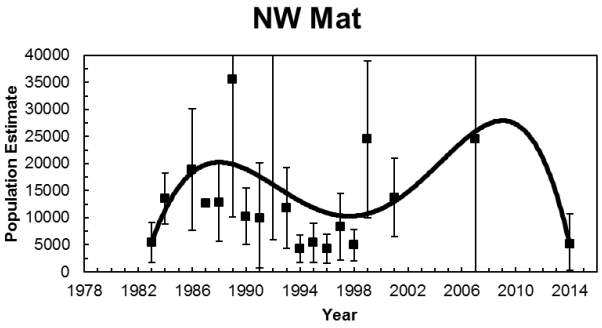
NW Mat
Population Estimate
40000
35000
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15000
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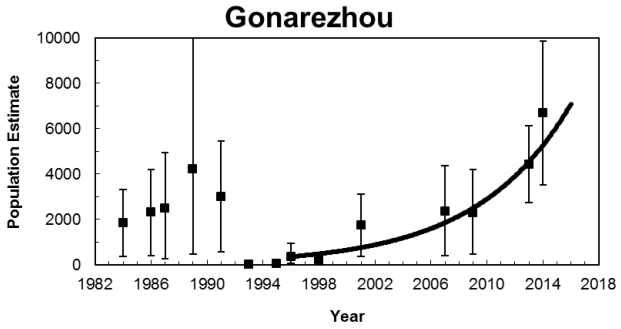
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year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Year

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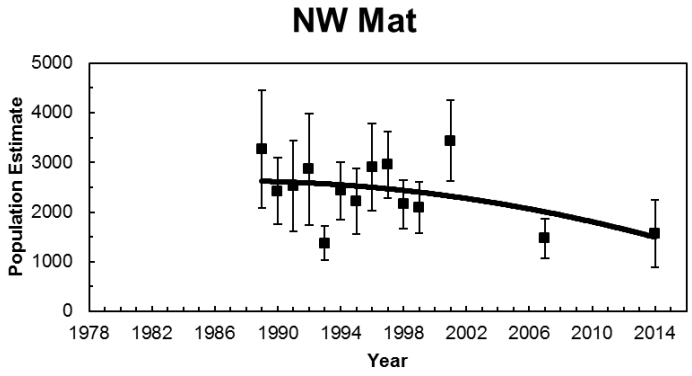
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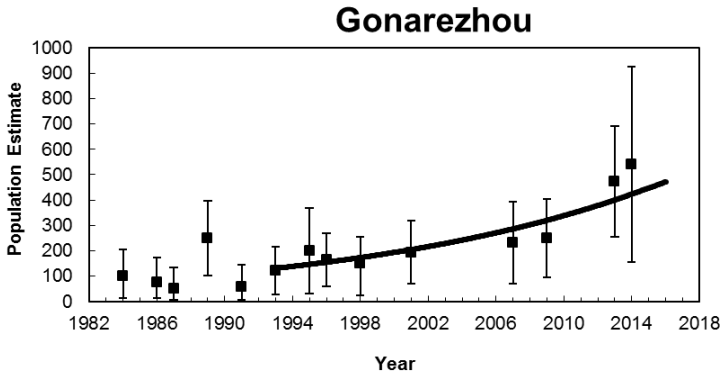
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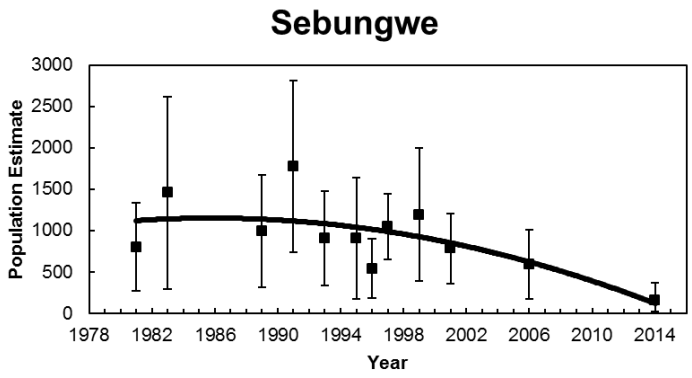
Year

Sable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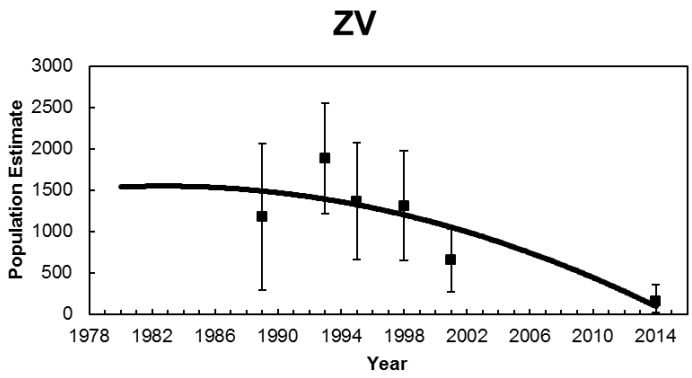
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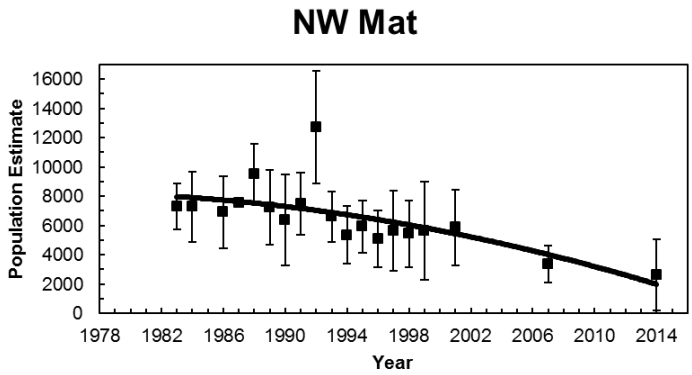
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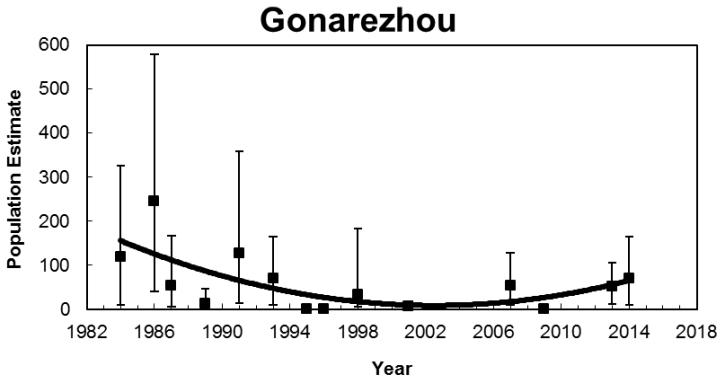
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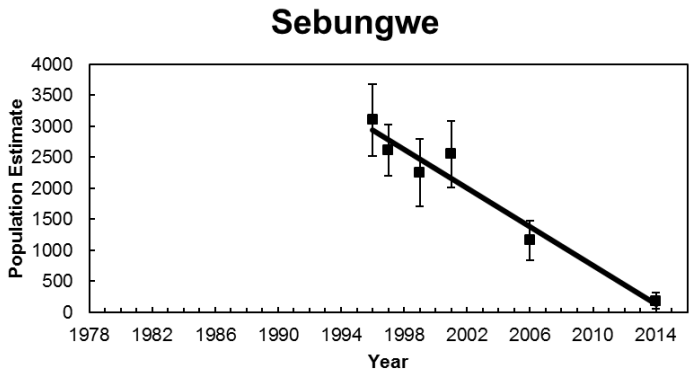
Year

Kudu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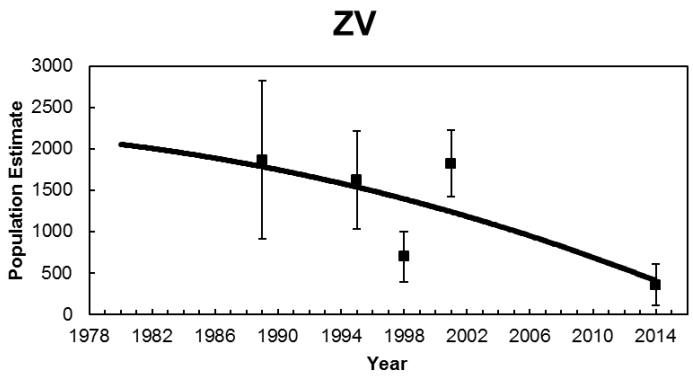
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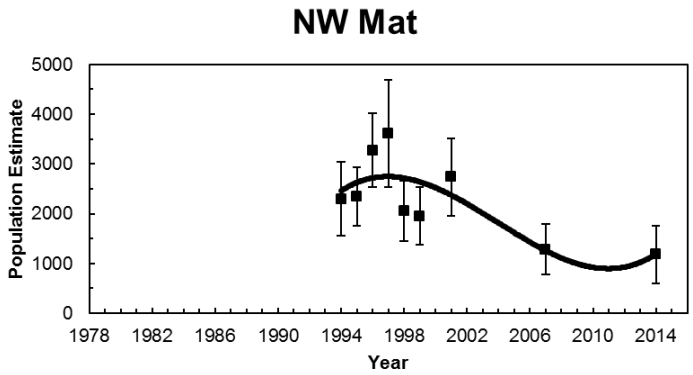
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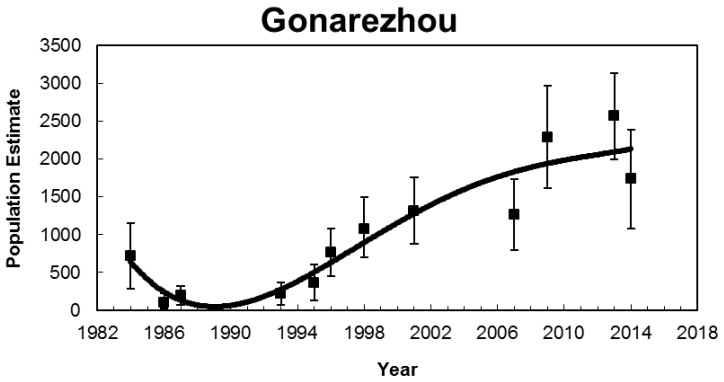
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Year

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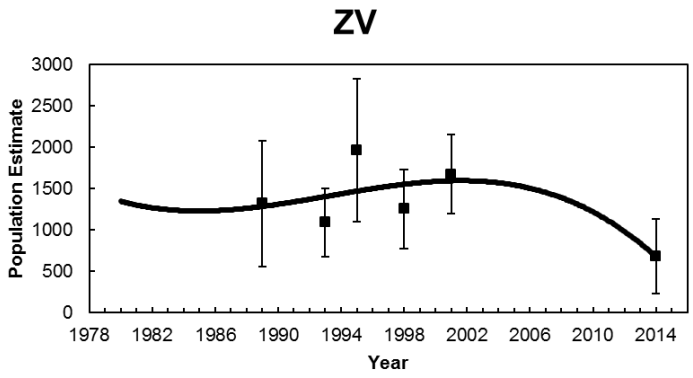
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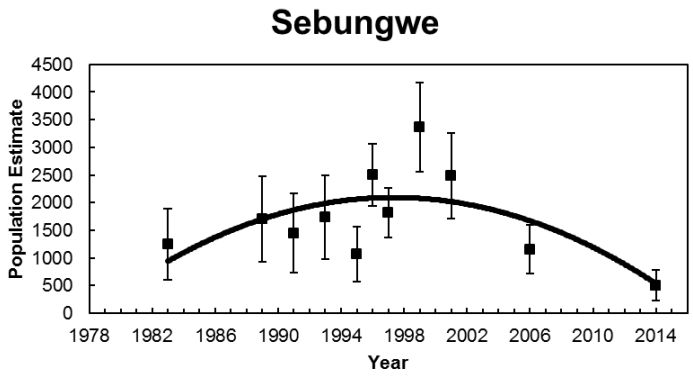
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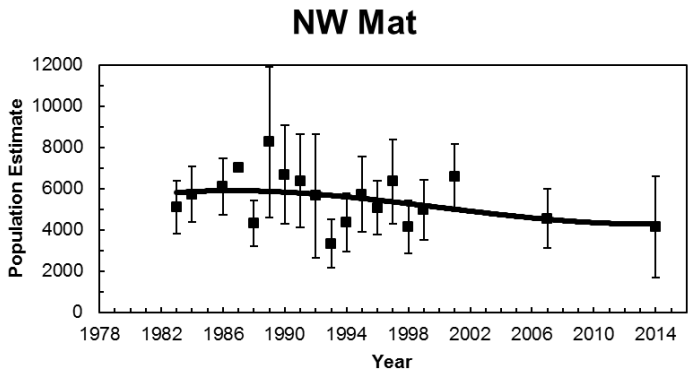
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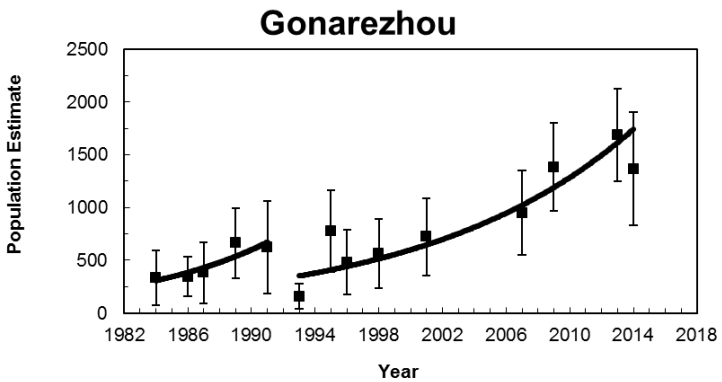
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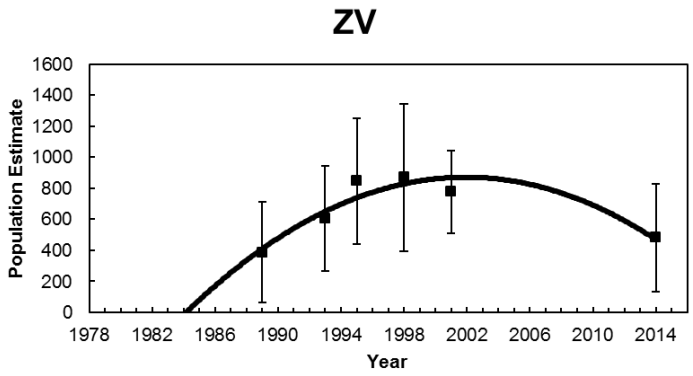
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Population Estimate
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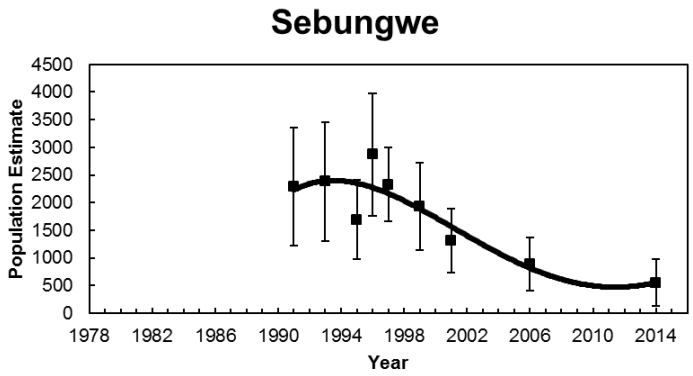
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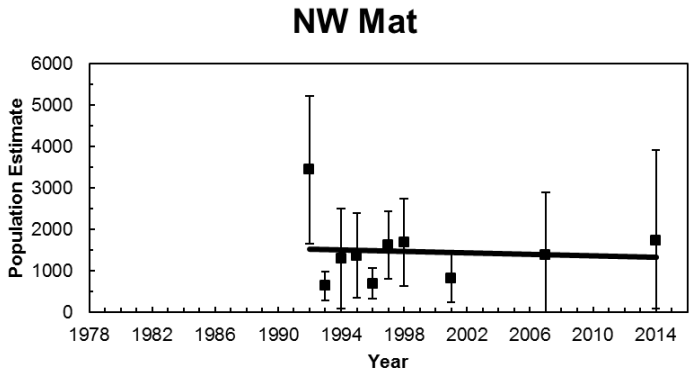
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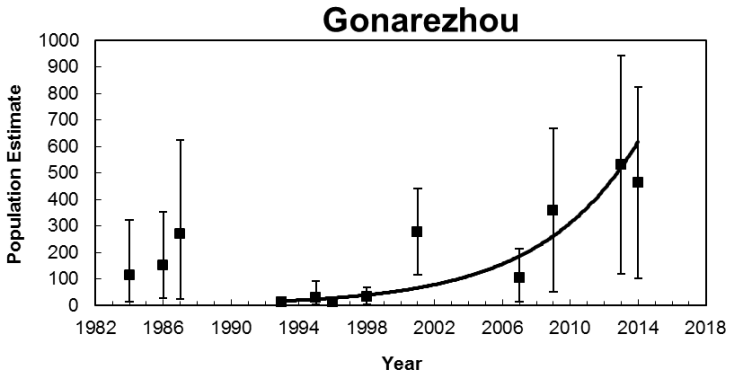
Gonarezhou
Population Estimate
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1982 1986 1990 1994 1998 2002 2006 2010 2014 2018
Year

9 ASSESSMENT OF THE ENHANCEMENT AND NON-DETRIMENT FINDINGS

The assessment of the enhancement and non-detrimental findings for lion in Zimbabwe is presented here using the "IUCN SSC GUIDING PRINCIPLES ON TROPHY HUNTING AS A TOOL FOR CREATING CONSERVATION INCENTIVES. VER. 1.0. IUCN SSC (2012)" as a guide. Zimbabwe recognises the importance of these principles to guide and manage trophy hunting as a legal, regulated conservation activity which provides a critical tool to secure a sound social, economic and ecological conservation scenario.

Biological Sustainability: Trophy hunting can serve as a conservation tool when it:

	Principle	**Remarks**
1	***Does not contribute to long-term population declines of the hunted species or of other species sharing its habitat, noting that a sustainably harvested population may be smaller than an unharvested one***	Considering the latest available estimate of lion population size in Zimbabwe (1,800 – 2,000), trophy hunting harvests a yearly mean of 2.7% of adult male lions. This figure has decreased since the establishment of age restriction rules on lion hunting. This low offtake is sustainable and generates significant financial and other benefits to ZPWMA, Communities and Private Sector.
2	***Does not substantially alter processes of natural selection and ecosystem function; that is, it maintains "wild populations of indigenous species with adaptive gene pools." This generally requires that hunting offtake produces only minor alterations to naturally occurring demographic structure. It also requires avoidance of breeding or culling to deliberately enhance population-genetic characteristics of species subject to hunting that are inconsistent with natural selection***	Safari hunting in does not substantially alter natural selection or ecosystem processes. The limited quota, as further limited by age restrictions, ensures that hunting offtakes do not negatively affect natural processes. This age-based policy was adopted in part to mitigate any social or population impacts from limited safari hunting. (Whitman et al. 2004).
3	***Does not inadvertently facilitate poaching or illegal trade of wildlife***	Safari hunting in Zimbabwe does not facilitate poaching or illegal trade. Poaching and illegal trade in lion products is currently very low suggesting that the existence of licensed, regulated hunting is helping control poaching and not facilitating it. Hunting operators are in the frontlines against poaching, and are obligated through their concession lease agreements to assistance with anti-poaching. Operators spend significant resources on this, and work in close cooperation with the ZPWMA to combat all forms of illegal wildlife trade. Even where anti-poaching is not a legal prerequisite, operators fund their own anti-poaching teams and support government rangers and community scouts e.g. in Sengwa and Dande Safari Area

	Principle	Remarks
4	***Does not artificially and/or substantially manipulate ecosystems or their component elements in ways that are incompatible with the objective of supporting the full range of native biodiversity***	Hunting in Zimbabwe has created financial incentives for the development and retention of wildlife across Safari Areas, Forestry Areas, Communal CAMPFIRE Areas and private Conservancies thereby supporting biodiversity over 145,000km^2 where hunting is a primary land use. Hunting areas on private and communal land outside of the protected areas also serve as buffer zones for many national parks and safari areas which would be converted to other land uses if these were abandoned.

Net Conservation Benefit: Trophy hunting can serve as a conservation tool when it

	Principle	Remarks
1	***Is linked to identifiable and specific parcels of land where habitat for wildlife is a priority (albeit not necessarily the sole priority or only legitimate use); and on which the "costs of management and conservation of biological diversity [are] internalized within the area of management and reflected in the distribution of the benefits from the use"***	Zimbabwe has identified Safari Areas within the Parks Estates where maintaining habitats and wildlife populations is the priority. These gazetted protected areas cover approximately 17,000km^2 where, without safari hunting, it would be difficult to secure and maintain natural ecosystems and prey bases for lions. In addition to these areas, lion occur on 66% (approximately 11,000km^2) of the land set aside as Conservancies. The operational and law enforcement costs incurred by hunting companies on a yearly basis ranges from US$300,000 to US$500,000 per hunting concession, which includes the expense of camps, salaries, anti-poaching, fuel, community assistance, etc. Many of the government's costs of maintaining Safari Areas are transferred to the private sector through the obligations of their concession agreements. Revenues from hunting in communal CAMPFIRE areas are used to support a range of social services (e.g. schools, clinics, irrigation schemes etc.) while operators cover the costs of anti-poaching, maintenance and development, and contributions to communities living nearby (e.g. through boreholes, grinding mills etc.).

		In private hunting areas and conservancies, the costs and benefits of wildlife in the area are internalized and distributed within the area of management. Critically, most of the Conservancies have elected to manage and conserve endangered species, such as black rhino, and offset the costs of this by conducting sustainable hunting of lion and other key trophy species.
2	***Produces income, employment, and/or other benefits that generate incentives for reduction in pressures on populations of target species, and/or help justify retention, enhancement, or rehabilitation of habitats in which native biodiversity is prioritized. Benefits may create incentives for residents to co-exist with such problematic species as large carnivores, herbivores competing for grazing, or animals considered to be dangerous or a threat to the welfare of humans and their personal property***	Hunting produces direct and indirect income, employment, and other benefits that generate incentives that reduce the threats to wildlife populations. Approximately US$44 million accrued to the country from the revenues of trophy hunting over the last two years. This could have been 5% higher if it were not for restrictions on the export of elephant and lion trophies. This revenue pays for the daily wildlife conservation work in all sectors of the wildlife industry, including research projects, surveys, anti-poaching, and other services. Of this amount, approximately 20% is paid directly to the ZPWMA which is then used to support its management activities, including anti-poaching budgets. Local communities benefit from hunting income through leasing the right to hunt and the sale of trophy fees in CAMPFIRE areas as well as from voluntary contributions and meat. Over the last 6 years, payments from hunting operations generated approximately US$16 million. The nature of the hunting industry does not require large numbers of people to be employed. Nonetheless, the average hunting company employs approximately 80 people on a permanent basis and 20 on a seasonal basis. This equates to approximately 3,000 people who would not otherwise secure any form of employment because of the lack of opportunities in the remote areas where hunting takes place.
3	***Is part of a legally recognized governance system that supports conservation adequately and of a system of implementation and enforcement capable of achieving these governance objectives***	All wildlife species in Zimbabwe, including the African lion, are protected under the Parks and Wildlife Act of 1996 (Chapter 20:14) as amended by Act Number 19 of 2001 which came into operation on the 1st of June 2002 through a Statutory Instrument 144C of 2002. The Act that was originally passed by Parliament in 1975 was a unique move in Africa, if not globally, that promoted the rapid development of the country's wild life industry and lead to the partial

		extension of the principle to the Communal Lands through the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) in the 1980s. The Act provided a legal basis for the devolution of Authority through granting Appropriate Authority Status to the communal areas to manage the wildlife resources for their own benefit. The Act was subsequently revised in 1996 and 2001 with the latest revision paving the way for the establishment of the current Parks and Wildlife Management Authority to replace the former Department of National Parks and Wild Life Management. Following the introduction of the Parks and Wild Life (General) (Amendment) Regulations, 1998 (No.2), i.e. Statutory Instrument 26 of 1998, the administration of the wildlife industry experienced increasing centralisation of controls on wildlife management and utilisation on alienated and communal land. The Parks and Wildlife Management Authority is mandated by the Parks and Wildlife Act [Chapter 20:14], with the responsibility of conserving Zimbabwe's wildlife heritage through effective, efficient and sustainable protection and utilisation of natural resources for the benefit of present and future generations. The Authority was established to allow it to retain the revenue that it generates to fund its operations and thereby reducing its dependence on Treasury. This entailed introducing a commercial dispensation and putting in place effective revenue generation and financial management systems. The ZPWMA has the mandate to manage the entire wildlife population of Zimbabwe, whether on state, private and communal land.

Socio-Economic-Cultural Benefit

	Principle	**Remarks**
1	***Is premised on appropriate resource assessments and/or monitoring of hunting indices, upon which specific quotas and hunting plans can be established through a collaborative process. Optimally, such a process should (where relevant) include local communities and draw on local/indigenous knowledge. Such resource assessments (examples might include counts or indices of population performance***	Zimbabwe implements an adaptive quota setting quota system that uses inputs from monitoring data and input from a variety of stakeholders including ZPWMA field and research staff, local communities, hunting operators, and independent biologists. Quotas are set based on population estimates or trend analyses, monitoring data, hunt return data, research work and indices as may be reflected in various reports by field personnel.

	such as sighting frequencies, spoor counts) or hunting indices (examples might include trophy size, animal age, hunting success rates and catch per hunting effort) are objective, well documented, and use the best science and technology feasible and appropriate given the circumstances and available resources	For lions, specifically, the ZPWMA together with the Safari Operators Association (SOAZ), the Zimbabwe Professional Hunters Association (ZPHGA) and invited independent scientists (such as Panthera) review the returns from the current hunting season and assign points as per the lion aging criteria. The overall quotas allocated and actual offtake have been reduced in recent years as a precautionary measure, including implementing moratoriums in some regions where lion densities have declined. These measures, i.e., age, population trends, maximum overall numbers and levels of utilisation has resulted in lower quotas thus underlining Zimbabwe's commitment to sustainable hunting.
2	***Involves adaptive management of hunting quotas and plans in line with results of resource assessments and/or monitoring of indices, ensuring quotas are adjusted in line with changes in the resource base (caused by ecological changes, weather patterns, or anthropogenic impacts, including hunting offtake)***	Quotas are set adaptively in line with the results of monitoring trends and on regulatory compliance. If an underage lion is harvested, the quota for that area is removed in the next season to allow the population to age and to penalize the non-compliance. In this way, Zimbabwe ensures responsible and sustainable offtakes that have limited impact on the lion population.
3	***Is based on laws, regulations, and quotas (preferably established with local input) that are transparent and clear, and are periodically reviewed and updated***	Safari hunting in Zimbabwe is regulated through the National Parks and Wildlife Act and supporting Regulations that specify when, where and how animals are hunted. Both the professional hunters and the hunting client are licensed in terms of these regulations, and all returns are lodged electronically and tracked through the Reserve Bank TRAS-2 system. As described above, quotas are established in a transparent and participatory way.
4	***Monitors hunting activities to verify that quotas and sex/age restrictions of harvested animals are being met***	The monitoring of the lion hunting is carried out through the implementation of a specific database and a specific safari return form. All hunting permits issued by (and compulsorily returned to) the ZPWMA are registered on a specific database that has been developed under the auspices of the Exchange Control Division of the Reserve Bank that records all parameters related to hunting safaris, including records of lion hunting. The database is accessible to the ZPWMA who can extract reports on all lion hunting activities for all areas in the country. Since 2013, all professional hunters conducting lion hunting safaris are required to fill in the return form for both successful and unsuccessful safaris that

		captures a broad range of general information on the safari (client name, duration, date, payments etc. For the successful lion hunting safaris, additional information related to hunting effort and success, trophy skull measures (total length and width) and specified photographs are taken of the physical features (mane etc.) and upper and lower jaws. These return forms and trophy photographs are compulsory. No CITES export permit can be issued without compliance. All data forms are reviewed by the ZPWMA together with a committee appointed by the SOAZ and ZPHGA to ensure the offtakes and subsequent exports are not detrimental to the survival of the species. Zimbabwe also requires that a ZPWMA ranger accompany all lion safaris both on state land and private land.
5	***Produces reliable and periodic documentation of its biological sustainability and conservation benefits (if this is not already produced by existing reporting mechanisms).***	The Exchange Control Division of the Reserve Bank publishes a detailed report that summarises all data related to sport hunting. This includes country of origin of clients, gross income from daily rates and trophy fees (by company), average trophy and safari values, and the contribution of key species to the overall income generated through hunting. The ZPWMA also produces annual reports that highlight the performance of the hunting industry, listing the challenges that it faces. It also submits periodic reports to CITES.

Accountable and Effective Governance

	Principle	**Remarks**
1	***Is subject to a governance structure that clearly allocates management responsibilities***	The governance structure is described in the Parks and Wildlife Act and its subsidiary regulations that clearly provides for institutional arrangements and administration defining the management responsibilities within the relevant Government Authority.
2	***Accounts for revenues in a transparent manner and distributes net revenues to conservation and community beneficiaries according to properly agreed decisions;***	The equitable distribution of costs and benefits take into consideration the role of stakeholders in relation to the land category. Benefit sharing to communities under the CAMPFIRE programme is determined through an approved ratio that channels 55% of all income from hunting to the Ward level. This institution is monitored at the local level by the Rural District Councils that guide Ward

		Wildlife Committees with respect to community projects and services. At national level this is monitored by Ministry of Rural Development, Preservation and Promotion of Culture and Heritage Safari operators contribute substantially and voluntarily, over and above the prescribed fixed contribution, especially where this involves anti-poaching efforts and community developments. They provide funding, equipment and the technical expertise for repairs, transportation, and other social services (schools, boreholes). In addition, hunting companies collaborate with both ZPWMA and District anti-poaching teams to remove snares, participate in serious wildlife crime investigations and arrest poachers.
3	***Takes all necessary steps to eliminate corruption;***	Anti-corruption efforts in Zimbabwe are governed by the following legislation: • The Prevention of Corruption Act (1983); • Public Service Act (1995); • The Ombudsperson Amendment Act (1997); • Anti-Corruption Commission Bill (2004); • The Criminal law (Codification and Reform) Act (2004); • Bank Use Promotion and Suppression of Money Laundering Act (2004); • Criminal Procedure and Evidence Amendment Act (2004); and • Criminal Law (Codification and Reform) Act of 2006 The Zimbabwean Anti-Corruption Commission (ACC) was established after the passing of the Anti-Corruption Commission Bill in June 2004. The Commission is a signatory to the Southern Africa Development Community (SADC) Protocol as well as the African Union (AU) and United Nations Convention on Anti-Corruption.
4	***Ensures compliance with all relevant national and international requirements and regulations by relevant bodies such as administrators, regulators and hunters.***	The CITES Management Authority of Zimbabwe, the ZPWMA, ensures compliance of safari hunting to CITES guidelines and provisions.

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11 APPENDICES

11.1 ANNEX I: SUMMARY OF NATIONAL PARKS ESTATE, FORESTRY, COMMUNAL AND PRIVATE LAND WHERE LION ARE KNOWN TO OCCUR

1. National Parks Estate

Type of Land	Name of Park	District	Area (hectares)	Presence of lion
NP	Chizarira	Binga	191,000	Yes
NP	Gonarezhou	Chiredzi	505,000	Yes
NP	Matusadonha	Nyaminyami	140,700	Yes
NP	Chimanimani	Chimanimani	17,110	No
NP	Mana Pools	Hurungwe	219,600	Yes
NP	Kazuma Pan	Hwange	31,300	Yes
NP	Hwange	Hwange	1,465,100	Yes
NP	Victoria Falls "A"	Hwange	1,904	No
NP	Victoria Falls "B"	Hwange	436	No
NP	Zambezi	Hwange	56,010	Yes
NP	Rhodes Nyanga	Nyanga	47,150	Migratory
NP	Rhodes Matopos	Matobo	42,400	No
Total Area National Parks (ha)			**2,717,710**	
Botanical Gardens	Pioneer Reserve	Beitbridge	38	No
Botanical Gardens	Tolo River Reserve	Beitbridge	44	No
Botanical Gardens	South Camp Reserve	Beitbridge	26	No
Botanical Gardens	Chisekera Hot Springs	Chiredzi	95	No
Botanical Gardens	Mawari Raphia Palm	Mt. Darwin	34	No
Botanical Gardens	Tingwa Raphia Pan	Mt. Darwin	290	No
Botanical Gardens	Haroni Forest	Chimanimani	20	No
Botanical Gardens	Rusitu Forest	Chimanimani	150	No
Botanical Gardens	Sebakwe Acacia Karoo	Kwekwe	60	No
Botanical Gardens	Sebakwe Great Dyke	Kwekwe	165	No
Botanical Gardens	Sebakwe Mountain Acacia	Kwekwe	53	No
Botanical Gardens	Mazowe "A"	Harare	43	No
Botanical Gardens	Mazowe "B"	Harare	3	No
Botanical Gardens	Bunga Forest	Mutare	495	No
Botanical Gardens	National Botanic Garden	Harare	67	No

Type of Land	Name of Park	District	Area (hectares)	Presence of lion
Botanical Gardens	Vumba Botanic Garden	Mutare	200	No
Botanical Gardens	Ewanrigg Botanic Garden	Goromonzi	286	No
Total Area of Botanical Gardens and Botanical Reserves:			**2,069**	
Sanctuary	Maninii Pan	Chiredzi	300	No
Sanctuary	Melsetter Eland	Chimanimani	1,800	No
Sanctuary	Mbaze Pan	Nkayi	40	No
Sanctuary	Nyamanyetsi (Nyamanechi)	Guruve	2,840	No
Sanctuary	Mushandike	Masvingo	12,900	No
Sanctuary	Rhodes - Bulawayo	Matobo	1,100	No
Total Area Sanctuaries			**18,980**	
Safari Area	Tuli	Beitbridge and Gwanda	41,600	Yes
Safari Area	Chete	Binga	108,100	Yes
Safari Area	Chipinga (Chipinge)	Chipinge	26,100	No
Safari Area	Malapati (Malipati)	Chiredzi	15,400	Yes
Safari Area	Chinsa	Gokwe	171,300	Yes
Safari Area	Hartley (Chegutu)	Chegutu	44,500	No
Safari Area	Charara	Kariba and Hurungwe	169,200	Yes
Safari Area	Hurungwe	Hurungwe	289,400	Yes
Safari Area	Doma	Makonde	94,500	Yes
Safari Area	Umfurudzi	Shamva	76,000	No
Safari Area	Dande	Guruve	52,300	Yes
Safari Area	Chelvore (Chewore)	Hurungwe	339,000	Yes
Safari Area	Sapi	Hurungwe	118,000	Yes
Safari Area	Deka	Hwange	51,000	Yes
Safari Area	Matetsi	Hwange	295,500	Yes
Total Area of Safari Areas:			**1,891,900**	
Recreational	Chibwatata	Binga	6	No
Recreational	Kavira	Binga	50	No
Recreational	Lake Kariba	Binga, Nyaminyami and Hwange	287,200	Yes

Type of Land	Name of Park	District	Area (hectares)	Presence of lion
Recreational	Ngezi	Kadoma	5,800	No
Recreational	Umfuli (Mfurudzi	Chegutu	12,700	No
Recreational	Lake Robertson (Manyame Lake)	Chegutu, Makonde and Harare	11,200	No
Recreational	Lake Cunningham	Insiza	4,172	No
Recreational	Chinhoyi Caves	Makonde	120	No
Recreational	Manjirenji	Zaka	3,400	No
Recreational	Bangala	Zaka and Masvingo	2,700	No
Recreational	Sebakwe	Kwekwe	2,600	No
Recreational	Robert McIlwaine (Chivero)	Harare	6,180	No
Recreational	Umzingwane	Umzingwane	1,233	No
Recreational	Kyle (Mutirikwi)	Masvingo	16,900	No
Recreational	Lake Matopos	Matobo	2,900	No
Total Area of Recreational Parks, Lakes and Dams			**357,161**	

Total Area National Parks (ha)	2,717,710
Total Area of Botanical Gardens and Botanical Reserves:	2,069
Total Area Sanctuaries	18,980
Total Area of Safari Areas:	1,891,900
Total Area of Recreational Parks, Lakes and Dams	357,161
Total Ha	**4,987,820**

2. Forestry Land

Land	Name	District	Area (ha)	Presence of lion
Forestry Areas	Fuller	Hwange	23,300	Yes
Forestry Areas	Panda Masuie	Hwange	33,500	Yes
Forestry Areas	Kazuma	Hwange	24,000	Yes
Forestry Areas	Mvutu	Hwange	2,100	No
Forestry Areas	Sikumi	Hwange	54,400	Yes
Forestry Areas	Gwayi	Lupane	144,265	Yes
Forestry Areas	Lake Alice	Lupane	39,000	No
Forestry Areas	Ngamo	Lupane	102,900	Yes

Land	Name	District	Area (ha)	Presence of lion
Forestry Areas	Chisengu	Lupane	4,006	No
Forestry Areas	Glencoe	Lupane	2,050	No
Forestry Areas	Lionhills	Lupane	2,747	No
Forestry Areas	Martin (i)		400	No
Forestry Areas	Martin (ii)		4,400	No
Forestry Areas	Mudima		6,355	No
Forestry Areas	Nyambewa		5,484	No
Forestry Areas	Tandai		5,450	No
Forestry Areas	Tarka		4,343	No
Forestry Areas	Gwampa	Nkayi	47,000	No
Forestry Areas	Chesa	Nkayi	14,250	No
Forestry Areas	Inseze	Nkayi	35,200	No
Forestry Areas	Inseze Extension	Nkayi	8,400	No
Forestry Areas	Umgusa	Nkayi	32,200	No
Forestry Areas	Umzibani	Nkayi	2,471	No
Forestry Areas	Kavira	Binga	28,200	Yes
Forestry Areas	Mzolo	Binga	67,200	No
Forestry Areas	Sijarira	Binga	25,600	Yes
Forestry Areas	Bembesi	Binga	55,100	No
Forestry Areas	Molo	Binga	2,900	No
Forestry Areas	Mtao	Chirumanzu	8,170	No
Forestry Areas	Chirindu	Chirumanzu	950	No
Forestry Areas	Gungunyana	Chirumanzu	1,650	No
Forestry Areas	Mafungabusi	Chirumanzu	82,100	No
Forestry Areas	Mudzongwe	Chirumanzu	1,420	No
Forestry Areas	Ungwe	Chirumanzu	567	No
Forestry Areas	Nyangu	Chirumanzu	16,600	No
Forestry Areas	York	Chirumanzu	1,455	No
Forestry Areas	Banti	Mutare	2,219	No
Forestry Areas	Stapleford	Mutare	24,600	No
Rhodes Estate	Erin	Nyanga	10,700	No
Rhodes Estate	Sauerdale North	Nyanga	214	No

Land	Name	District	Area (ha)	Presence of lion
Total Forest Areas (ha)			**927,866**	

3. CAMPFIRE Districts

District	Natural Region	Total Area (km^2)	Area of CF Wards (km^2)	Number of Wards	CF Wards	District Pop (persons)	Presence of lion
Beitbridge	5	12,935	4,595	21	6	80,946	Migratory
Binga	3,4&5	12,308	7,930	27	21	87,802	Migratory
Bubi	4	5,547	88	12	2	36,614	Migratory
Bulilimamangwe	4&5	12,574	1,530	33	10	156,641	Migratory
Chaminuka	2a,2b,3,4&5	2,752	380	26	2	94,047	No
Chimanimani	1,2a,3,4&5	3,419		28		110,836	No
Chipinge(Gazaland)	1,2a,3,4&5	5,223	408	33	2	336,893	Migratory
Chiredzi(Gaza Khomanani)	5	17,748	3,633	32	9	183,228	Yes
Chiweshe(Mazowe)	2a	4,482	375	29	5	198,319	No
Gokwe North	3,4&5	7,359	2,523	25	4	164,558	Migratory
Gokwe South	3&4	11,138	1,308	28	6	238,581	Migratory
Goromonzi	2a	2,504		26		147,126	**No**
Mbire (Guruve)	2a,3&4	7,810	4,215	28	14	135,637	Yes
Gwanda	4&5	10,792	2,283	23	6	112,984	No
Hurungwe	2a,3,4&5	19,895	2,793	40	9	246,902	Yes
Hwange	4&5	29,934	4,021	27	15	71,707	Yes
Hwedza	2b&3	998				69,981	No
Kusile(Lupane)	3&4	7,780	2,885	24	11	94,469	Migratory
Marondera	2a&2b	3,554		24		104,601	No
Matobo	4&5	7,278	1,233	26	4	89,281	No
Mudzi	4	4,222	1,009	18	2	109423	No
Mutoko	2b,3&4	4,052		29		122,941	No
Muzarabani	2a,3&4	4,322	2,540	17	9	69,851	Migratory
Mwenezi	4&5	12,933		31		101,354	Migratory
Nkayi	4	5,333	2,628	23	6	113,302	Migratory
Nyaminyami(Kariba)	4&5	6,327	3,532	16	11	27,717	Yes
Nyanga	1,2b,3&4	5,738	253	37	1	128,439	Migratory
Pfura(Mt. Darwin)	2a,2b,3&4	1,771				164,362	No
Rushinga	3&4	2,408		17		75,332	No
Tsholotsho	4	7,823	5,354	20	8	111,828	Yes
UMP Zvataida	2b,3&4	2,682	619	15	2	86,302	No
Umzingwane	4	1,074				62,954	No

District	Natural Region	Total Area (km²)	Area of CF Wards (km²)	Number of Wards	CF Wards	District Pop (persons)	Presence of lion
Zivagwe	4	2,363				65,752	No
TOTAL/AVERAGE		247,078	56,135	735	165	4,000,710	

4. Conservancies

	Name of Conservancy	District	Area (hectares)	Presence of lion
Conservancies	Malilangwe	Chiredzi	40,000	Yes
Conservancies	Save	Chiredzi	344,200	Yes
Conservancies	Chiredzi River	Chiredzi	28,500	No
Conservancies	Bubye Valley	Matabeland South	374,000	Yes
Conservancies	Bubiana	Matabeland South	130,000	No
Conservancies	Gwayi	Hwange	150,897	Migratory
Conservancies	Midlands Black Rhino	Midlands	85,000	No
Other	Matetsi Farms	Hwange	155,627	Migratory
Total Area of Conservancies			**1,308,224**	

11.2 ANNEX II: SUMMARY OF PRIMARY LEGISLATION AND REGULATIONS

11.2.1 The Policy for Wild Life of 1992

This policy provides for Government to maintain a protected area network known as the Parks and Wild Life Estate for the conservation of the nation's wild resources and biological diversity. According to the policy, government will use the Estate to promote a rurally based wild life industry and will harmonise the management of the Estate with the efforts of neighbouring communities that are developing wild life as a sustainable form of land use. The policy vests executive responsibility for the Parks and Wildlife Estate in the Department of National Parks and Wild Life Management (DNPWLM). It provides for the following categories of protected area: National Park; Safari Area; Sanctuary; Recreational Park, Botanic Reserve and Botanic Garden.

- The objectives of the Parks and Wild Life estate will be to:
- Preserve representative samples of Zimbabwe's aquatic and terrestrial flora and fauna and their physical environments;
- Protect areas of scenic beauty and special interest;
- Preserve rare, endangered and endemic species;
- Conserve water catchments;
- Provide opportunities for public education and the advancement of scientific knowledge;

and, without prejudice to any of the above:

- Encourage public use related to the enjoyment and appreciation of these areas; and
- Generate economic activity within the Estate and surrounding areas to enhance rural development.

The policy commits the DNPWLM to an adaptive management strategy in which research and monitoring are incorporated as integral components of management. It states that where sport

hunting is an objective in a protected area, quotas will be set to the maximum sustainable level at which trophy quality can be maintained and the hunting can be marketed. In terms of the policy the emphasis of tourism in parks should be low density and high quality tourism. An EIA must be carried out for major developments such as construction of roads, powerlines, buildings or dams.

With respect to Wildlife Conservation, the Policy states that the Government of Zimbabwe aims to encourage the conservation of wild animals and their habitats outside the Parks and Wild Life Estate recognising that this is only likely to be successful if wild life can be used profitably and the primary benefits accrue to people with wild life on their land. "*Recognising that much of Zimbabwe does not consist of good arable land, Government regards wild life management in all its diverse forms as a legitimate land use which may be the most appropriate or highest-valued form of development in many areas*". The policy also states that Government will take the necessary legal and enforcement measures to prevent the illegal use of wildlife.

Addressing community rights to natural resources the Policy states that government intends to "*transform land use in remote communal areas through its Communal Areas Management Programme for Indigenous Resources (CAMPFIRE), under which rural peoples have the authority to manage their wild life and other natural resources and benefit directly from so doing*". Further government will "*ensure that wildlife is not undervalued to the people living with it by permitting them to use it sustainably for their own gain as they are able to do with other natural resources and agricultural products*".

The policy states that the mechanism for communities to gain rights over wild life will be through the granting of Appropriate Authority to Rural District Councils (under the Parks and Wildlife Management Act of 1975). For this authority to be granted, the Minister will require:

1. An acceptable management plan from councils in which objectives for wild life are stated and preliminary intentions for achieving these objectives are outlined;
2. An acceptable institutional plan which outlines clearly the methods by which councils intend a) to involve wild life producer communities in district level management and b) to devolve the decision-taking process in local wild life management and the distribution of wild life benefits to producer communities;
3. The department to assist councils in managing their wild life and to coordinate the activities of NGOs who are assisting councils;
4. The approval by the department of all annual quotas of wild life killed or sold in communal lands during the interim period while councils develop their management capacity;
5. The presentation of annual reports from Councils to the Director and to their constituents detailing the year's performance in wild life management in their district.

The policy provides for the Minister to withdraw Appropriate Authority from a council not conforming to conditions and objectives under which it was granted.

11.2.2 Wildlife Based Land Reform Policy

In 2004 there was a move to revise the Policy for Wildlife to cater for the Land Reform programme. The revised policy, known as the Wildlife-Based Land Reform Policy, has not however been formally accepted by Government. Nonetheless, it is important to summarise what was envisioned at that time since this has influenced the way the management of wildlife outside of the Parks Estate has unfolded.

The vision of this reformed policy is to ensure profitable, equitable and sustainable use of wildlife resources, particularly in areas where agricultural potential is limited. It states that "*the policy has*

been developed in the context of Zimbabwe's Land Reform Programme and is underpinned by recognition that wildlife is a viable land-use option, that it can facilitate attainment of equity objectives and that it is feasible. This policy is complemented by existing natural resources legislation and the state protected area system."

The policy also states that the key issues that were taken into consideration were:

- The State will continue to make provision for wildlife management outside the protected area system, including setting aside certain core zones for wildlife production. Wildlife should be the only permitted primary land use option in these areas.
- Outside core zones, wildlife production, amongst other land use options, will be encouraged. The most profitable and ecologically sustainable land use option must be allowed to evolve in response to changing economic influences, notwithstanding the need to ensure food security in these areas.
- The scale of wildlife operations must be allowed to vary from intensive to extensive, depending on agro-ecological settings.
- All beneficiaries of wildlife operations, whether individually or jointly, must equitably share the costs of production.
- Wildlife management responsibility and authority must be devolved to the most appropriate level for efficient resource management and production incentives must be maximized for landholders.
- Security of tenure over resources is key to successful wildlife-based land reform. These core areas should be identified.

The aims of the Wildlife-Based Land Reform Policy are listed as:

1. To facilitate the indigenisation of the wildlife sector and to ensure more equitable access by most Zimbabweans to land and wildlife resources and to the business opportunities that stem from these resources.
2. To maintain a proportion of land outside state protected areas under wildlife production.
3. To enhance diversity of land uses through wildlife production.
4. To promote secure and equitable tenure.
5. To develop and implement appropriate institutional arrangements for wildlife-based land reform.

The policy recognized that wildlife production can be at different scales, which are dependent on several factors that include the type of wildlife, management regime and ecological conditions. Three categories are highlighted in the policy:

1. Intensive production systems with captive or semi-captive species such as crocodiles and ostriches (1 – 100 hectares).
2. Semi-intensive to semi-extensive production systems with free-ranging "plains game" populations (1,000 to 10,000 hectares).
3. Extensive production systems incorporating "big game" populations (over 10,000 hectares).

The Wildlife Based Land Reform Policy promotes two land redistribution models:

1. A state leasehold approach which is based on the reallocation of leasehold leases.
    a. This approach entails the acquisition of the entire land-holding with compensation for infrastructure, wildlife, etc.,

   b. The land will be reallocated to lessees under terms and conditions that will ensure sustainable wildlife management, on-going investment and capacity-building in that area.
2. A corporate equity model that involves transfer of shares within a land-owning company.
   a. The transfer of shares will be in accordance with the Indigenisation goals and sound business principles;
   b. Proposals from stakeholders must outline realistic ways in which new entrants can increase their shareholdings well beyond an initial level, over a reasonable time scale.
   c. The proposals must make provision for immediate allocation of shareholdings to new participants.

The Policy document also acknowledges that the two approaches can be applied in combination and shall be considered on a case by case basis, and that the State may from time to time consider other approaches that meet the objectives of the Wildlife Based Land Reform Policy.

11.2.3 Parks and Wild Life Act Chapter 20:14 of 1996 as amended in 2001:

This is the pivotal Act with respect to wildlife management in Zimbabwe. The Act includes the following sections:

1. Parks and Wildlife Board
2. Parks and Wildlife Estate and Parks and Wildlife Land
3. National Parks
4. Botanical Reserves and Botanical Gardens
5. Sanctuaries
6. Safari Areas
7. Recreational Parks
8. Specially Protected Animals
9. Specially Protected Indigenous Plants
10. Indigenous plants
11. Hunting, removal, viewing and sale of animal products
12. Protection of animals and Indigenous plants on alienated land
13. Fish Conservation
14. Evidence, prevention and detection of offences and additional penalties and forfeitures
15. Inspectors, Officers, employees and advisory committees
16. General

The Act also defines the different types of land (Alienated land):

a. “Private Land” means land the ownership of which is vested in any person other than the President.
b. “State Land” means land vested in the President other than Communal Land or trust land vested in the President.
c. “Trust land” means any land, other than Communal land held in trust by the President or a statutory body or by a person, whether solely or jointly with others, by virtue of his being the holder of some office in a statutory body.

The Parks and Wildlife Act of 1975 (as amended) states that the purposes of National Parks are:

1. To preserve and protect the natural landscape and scenery.
2. To preserve and protect wild life and plants and the natural ecological stability of wild life and plant communities for the enjoyment, education and inspiration of the public.

Establishment of Protected Areas: The Act enables the President to declare National Parks on State land or Trust Land if the trustees give their consent (Section 22). The Act enables the Minister acting on the authorisation of the President to acquire land for the Parks and Wild Life Estate either compulsorily or by agreement in terms of the procedures contained in the Communal Land Act and the Land Acquisition Act. The Act gives the Minister the power to manage National Parks, control entry and authorise or restrict certain activities and carry out various conservation measures. The Act provides for the provision of facilities and services for tourists in National Parks or to lease out such facilities or services. The Act allows the Minister to issue a permit for hunting in National Parks.

The Act makes provision for the establishment of Botanical Reserves and Botanical Gardens (Section 26) on State Land or Trust Land for the preservation and protection of rare or endangered indigenous plants or representative plant communities for the enjoyment, education and benefit of the public.

A third category of protected area is a Sanctuary which may be established by the President on State Land or Trust Land (Section 31) to afford special protection to all animals or a particular species of animal in the sanctuary for the enjoyment and benefit of the public. The Minister may provide tourism facilities and services in a Sanctuary or lease facilities or services. The Minister may also issue permits for hunting or the removal of game from a sanctuary for certain purposes.

In terms of the Act the President may establish Safari Areas on State Land or Trust Land as part of the Parks and Wild Life Estate (Section 36) for the preservation and protection of the natural habitat and the wild life in these areas in order that facilities and opportunities may be afforded to the public for camping, hunting, fishing, photography, viewing of animals, bird watching and similar activities. The Minister may lease sites in safari areas for various purposes and may grant hunting or other rights. Hunting or removal of wildlife in a safari area may only take place with a permit.

The fifth category of protected area provided for by the Act is a Recreational Park (Section 41), which may be established by the President for the purpose of preserving and protecting the natural features for the enjoyment, benefit and recreation of the public. The Minister may designate areas within Recreational Parks which can be alienated or leased for the provision of tourism facilities and services.

Prospecting and mining are prohibited in National Parks, Botanical Reserves, Botanical Gardens, Sanctuaries or Recreational Parks without a permit issued by the Minister and with the consent of the Minister of Mines (Section 119). The Environmental Management Act of 2002 also makes provision for land to be acquired by the State for conservation purposes. According to Section 109 the President may acquire land or set land aside for the improvement or proper management of the environment. In the absence of an agreement with the land owner the President may acquire the land in accordance with the procedures under the Land Acquisition Act. The President may set aside any area of Communal Land for the conservation or improvement of natural resources or for the protection of irrigation works or sources of water supplies provided that no such area shall be set aside until the Minister responsible for the administration of the Communal Land Act is satisfied that suitable provision has been made elsewhere for the inhabitants who will be affected by the setting aside of the area (Section 110).

Specially Protected Animals and Plants: The Act makes provision for the Minister to declare certain animals as specially protected (Section 44). In terms of the Act, no-one may hunt, have in their possession, or sell a live specially protected animal or the meat or trophy from such an animal without a permit. The trophy of any specially protected animal must be surrendered to the state if not obtained by a permit. The Act specifies the purposes for which the Minister may issue a permit for use of

specially protected animals (Section 46), but provides the Minister with some flexibility as he/she may issue a permit for any purpose which in the opinion of the Minister is in the interests of the conservation of animals.

The Act also makes provision for the declaration of specially protected indigenous plants (Section 49). No person may pick a specially protected plant without a permit, although the owners or occupiers of land or a person acting under their authority may pick a specially protected plant for cultivation, forestry, building construction or the construction of roads and other infrastructure. No person may sell a specially protected plant without a permit unless the person is a recognised dealer in specially protected indigenous plants or a member of a recognised horticultural society and the purchase is from a member of the same or other recognised society. The Act specifies the purposes for which the Minister may issues permits for the picking or sale of specially protected indigenous plants. The Act also stipulates that no person may pick or sell indigenous plants without a permit (Section 55) provided that the appropriate authority for any land may pick or sell or authorise others to pick or sell indigenous plants (Section 56). If the Minister deems it necessary for the conservation of an indigenous plant, the Minister may prohibit the picking or selling of that plant (Section 57).

Hunting and removal of animals: The Act prohibits hunting, removal of an animal or any part of an animal or the sale of an animal without a permit unless by an appropriate authority for the land (Section 59), which is the owner of freehold land, a Rural District Council on communal land, the Forestry Commission on state forests and the DNPWLM on the parks and Wildlife Estate. The appropriate authority for the land may issue permits to others to use the wild life (except for specially protected species). If the Minister deems it necessary for the conservation of a animal, he/she may prohibit the hunting or removal of such animals in a specific area (Section 60) and may serve a notice to prohibit a specific person from hunting, conducting photographic tourism, or being in the possession of a weapon used for hunting save for self-defence. The Minister does not have to give reasons for such prohibitions. The Act enables the killing of an animal without a permit for self-defence (Section 61).

The Act prohibits anyone from conducting of hunting or photographic safaris within the parks and wild life estate or on forest land without holding a professional hunter's licence or a professional guide's licence (Section 65). No person may manufacture an article from a trophy, process a trophy or sell or otherwise dispose of a trophy or an article manufactured from a trophy from an animal that has been hunted in contravention of the Act (Section 73).

If the Minister believes it in the interests of conservation, he/she may declare any animal that is not a specially protected animal as a protected animal and any indigenous plant that is not a specially protected plant as a protected plant (Section 77) on alienated land within the area of an environment committee established in terms of the Environmental Management Act of 2002 and the Rural District Councils Act of 1988. No person may, without a permit, hunt an animal or pick an indigenous plant that has been declared protected. The Minister may also restrict the extent of hunting animals or picking of indigenous plants on alienated (private freehold) land in the area of an environment committee if the Minister believes that the hunting of animals or picking of plants is unsustainable. The Minister may authorise an environment committee to reduce the numbers of problems animals on any alienated land within its area if the number of such animals is sufficient to cause excessive damage or nuisance. Section 79 gives environment committees the power to restrict hunting on alienated land if it believes that hunting is unsustainable.

The Minister may declare any person to be the appropriate authority for any waters (Section 83) and may declare controlled fishing waters (Section 84) for which the Minister may make regulations for

the control, regulation, restriction of prohibition of fishing. Unless the Minister designates areas of water where a permit is not required, no-one except the appropriate authority for that water may fish in any water without a permit. Section 87 regulates the means of fishing by prohibiting the use of explosives, firearms and poisons. Section 88 controls the introduction into any water of fish and plants that are not native to that water. No-one except the appropriate authority for a water may fish commercially and sell the fish without a permit (Section 90). The minister may ban fishing by specific persons in any area in the interests of conservation (Section 96).

Enforcement: The Act provides for the powers of conservation officials, and police officers in relation to enforcing the Act. It provides for penalties for various offences and for the Minister to make regulations on a wide range of issues and activities. The Act provides for the highest penalties to be awarded for the unlawful killing of a rhinoceros or other specially protected game specified by the Minister in an
official notice and for the unlawful possession or trade in rhino horn, ivory or the trophy of any other specially protected animal specified by the Minister in an official notice (Section 128).

The Environmental Management Act of 2002 provides the Minister responsible for the Environment to regulate the use of wetlands. In terms of Section 113 of the Act the Minister may declare any wetland to be an ecologically sensitive area and may impose limitations on development in or around such area. Further, no person may without authorisation in terms of the Act:

a. reclaim or drain any wetland;
b. disturb any wetland by drilling or tunnelling in a manner that has or is likely to have an adverse impact on any wetland or adversely affect any animal or plant life therein;
c. introduce any exotic animal or plant species into the wetland. Section 114 enables the Minister to serve an order on the owner, occupier or user of land under which they must take measures, construct such works or refrain from specific activities in order to protect the environment.

Biological Diversity: Further the Act enables the Minister to take such measures as may be necessary for the conservation of biological diversity and the implementation of Zimbabwe's obligations under the United Nations Convention on Biological Diversity adopted in 1992 and may, in so doing (Section 116):

a. identify the components of the biological diversity of Zimbabwe;
b. determine the components of biological diversity which are threatened with extinction;
c. prepare and maintain an inventory of the biological diversity of Zimbabwe;
d. determine actual and potential threats to the biological diversity and devise such measures as are necessary for preventing, removing or mitigating the effect of those threats;
e. devise measures for better protection and conservation of rare and endemic species of wild fauna and flora;
f. develop national strategies, plans and programmes for the conservation of the biological diversity of Zimbabwe;
g. promote the integration of conservation and sustainable use of biological diversity into relevant sectoral policies, plans and programmes;
h. require in writing any developer, including the government, to integrate the conservation and sustainable utilisation of the biological diversity in any project the implementation of which has or is likely to have detrimental effects to the biological diversity of Zimbabwe;
i. protect indigenous property rights of local communities in respect of biological diversity with scientific knowledge;

j. support the integration of traditional knowledge on conservation of biological diversity with scientific knowledge;
k. prohibit or restrict access by any person to or the exportation of any component of the biological diversity of Zimbabwe.

The Minister may also take such action or measures as may be necessary for the conservation of the biological diversity of a specific locality and may:

a. promote such land use methods as are compatible with the conservation of the biological diversity of that locality;
b. select and manage environmental protection areas for the conservation of the various terrestrial and aquatic ecological systems;
c. establish and manage buffer zones near environmental protection areas;
d. prohibit or control the importation of and introduction into the wild of exotic animal and plant species;
e. identify, promote and integrate traditional knowledge into the conservation and sustainable utilisation of the biological diversity of that locality; and
f. determine special measures for the protection of species, ecosystems and habitats faced with extinction.

Community rights to natural resources: The Act provides for land holders to acquire rights over wildlife through the granting of "appropriate authority" status. Thus, the owners of private freehold land are deemed to be the appropriate authority over wildlife on their land (Section 2). Communities acquire rights over wildlife through Rural District Councils (RDCs). A 1982 amendment to the Act provides for the Minister to appoint an RDC as the appropriate authority for wild life on the communal land within the jurisdiction of the RDC (Section 108). The Act states that no person may hunt any animal on any land or remove any animal or part of an animal except in term of a permit issued by the appropriate authority for that land [Section 59(2)]. The appropriate authority may hunt any animal on the land, remove any animal or part of an animal from the land and may issue permits to others to hunt or remove animals from the land. RDCs are then expected to apply the guidelines contained in the 1992 Wildlife Policy to devolve the decision-taking process in local wild life management and the distribution of wild life benefits to producer communities (i.e. smaller and more localised groups of people with wildlife on their land). Further policy guidelines state that RDCs
are expected to distribute a percentage of income derived from wildlife use to producer communities and to allow these communities to be responsible for several wildlife management activities. Because of the existing administrative system of local government, producer communities had to be represented by Ward Development Committees (WADCOs) and Village Development Committees (VIDCOs) which are advisory bodies to Councils.

In this way, various legal entities are granted authority over wildlife outside the Parks Estate. These authorities include private land-owners (where the land is held under an agreement of purchase or lease), forest land (such as Forestry Commission estates). For Communal Land, the Rural District Councils (RDC) may be appointed the Appropriate Authority. The Minister of Environment grants this authority, with input from the Zimbabwe Parks and Wildlife Management Authority. If appropriate authority is not granted, the authority remains vested in Central Government. This Appropriate Authority clause in the Act, paved the way for the implementation of the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE)[3].

Statutory Instruments: There are several statutory instruments (SI) that regulate the wildlife sector:

[3] Note that the CAMPFIRE programme is about to undergo a comprehensive review that will impact on future policies.

- SI 362 of 1990: This legislation provides in sections 66-75 for the Regulation of Manufacture, Processing and Dealing in trophies.
- SI 76 of 1998: Parks and Wild Life (Import and Export) (Wild Life) Regulations specifically deals with Import and Export of wildlife products. This legislation was enacted to ensure compliance with CITES requirements for export and import of wild flora and fauna. These provide for the following:
    - Section 3 deals with the Control of Import and Export of wild life and trophies and lays down a general prohibition on the import into or export from Zimbabwe of any "wild life" or trophy of "wild life" except in accordance with either a certificate issued in terms of section 5 by the Director or Director of Customs, or an open general permit:
    - Section 5 deals with Permits and Certificates and is consistent with CITES legislation.
    - Section 15 deals with Offences and Penalties. Any person who contravenes any of the provisions of subsection 1 shall be guilty of an offence, and liable to a fine or imprisonment. To effectively ensure compliance, the Zimbabwe Parks and Wildlife Management Authority deployed a permanent team of officers based at all ports of exit and entry to assist border control officials in monitoring and inspection of all wildlife exports.
- SI 26 of 1998: The regulation provides for the monitoring of all hunting activities in the country to ensure compliance by all Safari Operators and international clients and to ensure that the TR2 Form. (Tourism Hunting Return Form) is duly completed.
- Trapping of Animals (Control) Act Chapter 20:21: The Act provides for the control, restriction and regulation of the construction, possession and use of certain traps for the purpose of trapping animals; to control the sale and disposal of certain animals, to include lions and to provide for matters incidental to or connected with the foregoing.
- SI 92 of 1992: Parks and Wild Life (Payment for Hunting of Animals and Fish) Notice, 2009: This instrument provides for compensation values of various wildlife forms to include animals and fish. It acts as an additional deterrent measure in matters where poaching cases are being dealt with in accordance with the law. The compensation value for illegal hunting of lion is USD 5 000, 00.
- SI 93 of 2009: Parks and Wild Life (Payment for Trapping of Wild Animals) Notice, 2009. This instrument provides for the payment of compensation to the state or game owners in the event that one is convicted for illegally trapping wild animals on various land categories. The compensation value for illegal hunting of lion is USD 5 000, 00.
- SI 40 Of 1994: Parks and Wildlife (Appropriate Authorities for Communal Land) Notice, 1994. This SI facilitates the granting of Appropriate Authority status to various Rural District Councils. This legislation devolved authority to Rural District Councils and gave rights to local communities to sustainable utilize wildlife and other natural resources in their areas of jurisdiction.

11.2.4 The Rural District Councils Act Chapter [29:13] 2002

The Rural District Councils Act is important in the wildlife sector as it provides for a legal entity (in Communal Lands) responsible for wildlife resources. Since the land in Communal areas is not privately owned by the communities and given that most of the communities do not constitute a legal entity, the Appropriate Authority status is conferred to the Rural District Councils (RDCs). Thus the RDCs act as custodians of the wildlife resources on behalf of the communities.

Efforts are now underway in some areas to form Community Development Trusts. There is scope for these Community Development Trusts to be used as vehicles to further devolve authority from the District level to the sub-district level, which will provide more income at a community level and therefore increase conservation support from the community as they will have a true vested interest.

The feasibility of granting Appropriate Authority to these Trusts in Zimbabwe needs to be assessed and piloted. The major challenge with these Trusts is that of financial sustainability as they do not have adequate funds to cater for their activities. Capacity-building of all Trust members is also a key requirement to ensure institutional sustainability.

In the Rural District Councils Act, there are three key terms that will be described further: Ward, Ward Development Committee and Communal Land. According to the Act, a "Ward" (an administrative unit) means a ward into which a council area is divided or re-divided. Several villages make up a ward. In the Act, a "Ward Development Committee" means a village development committee established in terms of Section 58 of the Act. A Ward Committee is made up of members who are elected from the community to represent the community in discussions/meetings with the Rural District Council. The Act further defines three different types of Wards. These are, Commercial Ward, Communal Ward and Resettlement Ward. The Commercial Ward is a large-scale commercial ward or a small-scale commercial ward. A Communal Ward is a ward consisting wholly or mainly of Communal Land. A Resettlement Ward is a ward consisting wholly or mainly of Communal Land (as in the case of the Communal Ward). It is important to establish whether in practice, the RDCs make
this distinction of the wards or whether they are all considered simply just as wards.

The "Communal Land" is defined as any land that is Communal Land in terms of the Communal Land Act [Chapter 20:04]; and any other land that was within the area of a district council on the 19th August 1988.

11.2.5 The Forest Act of 1948

This Act establishes the Forestry Commission and places demarcated forests under its control. The commission is responsible for the control, management and exploitation of state forests including the leasing of timber harvesting rights. The Act also gives the Minister the power to regulate the commercial use of timber from indigenous trees on other land.

As the appropriate authority for the Forest Areas, the Commission is also responsible for the management and conservation

11.3 Annex III: Analysis of Total Revenue by Country of Destination

Destination	2014	2015	Total
United States	$14,485,835	$11,942,785	$26,428,620
Russian Federation	$1,444,729	$861,925	$2,306,654
China	$1,416,196	$441,759	$1,857,955
Germany	$1,100,534	$698,450	$1,798,984
Canada	$620,852	$474,935	$1,095,787
South Africa	$513,070	$576,035	$1,089,105
France	$825,975	$158,291	$984,266
Australia	$671,527	$259,136	$930,663
Spain	$488,616	$321,064	$809,680
Austria	$519,322	$201,073	$720,395
India	$302,653	$241,741	$544,394
United Kingdom	$357,317	$183,888	$541,205
Italy	$181,956	$343,197	$525,153
Hungary	$418,824	$104,262	$523,086
Mexico	$252,263	$266,543	$518,806

Destination	2014	2015	Total
Norway	$300,645	$119,831	$420,476
Denmark	$132,690	$194,435	$327,125
Switzerland	$171,991	$123,828	$295,819
Sweden	$196,575	$80,014	$276,589
Ukraine	$80,432	$163,604	$244,036
Czech Republic	$104,450	$137,456	$241,906
Neatherlands	$89,042	$105,227	$194,269
Nigeria	$171,830	$0	$171,830
Bulgaria	$21,865	$123,469	$145,334
Argentina	$106,529	$24,888	$131,417
Finland	$65,768	$63,223	$128,991
Brazil	$56,785	$59,886	$116,671
Honduras	$104,683	$0	$104,683
Poland	$38,911	$62,015	$100,926
New Zealand	$17,880	$81,127	$99,007
Mauritius	$56,225	$36,945	$93,170
Chile	$91,374	$0	$91,374
Belgium	$9,340	$80,355	$89,695
Portugal	$78,470	$0	$78,470
Columbia	$77,944	$0	$77,944
Slovakia	$69,420	$0	$69,420
Botswana	$59,401	$0	$59,401
Pakistan	$54,208	$0	$54,208
Namibia	$20,298	$18,862	$39,160
Latvia	$37,611	$0	$37,611
Estonia	$12,078	$23,586	$35,664
Slovenia	$20,620	$11,200	$31,820
Kenya	$14,302	$16,957	$31,259
Dominican Republic	$30,463	$0	$30,463
Belarus	$0	$29,430	$29,430
Kazakhstan	$0	$28,460	$28,460
Romania	$0	$20,112	$20,112
United Arab Emirates	$19,629	$0	$19,629
Lao Peoples Democratic Republic	$15,000	$0	$15,000
Bolivia	$0	$11,553	$11,553
Lithuania	$9,164	$0	$9,164
Costa Rica	$5,900	$0	$5,900
Qatar	$4,896	$0	$4,896
Grand Total	**$25,946,088**	**$18,691,547**	**$44,637,635**

11.4 ANNEX IV: ANALYSIS OF TOTAL REVENUE BY SPECIES

Species	$2,014	$2,015	Total	2015 Quota	Utilised	% Utilised
Buffalo	$2,528,559	$1,962,570	$4,491,129	1,635	482	29%
Elephant (Tusks)	$2,042,610	$1,447,090	$3,489,700	246	64	26%
Elephant (Tuskless)	$1,444,040	$229,860	$1,673,900	462	113	24%
Lion	$630,950	$753,000	$1,383,950	82	49	59%
Leopard	$714,100	$668,490	$1,382,590	530	151	28%
Zebra	$594,239	$555,744	$1,149,983	2,480	600	24%
Sable	$456,615	$309,260	$765,875	718	78	11%
Kudu	$341,092	$357,963	$699,055	2,503	289	12%
Waterbuck	$293,903	$256,133	$550,036	988	156	16%
Hippo	$310,321	$217,470	$527,791	303	83	27%
Impala	$277,198	$242,624	$519,822	8,594	1,261	15%
Crocodile	$284,650	$202,705	$487,355	211	70	33%
Eland	$179,470	$187,990	$367,460	1,659	132	8%
Wildebeest	$180,665	$170,350	$351,015	2,189	220	10%
Giraffe	$158,385	$157,410	$315,795	880	135	15%
Nyala	$130,840	$117,175	$248,015	174	38	22%
Bushbuck	$116,011	$94,936	$210,947	1,082	125	12%
Warthog	$98,975	$89,820	$188,795	3,060	208	7%
Hyeana	$75,648	$54,503	$130,151	1,702	118	7%
Klipspringer	$44,130	$40,441	$84,571	823	59	7%
Bush Pig	$18,226	$30,370	$48,596	1,972	69	3%
Tsessebe	$19,800	$19,500	$39,300	186	15	8%
Baboon	$24,909	$13,664	$38,573	8,017	264	3%
Reedbuck	$23,265	$12,731	$35,996	371	20	5%
Steenbok	$13,790	$15,070	$28,860	927	31	3%
Jackal	$9,656	$15,889	$25,545	2,179	105	5%
Civet	$8,850	$11,368	$20,218	1,034	29	3%
Grysbok	$9,435	$8,585	$18,020	632	31	5%
Eland	$16,750	$0	$16,750	1,659	132	8%
Genet	$6,020	$14,183	$20,203	1,136	38	3%
Duiker, Grey	$2,774	$12,523	$15,297	2,005	53	3%
Duiker, Blue	$7,991	$0	$7,991	-	-	-
Honey Badger	$3,681	$3,625	$7,306	622	15	2%
Wild Cat	$3,160	$4,180	$7,340	812	19	2%
Guinea Fowl	$5,496	$968	$6,464	29,174	121	0%
Porcupine	$4,123	$1,473	$5,596	857	9	1%
Serval	$2,670	$2,410	$5,080	536	6	1%
Egyptian Goose	$3,025	$60	$3,085	4	-	0%
Cheetah	$2,560	$0	$2,560	42	-	0%
Ant Bear	$900	$1,651	$2,551	39	6	15%
Francolin	$1,166	$609	$1,775	22,449	109	0.5%

Species	2014	2015	Total	2015 Quota	Utilised	% Utilised
Dove	$1,321	$418	$1,739	34,485	63	0.2%
Monkey, Vervet	$885	$800	$1,685	3,677	15	0.4%
Ostrich	$1,200	$0	$1,200	14	-	0%
Mongoose	$508	$690	$1,198	279	3	1%
Sandgrouse	$456	$688	$1,144	8,088	78	1%
Oribi	$500	$500	$1,000	82	2	2%
Duiker, Red	$950	$0	$950	-	-	-
Caracal	$900	$0	$900	351	-	0%
Bushbaby	$850	$0	$850	-	-	-
Bontebok	$700	$0	$700	-	-	-
Waterfowl	$0	$400	$400	40	2	5%
Springhare	$60	$120	$180	-	-	-
Gemsbok	$105	$0	$105	6	-	0%
Hyrax	$75	$20	$95	371	1	0.3%
Duck	$29	$20	$49	10,779	13	0.1%
Aardwolf	$0	$0	$0	-	-	-
Blesbok	$0	$0	$0	40		0%
Rabbit	$0	$0	$0	252	-	0%
Hare	$0	$0	$0	138	3	2%
Lichtenstein's Hartebeest	$0	$0	$0	5	-	0%
Red Hartebeest	$0	$0	$0	7	-	0%
Grand Total	**$11,099,187**	**$8,288,049**	**$19,387,236**			

Republic of Zimbabwe

Enhancement and Non-Detrimental Findings for

Panthera leo in Zimbabwe

Zimbabwe Parks and Wildlife Management Authority



October 2016

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1 INTRODUCTION

The United States Fish and Wildlife Service (USFWLS) made a ruling in terms of its Endangered Species Act of 1973 (ESA) that the status of the southern and eastern African lion subspecies (*Panthera leo melanochaita*) is threatened (see http://www.regulations.gov). This ruling, which came into effect on January 22, 2016, now requires that the importation of all trophy lion from Zimbabwe will require an import permit. The decision whether to issue an import permit will in future be based on a Non-Detrimental Finding (NDF) that takes into consideration four main factors outlined under 50 CFR 17.22 and 17.32. These are:

- What direct and indirect impacts would occur on the wild population?
- Would issuing a permit conflict with any known programs intended to conserve the species?
- Would the purposes of the permit reduce the threat of extinction facing the species?
- What are the opinions of experts?

In addition to these factors USFWLS will also take into consideration the IUCN Species Survival Commission (SSC) *Guiding Principles on Trophy Hunting as a Tool for Creating Conservation Incentives, Ver. 1.0* (IUCN/SSC 2012). This document identifies five guiding principles of a hunting program that creates "*incentives for the conservation of species and their habitats and for the equitable sharing of the benefits of use of natural resources*" and recognizes that trophy hunting can contribute to biodiversity conservation and the conservation of the hunted species.

These are:

- **Biological sustainability** i.e. the hunting program:
    - Cannot contribute to the long-term decline of the hunted species
    - It should not alter natural selection and ecological function of the hunted species or any other species that share the habitat
    - It should not inadvertently facilitate poaching or illegal trade in wildlife by acting as a cover for such illegal activities
    - It should also not manipulate the ecosystem or its component elements in a way that alters the native biodiversity.

- **Net Conservation Benefit** i.e. the biologically sustainable hunting program should be:
    - Based on laws, regulations, and scientifically based quotas, established with local input, that are transparent and periodically reviewed
    - It should produce income, employment, and other benefits to create incentives for reducing the pressure on the target species
    - It should create benefits for local residents to co-exist with the target species and other species

- **Socio-Economic-Cultural Benefit** i.e. a well-managed hunting program can serve as a conservation tool when:
    - It respects the local cultural values and practices
    - It involves and benefits residents in an equitable manner
    - It adopts business practices that promote long-term economic sustainability

- **Adaptive Management: Planning, Monitoring, and Reporting** i.e. can the hunting programme enhance the species when it is based on appropriate resource assessments and monitoring (e.g., population counts, trend data), upon which specific science-based quotas can be established. Resource assessments should be objective, well documented, and use

the best science available. Adaptive management of quotas, based on the results of resource assessments and monitoring, is essential

- **Accountable and Effective Governance** i.e. a biologically sustainable trophy-hunting program should be subject to a governance structure that clearly allocates management responsibilities. The program should account for revenues in a transparent manner and distribute net revenues to conservation and community beneficiaries, and take steps when needed to eliminate corruption and ensure compliance with national and international requirements and regulations.

To address the points raised above, a systematic review of the status of lion in Zimbabwe has been undertaken with the full cooperation of stakeholders from the Government, Private Hunting Sector, Community NGOs and research organisations to demonstrate that the lion populations in Zimbabwe are being managed sustainably for benefit of both the conservation of the species and that the management programme is also providing economic incentives for local communities to protect and expand lion habitats. In doing so this assessment addresses the following issues:

- That the Zimbabwe hunting industry is based on sound scientific information and identifies mechanisms that would arrest the loss of habitat or increase available habitat (where feasible) and ensuring adequate protection from human encroachment.
- Demonstrate that there are government incentives in place to encourage habitat protection by private landowners and communities and incentives to local communities to reduce human-wildlife conflicts.
- Demonstrate that hunting concessions are managed to ensure the long-term survival of the listed species and its habitat.
- That trophy hunting provides financial assistance to the Zimbabwe Parks and Wildlife Management Authority, including the communal CAMPFIRE programme and private sector, to carry out various wildlife management programmes. It will also highlight how local communities directly and indirectly benefit from the presence of lion in their areas.
- Finally, this document will demonstrate how the participation of U.S. hunters in the Zimbabwe hunting industry contribute to the overall management of lion within the country.

2 Status and Distribution of Lion in Zimbabwe

Bauer et al (2015) summarise time series data for 47 lion populations across West, Central, East and Southern Africa where regular survey data are available. Using a Bayesian state space model to estimate growth rate-λ for each population, this study concludes that lion populations are declining everywhere across Africa, except in four southern countries (Botswana, Namibia, South Africa, and Zimbabwe). The population models indicate a 67% chance that lions in West and Central Africa will decline by one half, while estimating a 37% chance that lions in East Africa will also decline by one-half over two decades. It is concluded that almost all lion populations that historically exceeded ~500 individuals are declining, *but lion conservation is successful in southern Africa, in part because of the proliferation of reintroduced lions in small, fenced, intensively managed, and funded reserves.* This statement reflects the situation in Zimbabwe where lion populations in the conservancies have flourished under sound management regimes. They have also recovered rapidly in instances where appropriate actions have been taken to arrest unsustainable practices (i.e. Hwange) and where protected areas are receiving adequate funding (i.e. Gonarezhou).

2.1 The extent of lion distribution in Zimbabwe

The Zimbabwe Parks and Wildlife Management Authority (ZPWMA) is responsible for managing one of the largest estates in the country which constitutes approximately 5 million hectares of land or 13%

of the Zimbabwe's total land area (see Table 1 below). The bulk of Zimbabwe's wildlife occurs within the Parks Estate which includes 11 national parks, 16 safari areas, 16 recreational parks, 6 sanctuaries, 12 botanical reserves and 3 botanical gardens, all spread across the country, among other wildlife tourism related activities (Parks and Wildlife Act 2001 Chapter 20:14).

Wildlife populations also occur on the state Forest Areas, Communal CAMPFIRE areas and private conservancies dedicated to wildlife-based land use (Figure 1). Table 1 below provides a summary of these different categories, and whether they support lion populations (see Annex 1 for the details of each area).

Table 1. Summary of the National Parks Estate, CAMPFIRE, Forestry and Conservancies where lion populations are resident

Land Category		**Presence of Lion**				**Total (ha)**	**Total (km^2)**
		Yes (ha)	**%**	**No (Ha)**	**Migratory (Ha)**		
Parks Estate	National Parks	2,608,710	96	61,850	47,150	2,717,710	27,177
	Safari Area	1,745,300	92	146,600	-	1,891,900	18,919
	Botanical gardens	-	-	2,069	-	2,069	21
	Sanctuary	-	-	18,980	-	18,980	190
	Recreational	-	-	357,161	-	357,161	3,572
Forestry		436,165	47	491,701	-	927,866	9,279
CAMPFIRE		8,953,700	36	5,435,100	10,319,000	24,707,800	247,078
Private Conservancies		758,200	66	243,500	150,897	1,152,597	11,526
Matetsi Farms		-	-	-	155,627	155,627	1,556
Total Ha		**14,502,075**		**6,756,961**	**10,672,674**	**31,931,710**	**319,317**
Total km^2		**145,021**		**67,570**	**106,727**	**319,317**	
Percentage		**45%**		**21%**	**33%**		

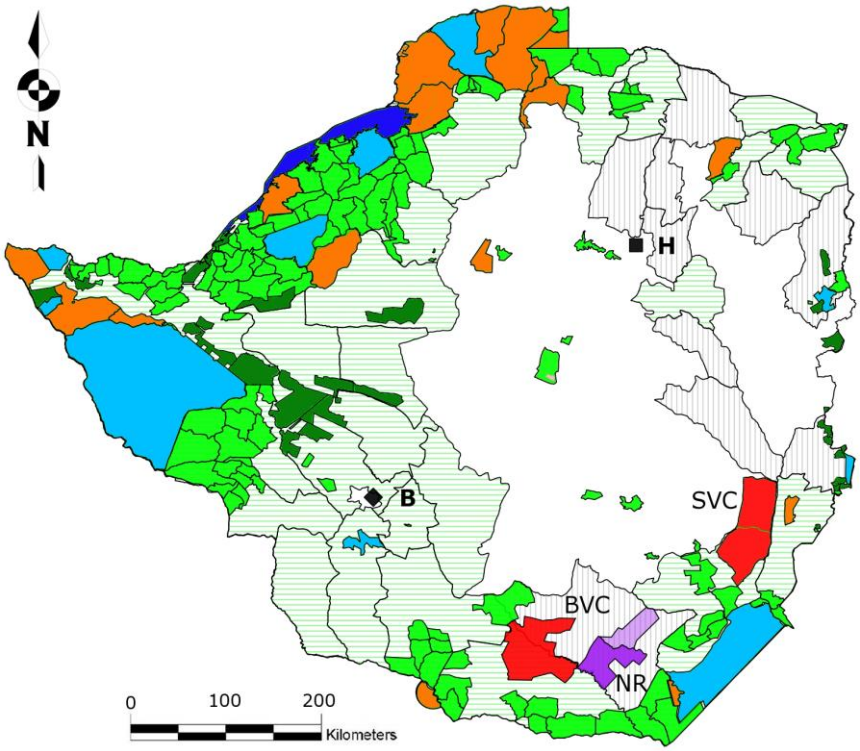


Figure 1: Map of Zimbabwe's main wildlife areas: [i] National Parks are represented in light blue; [ii] Safari areas are represented in orange; [iii] Forestry areas are represented in dark green; [iv] Community and Private wildlife areas are represented in light green; [v] Communal Land (CAMPFIRE Areas) in which sport-hunting may occur is represented by light green horizontal stripes; [vi] Communal Land in which sport-hunting does not occur is represented by grey vertical stripes. [vii] The Bubye Valley [BVC] and Savé Valley [SVC] Conservancies are represented in red. [viii] The Nuanetsi Ranch [NR] on which sport-hunting takes place is represented in dark purple (light purple represents the Nuanetsi Ranch cattle area); [ix] Lake Kariba is represented in dark blue. Harare (the capital city) is represented by a black square and letter '**H**'. Bulawayo is represented by a black diamond and letter '**B**'. Sport-hunting may occur in areas: ii, iii, iv, v, vii & viii (from du Preez, B. Groom, R., Mufute, O., Mandisodza-Chikerema, R. and Booth, V. (2016).

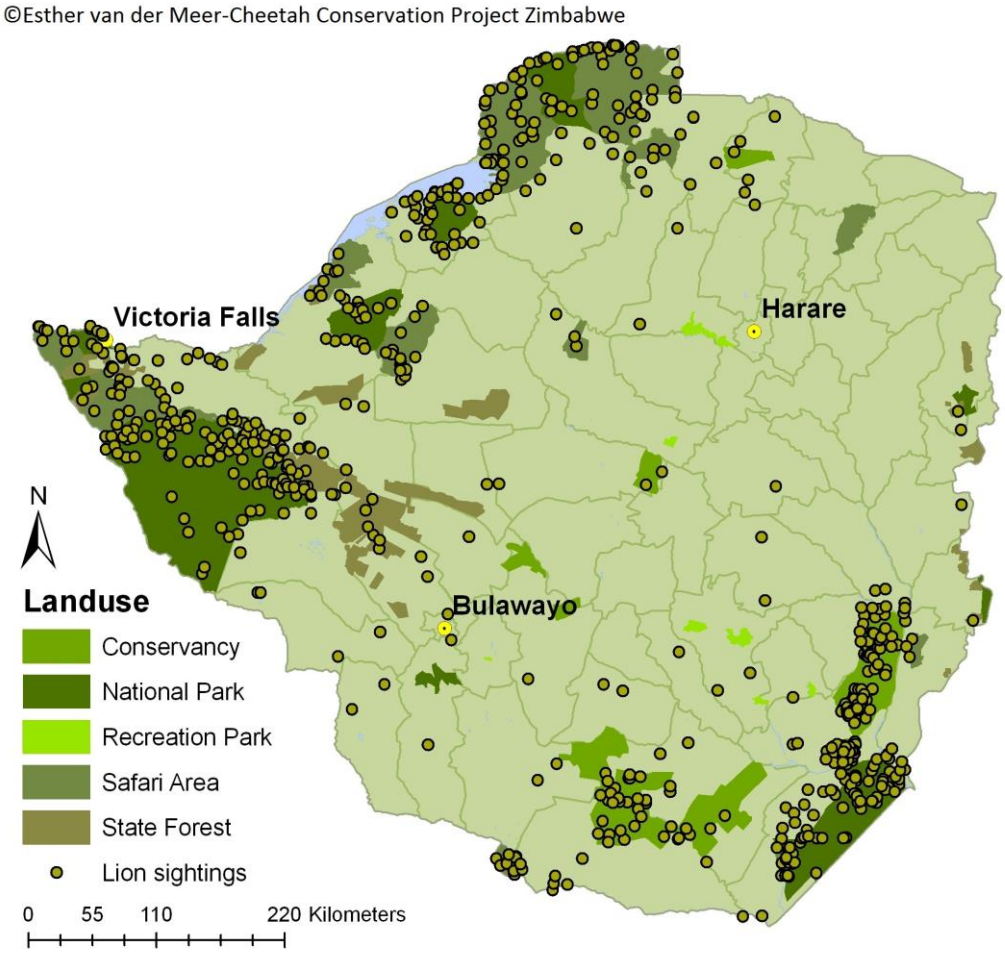


Figure 2: Range of African Lion Distribution in Zimbabwe

There are approximately 319,317 km^2 of land where some form of wildlife based land use is practiced in Zimbabwe. Lion occur permanently in 45% of this available range (c. 145,00km^2), with the majority occurring in State protected national parks (96%) and safari areas (92%). Lion also occur permanently in 47% of the State forest areas and 66% of privately owned Conservancies. The CAMPFIRE areas comprise approximately 247,000km^2 and lion occur in 36% of these areas. Lion are transient in CAMPFIRE, Conservancy and resettled areas adjacent to the major protected areas, and move across the border into Zambia, Mozambique, South Africa and Botswana (Figure 2).

There are two established Transfrontier Conservation Areas (TFCAs), the Great Limpopo Transfrontier Park (GLTP) which includes Gonarezhou National Park, and the Limpopo/Shashe TFCA. Other TFCAs that are at various stages of development are the Kavango-Zambezi (KAZA), Lower Zambezi-Mana Pools, Zimbabwe-Mozambique-Zambia (ZiMoZa) and Chimanimani.

2.2 Minimum population of lion in Zimbabwe

The minimum number lion that occur in approximately 51,642km^2 of land where reliable survey data are available is estimated to be c.1,917 (range 1,800 – 2,000) and is summarised in Table 2. The Western sector of the country dominated by Hwange National Park and the surrounding safari areas, forest areas, communal areas and private conservancies supports c.737 lion (or 38% of the overall population). The Southern sector dominated by the two major conservancies (Save and Bubye) and

Gonarezhou National Park supports c. 896 lions (48%) while the Central and Northern sectors of the country support c.284 lions (15%).

Table 2: Estimated minimum population of Wild Lion populations in Zimbabwe – September 2016 (Data compiled from a variety of reports)

REGION	AREA	AREA (km^2)	Estimated Number of Lions	Percentage
Western	Hwange NP	14,900	559	38%
	Matetsi Units 1-5	1,934	59	
	Matetsi Units 6-7 and Zambezi NP	1,585	67	
	Kazuma Pan NP	313	20	
	Kazuma Forest	240		
	Panda Masuie Forest	355		
	Matetsi ECA	1,556	15	
	Ngamo and Sikumi Forest	1,386	6	
	Gwaai Conservancy	927	22	
	Hwange Communal Land	392	2	
	Tsholotsho buffer adjacent HNP	1,275	7	
Subtotal		**24,863**	**737**	
Central	Chizarira NP	1,948	31	4%
	Chirisa SA	1,713		
	Omay	1,865	10	
	Matusadona NP	1,427	31	
Subtotal		**6,953**	**72**	
Northern	Chewore North and South	1,648	45	11%
	Dande	1,155	21	
	Hurungwe (Nyakasanga and Rifa)	1,709	32	
	Charara/Mukuti	1,692	20	
	Mana Pools	1,287	94	
Subtotal		**7,491**	**212**	
Southern	Gonarezhou National Park	5,053	125	48%
	Malilangwe	400	37	
	Bubye Valley Conservancy	3,440	450	
	Save	3,442	284	
Subtotal		**12,335**	**896**	
Overall Total		**51,642**	**1,917**	

2.2.1 Captive Breeding Facilities

Currently there are only two properties registered as captive lion breeders (Lion and Cheetah Park, and Antelope Park) and < 10 non-registered captive lion breeding operations (Table 3). Most of these centres keep lions for non-consumptive tourism and environmental education purposes with only a few keeping lions as pets. Altogether there are 345 lions held in captivity.

Table 3: Record of lions held in captivity – September 2016

Property	TOTAL
Doddieburn	13
Lion & Cheetah Park	40
Sentinel	2
Vhuka	5
Antelope Park	114
Safari Par, Masuwi Lodge (Lion Encounter)	4
Mhondoro Game Park	2
Chedgelow Farm	9
Chengeta	5
Turk Mine	6
Bally Vaughan	8
Mwanga Lodge	8
Masvingo	17
Karoi	2
Oscro	10
Simply Wild	19
Sondelani	9
Ruwazi	7
Imire	2
Makado Ranch	2
Chipangali	32
Crocodile Farm, Victoria Falls	1
Kuimba Shiri	2
Pamuzinda	6
Shearwater	10
Inyathi Ecogame Park	10
Total	**345**

3 Conservation and Management

3.1 Policy And Legislation

The Ministry of Environment, Water and Climate has a comprehensive suite of policies and legislation that provides the Zimbabwe Parks and Wildlife Management Authority (ZPWMA) with a mandate to conserve and protect all fauna and flora in the country.

The legal framework is enshrined in the National Legislation and associated Regulations that are informed by the Wildlife Policy (1992) that seeks to maintain a protected area network for the conservation of the nation's wild resources and biological diversity. Amongst others it seeks to create

economic activity to enhance rural development and encourages the conservation of wild animals and their habitats outside the protected areas.

The ZPWMA is established by the Parks and Wildlife Act of 1996 (Chapter 20:14) as amended by Act Number 19 of 2001 which came into operation on the 1st of June 2002 through a Statutory Instrument 144C of 2002. The Act provides for the:

- Establishment of a Parks and Wildlife Board;
- Confers functions and imposes duties on the Board;
- Establishment of national parks, botanical reserves, botanical gardens, sanctuaries, safari areas and recreational parks;
- The preservation, conservation, propagation or control of wildlife, fish, and plants of Zimbabwe and the protection of her natural landscape and scenery;
- Conferment of privileges on owners and occupiers of alienated land as custodians of wildlife, fish and plants;
- Giving of certain powers to environment committees (formerly intensive conservation area committees); and matters incidental to or connected with the foregoing.

The Act that was originally passed by Parliament in 1975 was unique in that it provided a legal basis for the devolution of Authority to private landowners over all wildlife on their land which resulted in in the rapid development of the country's wild life industry. It also paved the way for the partial extension of this principle to the Communal Lands through the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) in the 1980s that granted Appropriate Authority Status to the communal areas to manage the wildlife resources for their own benefit.

The Act was subsequently revised in 1996 and 2001 with the latest revision paving the way for the establishment of the current Parks and Wild Life Management Authority to replace the former Department of National Parks and Wild Life Management.

The legal and regulation framework applicable to the conservation and protection of lion and all other species includes:

- Parks and Wildlife Act; Chapter 20:14 (1996) as amended in 2001.
- Environmental Management Act; Chapter 20:27.
- Forest Act; Chapter 19:05.
- Statutory Instrument 362 of 1990: Parks and Wildlife (General) Regulations, 1990.
- Statutory Instrument 76 of 1998: Import and Export of Wildlife Products.
- Statutory Instrument 40 of 1994: Parks and Wildlife Act (General) Amendments.
- Statutory Instrument 26 of 1998: Parks & Wildlife Act (General) Amendment.
- Statutory Instrument 92 of 2009: Compensation Values for Wildlife.
- Statutory Instrument 93 of 2009: Compensation Values for Trapping of Animals.
- Trapping of Animals Control Act 20.16.

A summary overview of these instruments is provided in Annex II.

3.2 The Zimbabwe Parks and Wildlife Management Authority

The Parks and Wildlife Management Authority is mandated by the Parks and Wildlife Act [Chapter 20:14] with the responsibility of conserving Zimbabwe's wildlife heritage through effective, efficient and sustainable protection and utilisation of natural resources for the benefit of present and future generations. The Authority was established to allow it to retain the revenue that it generates for

funding its operations and thereby reducing its dependence on Treasury. This entailed introducing a commercial dispensation and putting in place effective revenue generation and financial management systems.

The ZPWMA has the mandate to manage the entire wildlife population of Zimbabwe, whether on state, private and communal land. Vision, mission and core values of ZPWMA are as follows:

Vision: *To be the world leader in sustainable conservation*.

Mission: *To conserve Zimbabwe's wildlife heritage through effective, efficient and sustainable utilisation of natural resources for the benefit of present and future generations and stakeholders*

Core Values: Teamwork, Commitment, Transparency, Professionalism, Integrity, Accountability, Fairness, in harmony with nature.

While private landowners may utilise the wildlife on their land, they are still accountable to the ZPWMA for the welfare of the wildlife in terms of Statutory Instrument 26 of 1998, which, among other things, states that "*No person shall permit any person who is not ordinarily resident in Zimbabwe to hunt on any land for which he is the appropriate authority any animals other than those entered on the authority to hunt…*'

3.3 Conservation Strategy and Action Plan for Lion

A *Conservation Strategy and Action Plan for the Lion (Panthera leo) in Zimbabwe* was prepared in 2006 by the ZPWMA, local and international NGOs. This was in response to the proposal submitted by Kenya at the 13th Conference of the Parties to the Convention on International Trade in Endangered Species of Flora and Fauna (CITES) calling for the transfer of the lion population from Appendix II to Appendix I. The Parties recommended a detailed examination of the issues surrounding the conservation of the African lion, through a series of regional workshops.

IUCN responded to this and together with other key stakeholders, organised the first workshop in 2005 which involved the 14 West and Central African lion range states. The second workshop brought together 15 lion range states from Eastern and Southern African in January 2006 (Bauer, Chardonnet and Nowell, 2005). Each workshop included the Directors of Wildlife Conservation Departments and their technical advisors, safari operators, community leaders, non-governmental organisations involved in conservation, as well as researchers on the African lion.

The workshops came up with several recommendations which included:

- The need for African lion range States to follow up the workshops by developing and implementing national lion management plans.
- The need for a Pan African Conservation strategy to form the basis of a region wide collaboration in the conservation of the lion and which would also form the basis for the management of other wildlife species on regional scale.

Responding to the first recommendation, the ZPWMA, together with IUCN, convened a workshop in November 2006 to develop a national lion conservation strategy and action plan for Zimbabwe attended by conservation NGOs, the private sector, and Rural District Councils (RDCs), as well as ZPWMA and IUCN (Conservation Strategy and Action plan for the Lion (*Panthera leo*) In Zimbabwe, 2006).

The deliberations of this workshop identified the following issues related to lion conservation in Zimbabwe:

- Management and research including technical advice, policy formulation and management interventions
- Capacity needs as reflected by adequate human, financial and material resources
- Mitigation of human-wildlife conflict
- Socio-economic costs and benefits of long-term lion conservation
- Communication and information dissemination for key decision makers at different levels
- Framework for captive breeding of lions
- Trade and regulations to ensure non-detriment findings related to trade in all lion related products
- Regional collaboration to strengthen bilateral and regional lion conservation strategies

The analysis of these issues led to the formulation of the conservation strategy whose vision is that *Lions (*are*) conserved and managed sustainably for their aesthetic, cultural and ecological values, and the socio-economic development of Zimbabwe*. The immediate objective of this strategy is *to secure and where possible, restore as many viable lion populations as possible in Zimbabwe whilst mitigating their negative impacts and enhancing their value for the benefit of people through sustainable use*.

Three broad targets were identified to achieve this objective:

1. Ensure the persistence of key lion populations and other important populations including those of doubtful viability;
2. Human and livestock loss reduced, and
3. Optimize wildlife conservation-related net benefits to local communities

Table 4 summaries the progress with achieving the results identified in the strategy:

Table 4: Summary of implementation progress of the 2006 lion conservation strategy.

Output 1. Lion Management - Lion populations, their habitats and wild prey effectively conserved and managed in collaboration with local stakeholders	
Target 1.1 Establish a baseline survey and monitoring programme for identified lion populations and their range inside and outside the Parks & Wildlife Estate	Baseline surveys have been completed for the Parks Estate using monitoring protocols for key variables (populations, habitats, prey). Selected surveys undertaken of areas outside National Parks in conservancies and some communal land and forest areas.
Target 1.2 Maintain and strengthen capacity for lion conservation, management, monitoring and research within PWMA and amongst other key stakeholders	Carnivore research programmes undertaken by NGOs (Mana, Matusadona, Gonarezhou, Zambezi and Hwange NPs, Matetsi, Chirisa SA) and research institutions (Bubye and Save Conservancies) in various parts of the country. Personnel trained in data collection and capture, management, lion aging and analysis.
Target 1.3 Identify and implement best management standards and practice for all trophy hunted lion populations, ensuring their viability and sustainable, equitable and adaptively managed trophy quotas	Quota setting methodology reviewed and annual quotas and offtakes analysed considering population changes, trophy quality and levels of PAC over time. Trophy hunting database in place and in process of being refined to provide cost-effective system for collation, entry, analysis, reporting and feedback to key stakeholders in the wildlife industry (ZPWMA, RDCs, SOAZ, ZPHGA, conservation NGOs, Researchers etc.). System of fixed and optional quotas reviewed and age-based criteria for male trophy animals in place and functioning.
Target 1.4 Develop and implement a national lion captive breeding management policy	Policy in place (see discussion below).
Target 1.5 Develop and implement co-management frameworks for wildlife management	Collaborative national lion action plans to co-management lion populations in place for NW Matabeleland and SE Lowveld, including three conservancies (Bubye Valley, Save and Malilangwe).
Target 1.6 The geographic distribution range of the lion population expanded	Conservancies and neighbouring communities are working together to maintain existing geographic distribution of lion populations. Zimbabwe proactive in the KAZA and GLTFCA programmes.
Output 2. Lion Research - Information for effective and adaptive lion conservation management generated	
Target 2.1 Initiate targeted research on lion ecology, management and mitigation of conflict	Extensive research programmes focussing on lion ecology and biology undertaken in Hwange, Bubye, Save, Malilangwe, Matusadona, Chizarira and Chirisa. ZPWMA have cooperated with NGOs, such as Panthera, to develop cost-effective age determination methods for lions. Key threats to lion populations, with focus on human-lion conflict, snaring and poisoning, undertaken and continually monitored.
Output 3. Mitigation - Human-lion related conflicts minimized and, where possible, eliminated	

Target 3.1 Develop and establish databases on lion/human conflict	Data on Problem Animal Control (PAC) reports on lion related problems collated.
Target 3.2 Identify and implement methods to reduce and mitigate livestock losses and lion attacks on humans	Approaches to mitigate livestock losses and lion attacks on humans being tested and implemented in Hwange. Methods to mitigate lion attacks on livestock being implemented as appropriate at selected sites (e.g. Tsholotsho).
Target 3.3 Trained and properly staffed PAC Units established to conduct rapid response, restrained and precisely targeted problem animal control	PAC Units at ZPWMA field station and/or RDC levels partially established.
Target 3.4 Incidents of human-lion conflict reduced by at least 30% in 5 years while also reducing retaliatory killing	Specific awareness and education package on lion conservation and management developed and implemented in Matusadona, Hwange and Gonarezhou regions.
Output 4. Socio- Economic - The costs and benefits of long-term lion management equitably distributed	
Target 4.1 Complete an inventory of stakeholders directly affected by lion conservation	Stakeholder groups (e.g. local communities, CAMPFIRE RDC representatives, commercial safari hunting operators (SOAZ, ZPHGA), tourism operators (ZATSO) identified. Financial impacts of lion conservation and extent and magnitude of socio-economic impacts on each stakeholder group completed.
Target 4.2 Deliver appropriate training and capacity building to prioritised stakeholders	Representative stakeholder groups in some regions identified (Hwange, Matusadona, Gonarezhou). Limited training undertaken. Implement adaptive programme across four wildlife regions
Target 4.3 Agree and implement collaboratively developed area-specific lion management plans with identified stakeholder groups in each wildlife region within 5 years	In progress. Hwange NP Management Plan approved.
Target 4.4 Implement transparent mechanisms to equitably distribute lion-related/generated income to identified stakeholders (groups and/or communities)	Scale of income generated from lion conservation reviewed and use of funds to encourage protection of lion populations reach local stakeholders undertaken (see CAMPFIRE generated revenues)
Output 5. Regulations - Effective regulation of consumptive lion utilisation ensured	
Target 5.1 Implement approved policy and practice at national and local levels regarding problem animal control (PAC) of lions within 2 years	Current policy and practice regarding problem animal control of lion reviewed, at national and local levels. PAC offtakes reconciled with trophy hunting quota offtake to ensure that the overall offtake (i.e. total quota) is sustainable.
Output 6. Communication, Awareness and Information Dissemination	

Target 6.1 To carry out awareness programmes in 50% of the districts in Zimbabwe within the next three 3 years	Awareness programmes initiated at a national level, with professional hunters, communities and NGO community. Awareness campaigns being carried out by the Extension and Interpretation Unit in all the regions.
Target 6.2 Create lion conservation and management information units within one year	Databases established at some key research centres using dedicated external research programmes (e.g. WILDCRU).
Output 7. Regional and Trans-Boundary Collaboration	
Target 7.1 Undertake an inventory of national strategies for lion management	Done.
Target 7.2 Encourage the development of national lion conservation strategies where these are missing &/ or incomplete	National lion conservation strategies discussed at AWCF (meeting held under auspices of KAZA).
Target 7.3 Develop an integrated and harmonised lion management strategy for Transfrontier Conservation Areas (TFCAs)	Lion conservation strategies for SADC discussed at AWCF meeting held under auspices of KAZA.
Target 7.4 Implement lion conservation strategy and management plan	Strategy under review.

3.3.1 National Lion Captive Breeding Policy

A target of the Conservation Strategy and Action Plan for the Lion in Zimbabwe was to develop and implement a National Lion Captive Breeding Management Policy. This was achieved in 2011 when the ZPWMA met with lion breeders, keepers and animal welfare organizations to define the purpose of breeding and keeping lions; identify and discuss issues related to breeding and keeping of lions in captivity and to chart the way forward on the breeding and keeping of lions in captivity.

The objectives of the policy are to provide a national approach and minimum standards to all aspects relating to the management of captive bred lions including the role of captive bred lions upon reaching maturity and regulate the import and export of captive bred lions. The policy also defines the measures to protect the genetic integrity of indigenous lion populations. The use and welfare of captive bred lions is monitored by a captive lion inspection team.

In terms of this policy, lions that are kept in captivity for species conservation and commercial purposes are subject to the following conditions:

1. No permit for the keeping of lions in captivity will be issued before the facility has been inspected and approved by ZPWMA as a Captive Lion Holding Facility.
2. Lions may not be allowed to breed in captivity unless the holding facility is registered as a Captive Lion Breeding Centre. If a breeding permit is not issued, it is the responsibility of the owner to ensure that the animals do not breed. If breeding occurs without a permit the owner will be fined and the animals are subject to confiscation and possible destruction by ZPWMA.
3. Lions may not be captured from the wild population and kept in captivity unless the animal is orphaned or injured and is captured with the purpose of rehabilitating the animal and returning it to the wild within as short a time as possible.
4. Captive bred lions may not be released into the wild or transferred from the facility without prior permission from ZPWMA, and are subject to an approved release plan.

No lion can be transported without the necessary internal and national permits and without being micro-chipped, and all transportation of live animals must comply with CITES Resolution Conf. 10.21(Rev. CoP 14). To safeguard the integrity of the indigenous gene pool, no import permits will be issued for non-indigenous lions. Any lion that are to be transported must be issued a certificate of health by a competent veterinarian confirming that the premises of origin has been free from anthrax, panleukopenia and canine distemper for six months, and that each predator is free from diseases such as FIV, BTB or any other disease which may threaten local populations. The animal should also have been vaccinated for rabies and treated with a broad spectrum de-wormer and acaricide.

It is an offence to export lions from Zimbabwe without a ZPWMA export permit, and all export permit will only be considered if the exporting facility holds a current permit to keep captive lions. Moreover, an export permit will only be issued if the importing facility, in the country of import, conforms to regulations laid out in this policy document.

4 Population Trend Data For Key Lion Populations In Zimbabwe

Zimbabwe has in recent years taken proactive actions to enhance the conservation of lion populations both inside and outside the protected areas. These have included implementing moratoriums on hunting, reducing quotas, implementing an age-based hunting regulation and undertaking independent monitoring programmes conducted by international research institutions. Emerging from this is evidence that by implementing appropriate regulatory, management and monitoring actions, coupled with raising awareness, the lion populations respond rapidly and recover to near

former levels. The section below summarises the data from key range areas both inside and outside the National Parks Estate to substantiate this.

4.1 LION SURVEY TECHNIQUES

The population estimates of lions in Zimbabwe are determined through carnivore spoor surveys, systematic lion collaring and call-up surveys. With the strategy to maintain the wilderness values of most protected areas, there is low road penetration in the parks estates, however all suitable roads are used as transects, and in areas of suitable substrate, spoor surveys have shown to be an effective and efficient means to assess wildlife densities (Stander 1998, Fuston et al. 2001, Davidson and Romanach 2007). Patrol reports, field observations by ZPWMA rangers and other sightings by tour operators and tourists also contribute to the knowledge of the status of lions in Zimbabwe's protected areas. Similarly, the occurrence of lion in Safari Areas is recorded by resident safari operators, including those operating in CAMPFIRE areas.

4.2 RESULTS OF REGIONAL LION SURVEYS

Lion population surveys provide indices of abundance that can be used to determine spatial distribution, as well as temporal trends in population numbers. The results of the different survey methods are used to generate information for setting sustainable lion trophy hunting quotas and for population management.

4.2.1 Gonarezhou National Park

Spoor count surveys of the Gonarezhou National Park have been conducted since 2009 using the same methodology to obtain direct estimates of lion populations to compared actual lion densities with potential density estimates (Groom, 2009, Groom et. al. 2014). Table 5 below illustrates the growth of the lion population in the Park (Groom and Watermeyer, 2015).

Table 5: Population estimates of lion in the whole of Gonarezhou National Park (extrapolated from survey area) from 2009 – 2015 (Groom and Watermeyer, 2015).

2009	2010	2011	2012	2013	2014	2015
31	45	72	64	77	116	125

As with many lion populations anthropogenic factors can be key drivers of lion population dynamics, and in areas with high human impact lion numbers may be significantly lower than those predicted by prey biomass models. This was found to be the case in the Gonarezhou National Park. Groom et. al. (2014) concluded that high hunting quotas either within or around the protected area were the most likely cause of the low lion numbers, with quotas in some areas being as high as seven lions per 1,000km^2 in some years. Other factors included persecution, poisoning and problem animal control, as well as disease and competition with spotted hyaenas (*Crocuta crocuta*).

Following decisions to halt lion hunting, and reducing human-lion conflict, the lion population responded and steadily increased, reaching a density of 2.5 lions / 100km^2 in 2014 (as compared with 0.6 / 100km^2 in 2009). Relative to other populations (average over Kruger NP, Hwange NP, Selous GR and Serengeti NP = 9.6 lions / 100km^2) this is still low, suggesting the population could continue to increase further. Groom et. al. (2015) conclude that the lack of artificial water in Gonarezhou means that natural carrying capacity will be lower but based on prey biomass availability predictions of lion carrying capacity could support between 200 and 300 lions (Groom 2010). It is therefore still possible that the lion population in the park could at least double before reaching carrying capacity (especially because prey biomass is now greater than it was in 2010 – see Section 8.5 below).

4.2.2 Save Valley Conservancy

The African Wildlife Conservation Fund carries out an annual large carnivore spoor survey to assess population trends of the carnivores in the Savé Valley Conservancy (SVC) to aid management decisions. A standardised methodology is used to ensure consistency through time and comparability with other studies. Since 2008, the spoor surveys have been done using the same roads and the same observer. The results of these surveys are provided in Table 6 showing that the lion population has increased from 40 in 2005 to 284 in 2015 (Groom and Watermeyer, 2015, du Preez et al, 2016).

Table 6: Population estimates of lion in the whole of Savé Valley Conservancy from 2005 – 2015

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
40	50	52	76	114	143	105	130	115	182	284

The lion population has increased substantially in the last two years, and there are now an estimated 284 lions in the whole of the conservancy. This is a notable increase since the 2013 estimate of 115 lions and 2014 estimate of 182, and is perhaps a latent effect of no hunting for over several years. Of the 149 lion tracks encountered, 28% were big adult males with 53% identified as females/juveniles and 15% as young cubs (3% of tracks were unidentified). The number of lions in SVC equates to a density of 11.7 lions/100km². This is slightly higher than other population estimates of 9.6 lions/100km² (average over Kruger, Hwange, Selous and Serengeti).

4.2.3 Bubiana Valley Conservancy

After originally being eradicated by cattle ranchers in the area, 13 lions were reintroduced to the Bubye Valley Conservancy in 1999, and four young males broke into the Conservancy that same year. From the original 17 animals present in 1999, the Bubye Valley Conservancy lion population was estimated at approximately 280 individuals in 2009 when robust population surveys were initiated by a team from the University of Oxford Wildlife Conservation Research Unit (WildCRU), and this population has continued to grow. Today it is estimated that there are over 500 lions on the Bubye Valley Conservancy (Figure 3, du Preez et. al., 2016).

The exponentially increasing Bubye Valley Conservancy lion population currently exists at one of the highest densities in Africa (~0.190 lions/km^2: du Preez et al. 2015, du Preez et al. 2016), greater than that of the Serengeti, Tanzania (0.10 lions/km^2), Selous, Tanzania (0.080 – 0.130 lions/km^2: Creel and Creel 1997), Kruger National Park, South Africa (0.096 – 0.112 lions/km^2: Mills et. al. 1995), and Hwange National Park, Zimbabwe (0.027 lions/km^2: Loveridge et. al. 2007). This equates to the largest contiguous lion population in Zimbabwe.

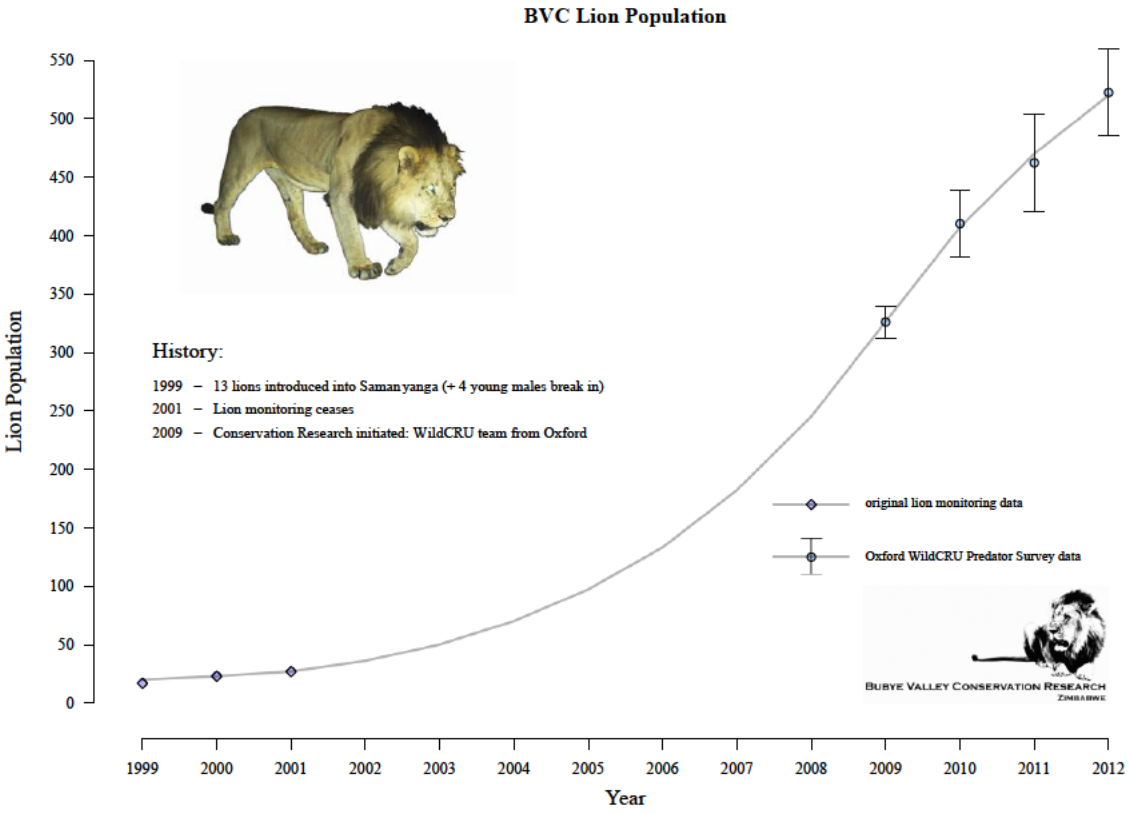


Figure 3: The Bubye Valley Conservancy lion population has increased exponentially since the original reintroduction of the species to the conservancy in 1999.

4.2.4 Mana Pools National Park

In conjunction with ZPWMA, Zambezi Society and the Cheetah Conservation Project, the Wildlife Conservation Research Unit (WILDCRU) based in Oxford (U.K.) conducted a camera trap and spoor count survey of Mana Pools National Park with the objective of:

- To undertake park wide surveys to estimate population density, distribution and habitat occupancy of common predator species in Mana Pools National Park.
- To contribute to Cheetah Conservation Project Zimbabwe's (CCPZ) cheetah monitoring protocol.
- To provide presence/absence data on all the larger mammal species.

A Facebook page was also created for the survey that was regularly updated on the progress of the survey (Facebook.com/Mana Pools Survey 2015).

The preliminary results of this survey identified 67 individual lions from the 267 images captured. When combined with the spoor count surveys, the population was estimated at 94 lions at a density of 4.5 lion/km^2 (Seymour-Smith and Loveridge, 2015),

4.2.5 Hwange National Park

The Hwange Lion Research Project undertaken by the Wildlife Conservation Research Unit (WILDCRU, Oxford University) works in association with the Zimbabwe Parks and Wildlife Management Authority. Since 1999 this project has identified over 600 lions and currently monitors approximately 15 prides and 12 male coalitions in a 5,000km^2 study area. This is one of the most intensive and long-term lion

projects in Africa. A key finding of this research programme has been to demonstrate that the way lion trophy hunting is managed can rapidly improve the status of lion populations by implementing a biologically sustainable system of allocating quotas. This project has also increase the understanding of human related impacts on lion populations (and vice-versa) along the park boundary. More recent research is focussed on understanding connectivity between Hwange NP and other areas such as parks in Botswana and in Zimbabwe.

This project was initiated because there was a perception that levels of sport hunting of male lions' in the hunting concessions surrounding the Hwange National Park were having a negative impact on the conservation of the population (Loveridge, et. al. 2007). Data collected between 1999 and 2004 suggest that this was indeed the case and this contributed to a suspension of sport hunting of lions in the area surrounding the Park between 2005 and 2009. This was a crucial shift in management policy for this species and an important step towards sustainable management and conservation of lions. Following the imposition of the hunting moratorium, lion densities increased (Figure 4).

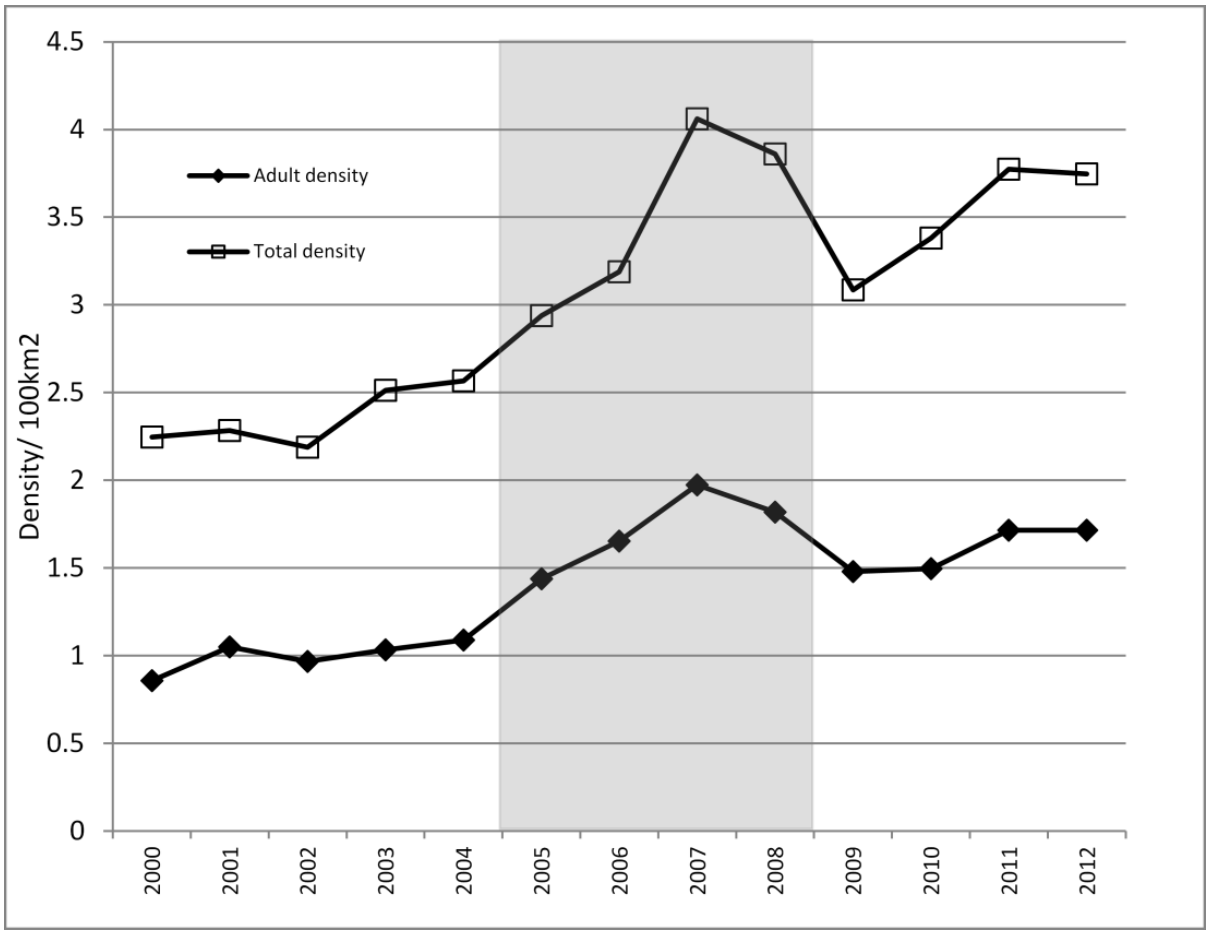


Figure 4: Lion densities in the Hwange area between 2000 and 2012

Following the lifting of the moratorium, and by implementing strict monitoring and hunting guidelines, the overall Hwange lion population has continued to show a positive trend, and is now estimated at over 550 animals.

4.2.6 Zambezi National Park and Units 6 and 7

Victoria Falls Wildlife Trust (VFWT) in collaboration with ZPWMA and the Hwange Lion Research Project has recently completed both spoor count transects and a camera trap surveys in Zambezi National Park, and Units 6 and 7 of the Matetsi Safari Area. The preliminary results of these surveys show that the lion population has increased since 2013 to approximately 67 (Rodger Parry, pers comm.).



Coalition males, Zambezi National Park, June 2016 (*Photo credit: Jessica Dawson, Victoria Falls Wildlife Trust)*

4.2.7 Chizarira National Park and Chirisa/Sengwa Safari Area

A survey was undertaken jointly by the Zimbabwe Parks and Wildlife Management Authority and the African Lion and Environmental Research Trust in September 2015 (Dr Norman Monks pers comm.). The survey area consisted of the 1,910 km^2 Chizarira National Park (a non-hunting area) and the adjoining 1,713 km^2 Chirisa/Sengwa Safari Area (a hunting area). No large carnivore counts using the call-up method had previously been conducted in these contiguous protected areas.

The survey method used the standardized protocol of audio broadcasts of a buffalo calf in distress. Spoor counts were not used for these surveys since previous research had shown that the call-up method was more precise, took less time, and was less costly to complete to achieve accurate results. Up to three stations were sampled nightly commencing just after sunset.

Twelve call-up sites were sampled. Response to the call-up stations by lions was low with only 2 of the 12 stations visited. The population abundance was estimated to be 31.6 (0.872 lion 100/km^2), suggesting a decline of 68.4% since 2004 when estimates of lion numbers were provided to Bauer and van der Merwe, (2004).

5 CONSERVATION IN ZIMBABWE

Zimbabwe Parks and Wildlife Management Authority (ZPWMA) falls under the Ministry of Environment, Water and Climate and it was established under the Parks and Wildlife Act of 1996 (Chapter 20:14) as amended by Act Number 19 of 2001. The rationale behind the establishment of the Authority was to allow it to retain all the revenue it generates to be ploughed back into conservation. The functions of the Authority are provided for in detail in section 4 of the Parks and Wildlife Amendment Act Number 19 of 2001. The Act gives the Authority power to control, manage and maintain Zimbabwe's wildlife resources.

Its **vision** is "*To be a World Leader in sustainable conservation*" and its **mission** is "*To conserve Zimbabwe's wildlife heritage through protection and sustainable utilisation of natural resources for the benefit of present and future generations*."

5.1 STAFF ESTABLISHMENT

The staff strength at the beginning of January 2015 was 2,043 and ended at 2,044 on 31, December 2015 (2015 Annual Report (unpublished). Fifty (50) rangers were recruited in 2015. The following is the staff status report as at 31st December, 2015 (Table 7).

Table 7: Summary Staff Establishment by Region

Position	Grade	HQ	VMU	Northern	Western	Southern	Central	Total
Executive	F & E	3	0	0	0	0	0	**3**
Department Managers/Sectional Heads	D3-D5	19	0	3	4	3	3	**32**
Ecologists/ Area Managers/Officers	D1-D2	11	1	19	19	13	4	**67**
Snr Rangers /Officers	C1-C5	29	6	64	89	49	34	**271**
Rangers/Clerical	B2-B5	33	12	507	461	310	197	**1,520**
Gen. Hands / Lodge Attendants	B1	2	2	30	66	33	17	**150**
TOTAL		**97**	**21**	**623**	**639**	**408**	**255**	**2,043**

The current remuneration levels have remained low with the lowest paid worker receiving a gross salary of $375 per month. The last salary increase of 23% was in January, 2014. A comparison with other Parastatals within the same parent ministry, shows that the Authority has the lowest salary scales.

5.2 TRANSPORT OPERATIONS

As indicated in Table 8, the total cost of operating the Parks transport fleet was is $1,547,172.82 (excluding insurance and licensing) in 2015. The existence of old and obsolete vehicles in the fleet increases costs as most of them require major component replacements thereby increasing vehicle downtime.

Table 8: Overall travel and fuel consumed by Region

Station	Km travelled	Fuel Consumed		Repairs & Maintenance Cost ($)	Total Cost ($)
		Litres	Cost ($)		
Head Office	1,489,294	190,644	272,620	136,419	409,039
Northern	1,429,260	149,577	213,895	147,113	361,007
Southern	1,075,077	110,111	157,458	59,548	217,006
Western	1,313,263	142,012	203,077	161,120	364,196
Central	392,885	47,995	68,632	127,288	195,920
TOTAL	**5,699,779**	**640,339**	**$915,684**	**$631,486**	**$1,547,172.**

Table 9 below summarises the status of the Authority's vehicle fleet as of 2015. Out of the fleet complement of 316 (including tractors and motor cycles), only 70% are in sound condition.

Table 9: Number of vehicles per region

Region	Runners	Non-Runner	Total	% of Non-Runner
Head Office	41	6	47	13
Northern	53	19	72	26
Southern	30	21	51	41
Western	80	39	119	33
Central	17	10	27	37
Total	**221**	**95**	**316**	**30**

The Authority also owns three aircraft: Bell Jet Ranger and Robinson R22 Beta 11 helicopters, and a Cessna 185. The Jet Ranger is based at Hwange National Park and is used for game capture and law enforcement. The remaining aircrafts are non-operational.

5.3 LAW ENFORCEMENT

A major component of the Authority's mandate is law enforcement. This has become increasingly more important with the escalation in illegal wildlife trade, particularly involving elephant and rhino. The Authority has an establishment of 2,146 rangers however by the end 2015, there were 1,448 rangers in post (67%). Of the 1,448 rangers in post, 1,004 are deployable for anti-poaching operations.

The level of effort of law enforcement over the last 3 year is summarised in Table 10. In 2015 there were 2,139 incursions detected, and arrest of 1,354 local and 129 foreign poachers. The number of armed contacts declined from 26 in 2014 to 23 in 2015, and number of poachers killed declined from 13 in 2014 to 11 in 2015. Recoveries made in the field included 25 rifles, 276 rounds of ammunition, 496 pieces of elephant ivory, 4 rhino horns and 5,133 wire snares.

Table 10: Detections, Arrests and Recoveries for 2013, 2014 and 2015

Year	No of Incursions	No of contacts		Number of poachers				Recoveries					Other recoveries and arrests		
				Killed		Arrested									
		Armed	Visual	Local	Foreign	Local	Foreign	Rifles	Ammunition	Ivory	Rhino horn	Snares	Gold	Poachers Camp	Dogs
2013	1842	27	344	9	0	1421	131	20	945	436	5	4415	93	264	180
2014	1571	26	362	10	3	4161	94	20	163	202	19	4864	221	186	272
2015	2139	23	356	6	5	1354	129	25	276	496	4	5133	134	339	167

5.3.1 Illegal Harvesting of Wildlife

Commercial wildlife poaching involving both local and foreign nationals continues to plague Zimbabwe, especially with respect to elephant and rhino located in the Zambezi Valley, Sebungwe, North-West Matabeleland, South-East Lowveld. The species targeted are shown in Table 11 and 12. Note that 21 lions were killed illegal between 2013 – 2015, with 6 animals killed through snaring in the area adjacent to Hwange National Park in 2015.

Table 11: Trends in wildlife poaching in the parks estate

Year	Illegally killed wildlife										
	Elephant	Buffalo	**Lion**	Kudu	Zebra	Impala	Warthog	Nyala	Eland	Crocodile	Waterbuc k
2013	293	65	**12**	65	21	67	22	5	6	2	15
2014	176	44	**2**	34	8	65	26	2	5	3	15
2015	317	78	**7**	76	21	92	46		9	17	6
2016*	101	23	**0**	23	22	54	12	1	4	1	5
Total	**807**	**210**	**21**	**200**	**72**	**278**	**106**	**8**	**24**	**23**	**41**

*To September 2016

Table 12: Illegally killed wildlife 2015 in the four regions

Region	Elephant	Buffalo	**Lion**	Kudu	Sable	Zebra	Croc	Impala	Eland	Warthog	B/Buck	waterbuck
Central	46	30	**0**	16	0	6	1	28	0	17	7	
Northern	75	6	**0**	6	0	0	0	0	0	0	0	0
Southern	65	38	**1**	42	0	9	4	31	4	25	1	6
Western	131	4	**6**	12	1	6	12	33	5	4	1	0
Total	**317**	**78**	**7**	**76**	**1**	**21**	**17**	**92**	**9**	**46**	**9**	**6**

5.3.2 Illegal trophy hunting – the "Cecil" effect

Professional hunter Theodor Bronkhorst was arrested for allegedly illegally hunting of a lion popularly known as 'Cecil' with a foreign client on Antoinette and Antoinette farm in Gwayi River Conservancy (which is adjacent to Hwange National Park). The same case involved Umguza Rural District Council in alleged illegal quota transfer[1]. At the time of writing, this case has not been brought before the court, and is still under judicial review[2].

The Authority immediately implemented the following measures in response to this incident:

- Hunting of lions, leopards and elephant in areas outside of Hwange National Parks required confirmation and authorization in writing by the Director-General of the Zimbabwe Parks and Wildlife Management Authority, and all hunts are to be accompanied by the Authority's staff whose costs will be met by the landowner.
- Bow hunting was suspended except with confirmation and authorization in writing by the Director-General of the Zimbabwe Parks and Wildlife Management Authority.
- Members of the hunting fraternity were reminded that it was illegal for quotas to be transferred from one hunting area to another. Any case of quota transfer would be regarded as poaching, and the Authority will not hesitate to arrest, prosecute, and ban for life any persons including professional hunters, clients and land owners who were caught on the wrong side of the law.

[1] This system facilitated the transfer of a quota from one property to another has since been suspended by the Authority.

[2] Note: This case has been dismissed by the court on 12th November 2016.

- 2015 hunting quotas and permits for Antoinette and Antoinette farm, Railway farm 33, Umguza Rural District Council and Kusile Rural District Council were suspended.
- Professional hunters' license for Theodor Bronkhorst was suspended.

5.4 Human Wildlife Conflict

The Authority is called upon to deal with human-wildlife conflict (HWC) issues across the country, and this continues to be a challenge. A total of 863 reports of problem wild animals causing threat to human life and property were received in 2015 compared to 1,637 reports in 2014 (Table 13). From these incidents, a total of 39 human fatalities by crocodiles, elephants, lions and buffaloes were recorded in 2015 compared to the 27 fatalities in 2014.

Table 13: Trends of Human and Wildlife Conflict Incidents

Year	Total Reports Received	People killed	People Injured	Cattle killed	Goats killed
2013	1 088	21	16	67	65
2014	1 637	27	24	217	129
2015	863	39	23	232	213
Total	**3 588**	**87**	**63**	**516**	**407**

The scale and species involved in HWC is summarised in Table 14. The authority received 200 problem lion reports and responded to 177. One person was killed by lion, and 206 livestock. The Authority elected to capture problem lion (6) rather than destroy the animals.

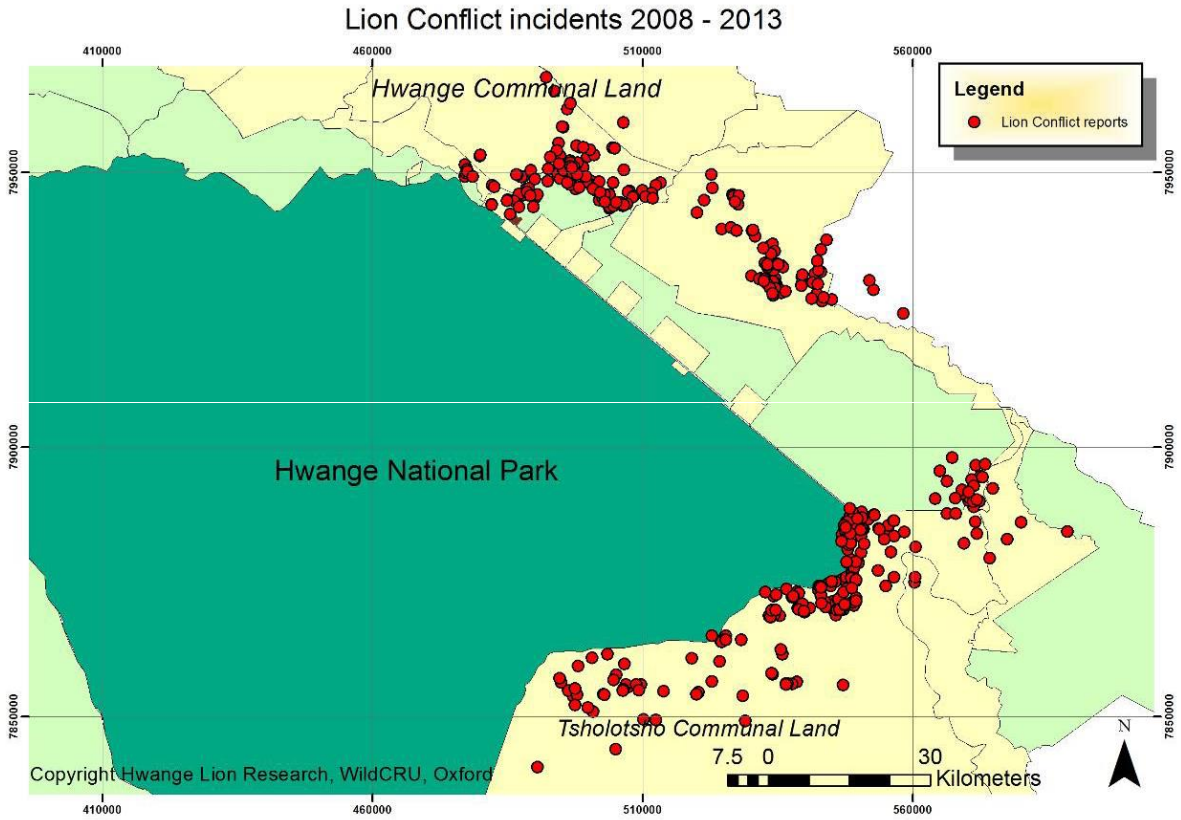
Table 14: Scale of countrywide human wildlife conflict in 2015.

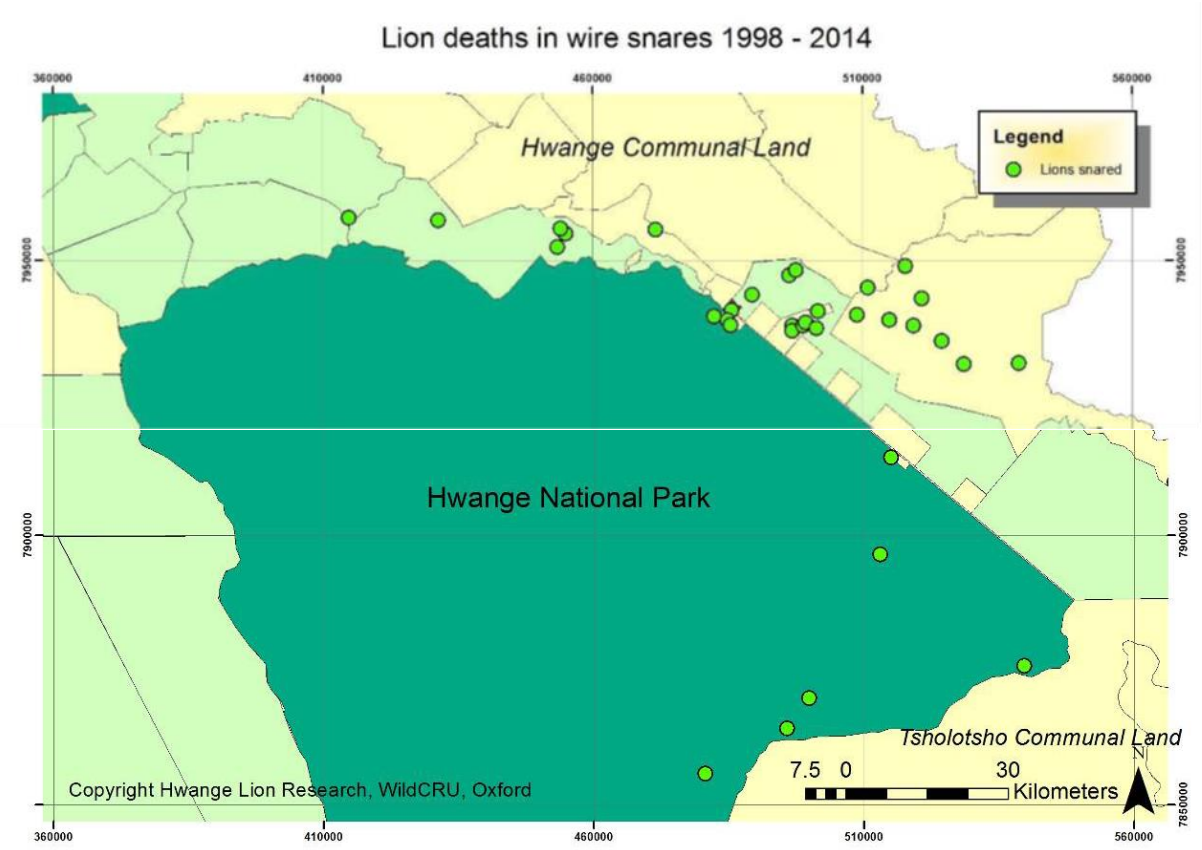
Species	Nature of problem	No of reports received	Reports attended	Number of animals eliminated		People		Livestock killed		
				Killed	Captured	Killed	injured	Cattle	Donkeys	Goats
Baboons	Damage to infrastructure, crop raiding, threat to humans	109	105	51	48	0	0		0	0
Buffalo	Threat to human life and crop raiding	46	40	0	15	2	1		0	0
Elephant	Threat to human life, crop raising, destroying property	216	177	0	38	4	5	0	0	0
Hippo	Threat to human life and crop raiding	131	87	0	34	0	0	0	0	0
Crocodile	Threat to human life and killing livestock	106	85	39	9	27	14	16	1	47
Hyenas	Killing livestock	36	18	0	7	0	0	68	2	54
Leopard	Killing livestock	19	11	0	1	0	0	32	0	33
Lion	**Threat to human life and livestock killing**	**200**	**177**	**0**	**6**	**1**	**0**	**115**	**12**	**79**
Total		**863**	**700**	**90**	**158**	**34**	**20**	**231**	**15**	**213**

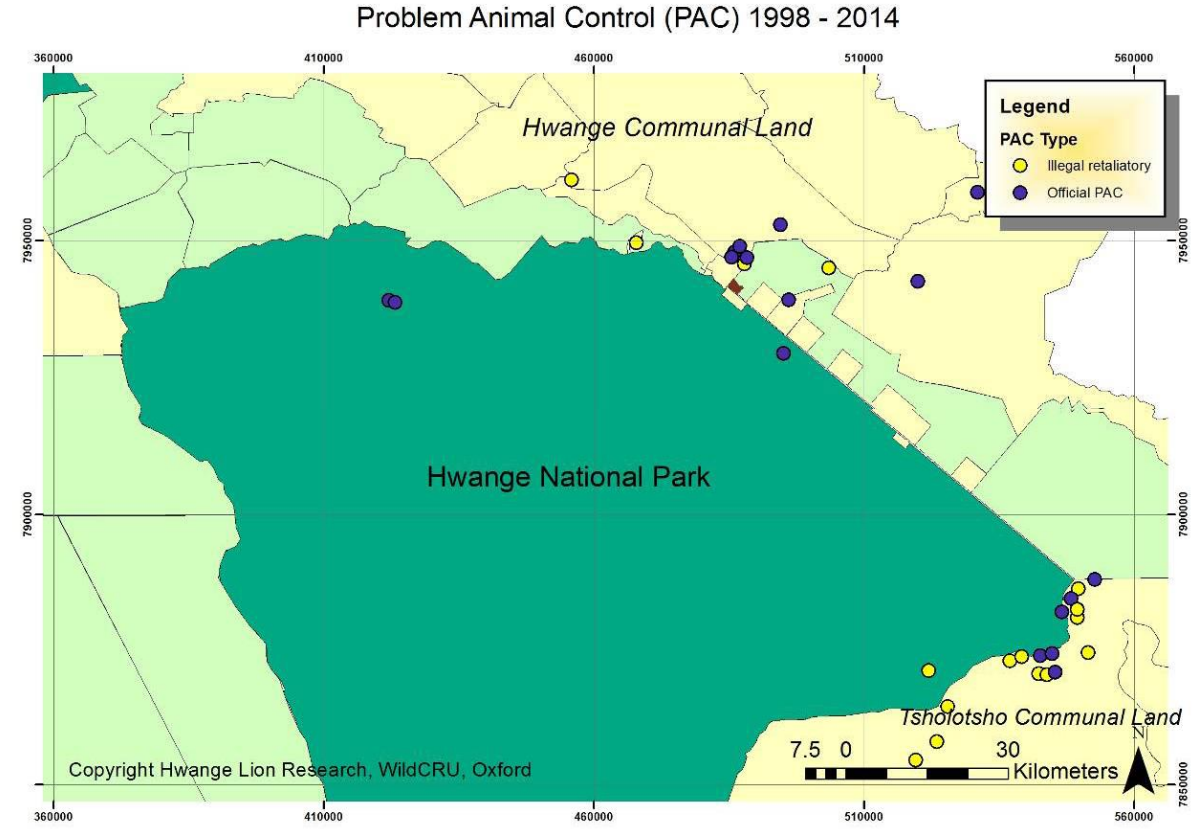
5.4.1 Case Study of Human- Lion Conflict from Hwange National Park

The following information has been extracted from the Hwange National Park Management Plan (ZPWMA, 2016) and is provided here to illustrate the challenges facing the management of lion populations residing adjacent to communal and commercial properties. Variations of the scenario described here apply to other areas of the country where hyaenas and lions are the most problematic carnivores in the communal areas adjacent to protected areas. Hyaenas are perceived to be more of a problem than lions as they account for large numbers of livestock (cattle, goats and sheep). The data presented here has been extracted from the WildCru Lion Research project in Hwange and considers only lions.

Since its inception in 2007 a significant component of the WildCru Lion Research project has focused on understanding the ecological and human socio-economic factors of conflict between the local agro-pastoralist people residing in Tsholotsho and Hwange Communal Land and lions. The project developed an intensive reporting system to record conflicts and has undertaken a detailed survey to record the baseline data on human wildlife conflict at the household level. Between 2007 and 2013 a total of 1,113 conflict incidents were recorded in the Hwange area in which 915 head of stock was lost to lions.







To mitigate this conflict, the project has initiated the "Long Shields Guardian Programme" whereby communities are notified of movements of collared into their areas via cell phone who then motivate the community to take appropriate action (i.e. moving the cattle, chase the lions etc.). In 2013 alone,

1,850 warnings were passed to the "Long Shields". In addition, the project is working on improving bomas and husbandry techniques as another way to lessen the conflict between lions and people, and although these actions may reduce the incidents of livestock marauding lions, cattle deaths still occur resulting in retaliatory killings or action on the part of National Parks to destroy the animals.

5.5 Trend in Financial Performance of the Authority

The average Income and Expenditure for the period 2010 – 2015 is shown in Table 15 that highlights the inability of the Authority to generate adequate revenue to cover both the capital and operating requirements. The average total income over this period is US$22.4 million (range US$16.5 – US$29.3 million). For the period ending December 2015, the Authority generated total revenue of $24,1million, which is 32% below the anticipated budget of $35.5 million. This includes a government grant of $716 000 and a donation of vehicles and equipment worth $2,1 million from the Government of China.

The average total expenditure for the period 2010 – 2015 is US$25.3 million (range US$18.1 – US$30.7 million). The Authority has thus incurred a loss of approximately US$2.8million/year. For the year ended December 2015, the Authority incurred a loss of US$5,4 million including depreciation.

The Authority is dependent on income from Conservation Fees (i.e. entry fees to Parks etc.) that accounted for 39% in 2015 (average 34%/year), hunting (13% in 2015) and leases (10% in 2015, Table 15).

Although individual salaries remained low, staff costs in 2015 were $20,7 million which is 71% of total revenue raised (average 64%). This is unsustainably high and leaves very limited resources for operation (16%), marketing (1%) and administrative expenses (7%, Table 15).

The major reasons for the budget deficits in the past six years can be attributed to:

- Declining income from hunting – this has been exacerbated by the recent bans imposed on elephant trophy imports into the United States by US Fish Wildlife Service (USFWS) and the much-publicised death of *Cecil the lion* that had a negative effect on revenue generated from hunting.
- Government Grant – The Authority has not received meaningful funding from the fiscus despite requests made by management that non-revenue generating activities which are of national nature be funded by Government.
- The Authority failed to dispose of its ivory stock pile due to the continued ban on ivory trade by CITES. The ivory stock which the Authority is currently holding exceeds 80 tons.

Table 15: Statement of Comprehensive Income for period 2010 – 2015 and the year ended 31 December 2015 (extracted from 2015 ZPWMA Annual Report).

Revenue	US$ 2015	%	Average 2010 - 2015	%
Conservation Fees Land	$7,879,987	33%	$6,506,508	29%
Conservation Fees River	$1,409,160	6%	$1,136,041	5%
Accommodation	$1,720,640	7%	$1,904,477	8%
Annual registration	$507,211	2%	$722,847	3%
Permits	$1,476,176	6%	$849,916	4%
Service and Facilities	$307,692	1%	$152,616	1%
Law enforcement (fines etc.)	$224,657	1%	$215,591	1%

Revenue	US$ 2015	%	Average 2010 - 2015	%
Hunting income	$3,256,698	13%	$5,049,089	22%
Fishing permits	$561,797	2%	$941,833	4%
Leases and rentals	$2,434,676	10%	$1,880,258	8%
Parks product sales	$623,084	3%	$767,347	3%
Examinations	$116,000	0%	$70,873	0%
Projects	$349,864	1%	$248,614	1%
Other income/donations	$2,555,729	11%	$907,169	4%
Government grant	$716,000	3%	$1,141,119	5%
Total	**$24,139,371**			
Expenditure				
Operational costs	$4,801,815	16%	$5,146,091	20%
Staff costs	$20,766,023	71%	$16,311,677	64%
Marketing and promotions	$212,406	1%	$147,334	1%
Administration costs	$2,056,681	7%	$2,631,019	10%
Depreciation	$1,531,000	5%	$1,069,138	4%
Total expenditure	**$29,367,925**		**$25,305,258**	
Operating surplice/deficit	**-$5,365,082**		**-$2,810,962**	

The Authority receives considerable support from many local and international NGOs who undertake a variety of routine management activities e.g. supply and maintain artificial game water supplies, provide logistic support to law enforcement operations. This is in addition to the support provided by hunting operators that hold concessions in the Safari Areas.

6 STAKEHOLDER INVOLVEMENT IN LION MANAGEMENT AND CONSERVATION

There are several private sector initiatives that are directly or indirectly involved with lion management and conservation both inside and outside the Parks estate. These stakeholders are represented by companies from the consumptive and non-consumptive sectors of the industry.

6.1 BENEFICIARIES OF WILDLIFE BASED LAND USE

Various forms of wildlife based land use occur in Zimbabwe that benefit different segments of the community depending on the authority for the land. Table 16 summarises these broad categories. The Authority is the direct beneficiary from the use of wildlife in National Parks and Safari Areas while the Forestry Commission is the beneficiary in Forestry Areas. In terms of the Act, Communal CAMPFIRE areas are the primary beneficiaries where the income generated from hunting is shared between the Rural District Council and Community Wards (see below). Similarly, private conservancies and land owners are the primary beneficiaries.

Collectively, these different management regimes contribute to the overall conservation of the wildlife both inside and outside the Parks Estate, and is supported through the existing policy and legal framework that facilitates incentives to promote wildlife based land use.

Table 16: Direct beneficiaries from Wildlife Based Land Use

Land category	Direct Beneficiary
National Parks and Safari Areas	Zimbabwe National Parks and Wildlife Management Authority
Forestry Areas	Forestry Commission
Communal Campfire Areas	Rural District Council and Wards
Private Conservancies	Private Landowners

6.2 CONTRIBUTION OF THE PRIVATE SECTOR

A questionnaire was circulated to all safari hunting operations to gather data on:

- Area and land category where hunting takes place
- Payments in terms of concession fees
- Number of people employed
- Approximate value of investment in assets
- Approximate costs of the hunting operations
- Hunter days generated through various packages
- Indication of the prey base

Data from 18 companies that have been allocated lion on quota and offer these trophies as part of their hunting packages is summarised below (Table 17). These data indicate that

- The average hunting concession covers 1,590km^2 and generates $178,488 in concession fees annually.
- Each company on average employs 109 people of which 24 are seasonal staff (22%). Law enforcement staff make up 26% of the staff complement.
- On average, each company has invested approximately $1.3 million in fixed and moveable assets (buildings, tents, vehicles, equipment etc.).
- On average, each company incurs approximately $1 million in expenses annually, with staff wages (24%) and operating expenses (27%) forming the bulk of these costs.
- Lion safaris contribute approximately 9% (126 hunter days) to the 3-year average number of hunter days generated (1,405) with the bulk of hunter days generated from buffalo safaris (see below for more details on the financial significance of this contribution).
- On average, each hunting area supports 2,000 large mammals, 3,000 medium sized mammals and 6,000 small sized mammals. However, there are large differences between state, forestry, CAMPFIRE and conservancies areas. State areas tend to support more large animals (buffalo, giraffe) while conservancies support greater numbers of medium and small animals.
- Observations on the status of lion populations indicates that each area supports on average 5 prides of 7 animals (i.e. 35 lions) although there is a wide variation in these numbers with more prides occurring in the conservancies than on Forest and CAMPFIRE areas. In these areas, the operators report that lion are transient/migratory rather than permanent.
- All areas report incidents of human-lion conflict, including incidents of snared animals.

Table 17: Summary of 18 hunting company statistics where lion hunting occurs

Companies (N=18)	**Total**	**Average**	
Total Hunting Area (ha)	2,872,932	159,607	
Concession fee	$2,141,860	$178,488	
Number people employed			
Owner/Manager	65	4	3%
Administration	59	3	3%
Camp Maintenance	308	17	16%
Safari operations	295	17	16%
Professional Hunters	82	5	4%
Skinners	59	3	3%
Trackers	138	8	7%
Law enforcement	449	28	26%
Seasonal/Casual staff	379	24	22%
Average Staff employed/company		**109**	
Approximate Asset Value (US$)	**$21,557,610**	**$1,347,351**	
Major Expense Items			
Central Government Licenses:	$415,700	$25,981	3%
ZNWMA Fees:	$1,932,472	$128,831	13%
Community Development:	$525,378	$35,025	4%
Law Enforcement:	$1,319,562	$87,971	9%
Staff wages & Welfare:	$3,601,439	$211,849	24%
Administrative costs:	$1,870,267	$116,892	13%
Operating expenses:	$3,986,619	$249,164	27%
Management and Marketing costs	$661,974	$41,373	4%
Any other costs	$411,693	$25,731	3%
Overall costs	**$14,725,104**	**$922,818**	
Hunter days generated over 3 years			
Lion	2,137	126	9%
Leopard	4,565	269	19%
Buffalo	10,344	608	43%
Elephant	3,131	184	13%
Plains game	999	59	4%
Total Hunter days	**25,294**	**1,405**	
Prey base status			
Large mammals (Buffalo, Giraffe)	28,190	2,014	
Medium mammals (Eland, zebra, kudu, waterbuck etc.)	53,273	3,552	
Small mammals (Bushbuck, warthog, impala)	82,297	5,878	
Status of lion population			
Number of prides	71	5	
Average pride size	80	7	

Companies (N=18)	Total	Average	
Number of cubs	243	19	
Number Coalition males	89	7	
Monitoring of lion population			
Natural deaths	4	1	
Reports of Human-Lion Conflict	33	5	
Incidents of infanticide recorded	6	2	

6.3 CAMPFIRE COMMUNITY PROGRAMMES

The right to exploit and benefit from wildlife was extended to communal areas through granting of Appropriate Authority Status over their wildlife resources to Rural District Councils in 1982. The intention was to return rights of access to natural resources through legislative change, devolve responsibility and economic empowerment. The CAMPFIRE model focuses on three main criteria:

- Voluntary interest in participation by communities and their Rural District Councils (RDCs),
- Presence of wildlife populations capable of producing sustainable and economically significant revenues.
- Benefit sharing for local communities based on:
    - The number of animals harvested within a local community's area each hunting season.
    - The extent of wildlife habitat present within a local community's area annually.

Currently 58 Rural Districts have been granted the Appropriate Authority status to manage wildlife resources in their areas, however only 16 are actively engaged in some form of wildlife based land use (see Figure 5).

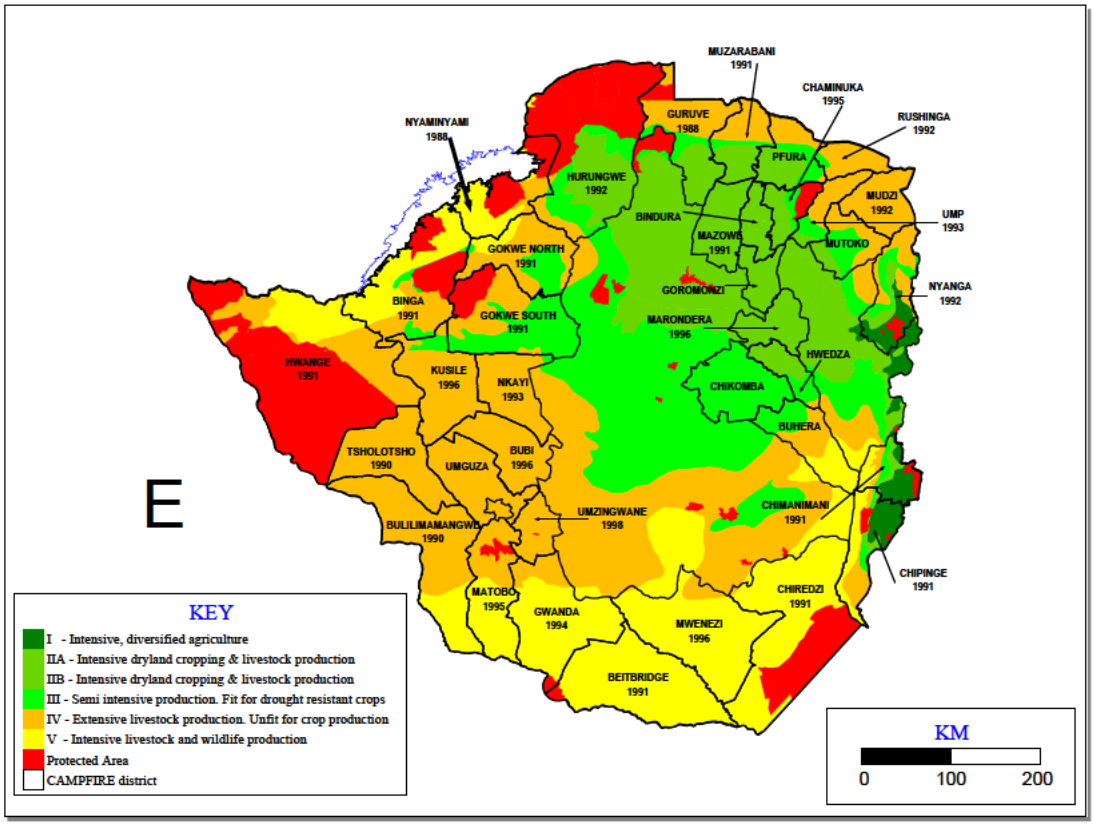


Figure 5: Map of Zimbabwe showing CAMPFIRE districts and year of establishment

The performance of ten key CAMPFIRE Districts is summarised below to illustrate the level of benefits that flow to RDCs, Wards and households, and the role that income from lion play in this process.

1. OVERALL QUOTA ALLOCATION, UTILISATION AND INCOME GENERATION FROM KEY SPECIES: All Districts: 2010 - 2015

	Elephant	Lion	Leopard	Buffalo	Hippo	Crocodile	Total
Quota	1,079	140	487	2050	602	471	
Offtake	655	45	193	908	270	305	
% Utilisation	61%	32%	40%	44%	45%	65%	
Total income N=6 years)	**$7,129,658**	**$240,000**	**$532,675**	**$2,263,150**	**$464,000**	**$441,903**	**$11,071,386**
Average/year	**$1,188,276**	**$40,000**	**$88,779**	**$377,192**	**$77,333**	**$73,651**	**$1,845,231**
Percentage	64%	2%	5%	20%	4%	4%	

The overall income generated over a 6-year period was US$11 million. An overall quota of 140 lions (average 23/year) were allocated to the CAMPFIRE programme over which 45 (32%) were utilised (8 per year). This generated US$240,000 or 2% of the overall income.

2. SOURCE OF CLIENTS AND GROSS INCOME TO SAFARI OPERATIONS:2010 - 2015

Origin of Clients	USA	Canada	South America	Europe	Asia	Middle East	Oceania	Africa	Total (N=6 years)
Total	**880**	**16**	**54**	**456**	**82**	**9**	**51**	**131**	**1679**
Percentage	51%	1%	3%	27%	5%	1%	3%	8%	
Total	**$8,624,059**	**$150,987**	**$543,003**	**$5,201,168**	**$550,062**	**$781,076**	**$394,208**	**$567,897**	**$16,812,459**
Average/year	**$1,462,508**	**$25,165**	**$90,500**	**$866,861**	**$91,677**	**$130,179**	**$65,701**	**$94,650**	**$2,802,077**
Percentage contribution	**51%**	**1%**	**3%**	**31%**	**3%**	**5%**	**2%**	**3%**	

Hunting clients from the USA are by far the most numerous (880 over 6 years) contributing 51% (or US$8.6 million) of the estimated US$16 million generated from hunting in CAMPFIRE areas from 2010 - 2015.

3. INCOME TO DISTRICTS: 2010 - 2015

	Hides (US$)	Trophy fees (US$)	Percentage of daily rate	Hunting concession fees	Photographic (lease fees/bed night levy)	Other (vehicle hire, grinding mill etc.)	Total	Average (N=6)
Total	$131,741	$10,618,127	$1,277,525	$862,721	$737,613	$731,218	$14,358,945	$2,393,158
Percentage	1%	74%	9%	6%	5%	5%		

The CAMPFIRE districts that benefit from hunting rely heavily on trophy fees (74%) as their primary source of income.

4. INCOME TO WARDS, VILLAGES AND HOUSEHOLDS: 2010 – 2015

Overall Income to CAMPFIRE Wards: 2010 - 2015						
	No Concessions	Area (ha)	Number Wards	Number Villages	Number Households	Gross Income
Total	**26**	**2,288,284**	**62**	**603**	**56,297**	**$5,946,370**
Income (n=6 YEARS)	**$228,706.55**	**$3**	**$95,909.20**	**$9,861.31**	**$105.6**	

Income generated at the District level is then disbursed to Wards. Since 2010, this is estimated to be approximately US$5.9 million. The available data shows that 62 wards representing 603 villages (or 56,297 households) received the equivalent of US$95,909/ward (or US$105/household).

These levels of income are not sufficient to make a significant impact at the individual level, and require that the Districts and Wards channel these revenues into activities that benefit the overall community. This is achieved through supporting several communal projects such as schools, clinics, water provisions etc.

5. DISTRICT EXPENDITURE AND COMMUNITY BENEFITS: 2010 - 2015

	Administration	Law Enforcement	Compensation	Management	Social Services	Other	Total
Total	**$2,486,268**	**$1,778,100**	**$67,600**	**$682,740**	**$1,084,779**	**$779,030**	**$6,878,517**
Average	**$414,378**	**$296,350**	**$11,267**	**$113,790**	**$180,796**	**$129,838**	**$1,146,420**
Overall costs	**$5,014,708**				**$1,084,77**	**$779,039**	
Percentage	**73%**				**16%**	**11%**	

At the District level, 73% of the revenues from hunting are channelled towards administration, law enforcement, compensation and general management while limited funds are used to support social services (16%).

6. WARD EXPENDITURE AND COMMUNITY BENEFITS

	Administration costs					Community Benefits				
	Meetings & Admin	Wages/salaries	Compensation schemes	Management activities	Project Management Costs	Social services	Food security	Direct cash benefits	Other	Total
Total	**$553,260**	**$815,639**	**$56,432**	**$312,178**	**$345,762**	**$2,468,216**	**$223,659**	**$216,077**	**$139,565**	**$5,302,709**
Overall costs	**$2,083,271**					**$2,907,952**			**$139,565**	
Percentage	**39%**					**55%**				

At the Ward level, where communities are directly involved, the tendency is to channel most the income towards community benefits (55%) rather than administration which is seen to be the responsibility of the local government. This means that the bulk of the income from hunting is used to support social services such as schools, clinics, irrigation schemes etc. where the impact at the community level (village, household) is far greater (Figure 6).



Figure 6: Bhemba Clinic in Ward 2 of the Tsholotsho Communal Area (top) and Masera Secondary School (Beitbridge, bottom) that are supported by funds generated through the CAMPFIRE programme

Lessons learnt

1. Quota utilisation of lion (32%) is low in CAMPFIRE areas, equating to 8 lion/year.

2. Trophy fees from key species (elephant, lion etc.) contributed $1,845,231/year to CAMPFIRE revenues:
    a. Elephant (64%) and buffalo (20%) are major contributors
    b. Lion and leopard contribute 7%

3. Income from the sale of safaris generate approximately $2,802,077/year
    a. Hunters from USA contribute 51% and Europe 31% of this income.

4. Income to Districts from a variety of wildlife related revenue streams is approximately $2,510,783/year:
    a. Trophy fees are responsible for 74% of this income, of which lion play a small role.
    b. Fees from photographic tourism are responsible for 5%.

5. Wards receive $5,830,244 (57%) from district trophy fees. These revenues are used to support a variety of social services that benefit a large proportion of the local community.

The cessation of import of lion (and elephant) trophies into the USA has had a significant impact on these revenue streams and consequently on the benefits reaching communities at the local level. These revenues cannot be replaced through alternative revenue streams.

7 Management and Administration of the Safari Hunting Industry in Zimbabwe

7.1 Performance of the industry

To fully account for earnings in the Hunting Sector, the Reserve Bank of Zimbabwe, in collaboration with all the relevant stakeholders, introduced the Tourism Receipts Accounting System (TRAS2) in January 2015. The TRAS2 is a web-based system which links Safari Operators, Zimbabwe Parks and Wildlife Management Authority, Taxidermists, Shipping Agents, International Marketing Agents and Reserve Bank for the purposes of authorizing hunts, capturing hunting data, monitoring hunting quota utilization and tracking hunted trophies.

On an annual basis, Exchange Control Division of the Reserve Bank of Zimbabwe attends the SCI Conventions to achieve the following objectives: -

1. To assess regional price differentials of same hunts at the SCI Convention and the reasons thereof;
2. To present Form TRAS2 systems updates to the users including international marketing agents;
3. To engage international marketing agents of sport-hunting (standardised international marketing agreements, payment arrangements and follow up on overdue export receipts);
4. To obtain relevant insights on governing of the hunting sector; and
5. To come up with an effective mechanism to fully account for export proceeds from the hunting sector.

7.1.1 Global earnings of the industry

The TRAS2 system was introduced in January 2014, and has since recorded a total of $44.6 million ($18.9 million in 2015 compared to $25.9 million in 2014) as shown in Figure 7. The figures are inclusive of daily rates, trophy fees and other incidental revenue. In line with other regional

countries offering safari hunting, the market is dominated by the USA (59%) and Europe (25%) with the remainder of the market taken by the Americas (Canada, Argentina etc.), Asia, Africa, Oceania and Africa (mostly South Africa). Appendix III illustrates the distribution of total hunting revenue by country of destination (Chitauro, 2016).

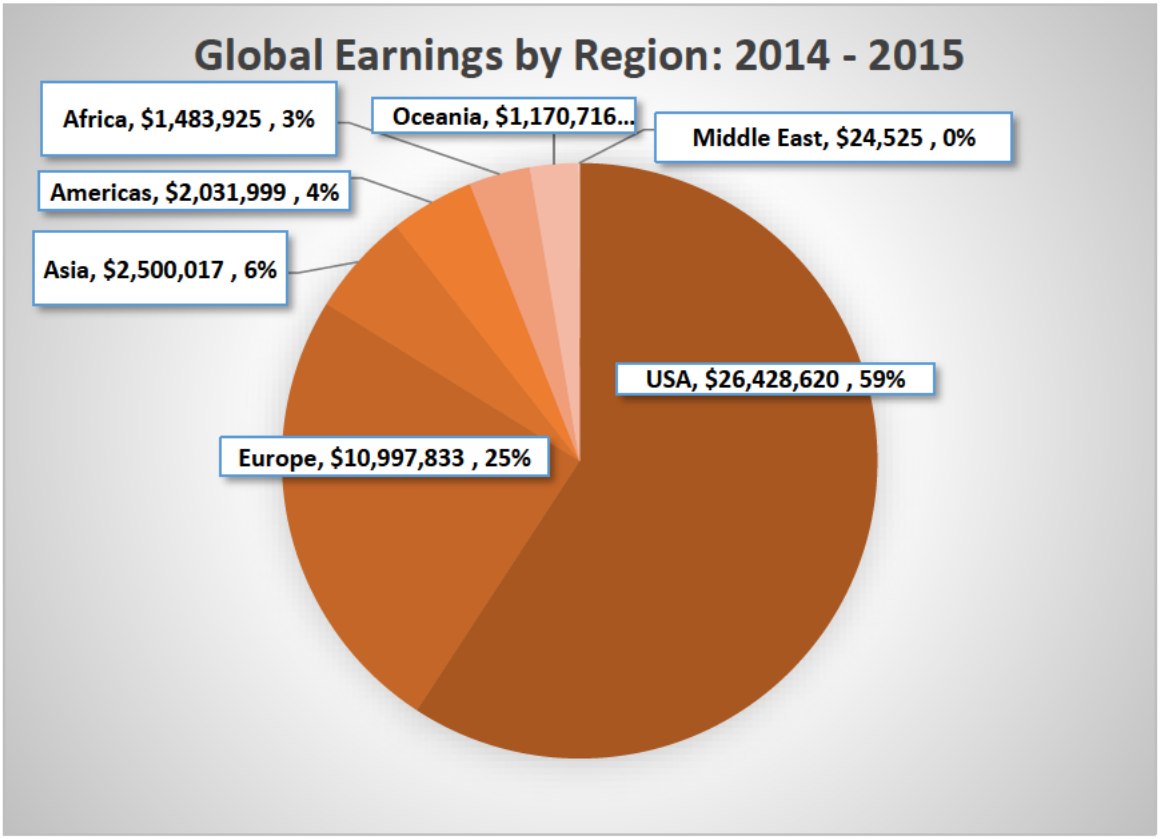


Figure 7: Breakdown of source of hunting income (2014 and 2015) from various regions in the world (adapted from Computerised Exports Payments Exchange Control System, CEPECS - TRAS2)

7.1.2 Quota allocation, Utilisation and Total Trophy Fees Earned

The total income from the sale of trophies in 2014 and 2015 is shown in Table 18. The income in 2015 (US$8.2 million) is less than that in 2014 (US$11.1 million) because of the import restrictions of elephant and lion into the USA.

Table 18 also provides data on the quotas allocated in 2015 and the number of level of utilisation. The complete list of species is provided in Appendix III (Chitauro, 2016). These data show that levels of utilisation for all species varies from 10 – 40% for most mammals and far less for birds etc.

Table 18: Summary of the revenue generated from the 11 most common species utilised for hunting, and the percentage utilisation in 2015 (adapted from Computerised Exports Payments Exchange Control System, CEPECS - TRAS2)

Species	2014	2015	Total	2015 Quota	Utilised	% Utilised
Buffalo	$2,528,559	$1,962,570	$4,491,129	1,635	482	29%
Elephant (Tusks)	$2,042,610	$1,447,090	$3,489,700	246	64	26%
Elephant (Tuskless)	$1,444,040	$229,860	$1,673,900	462	113	24%

Species	2014	2015	Total	2015 Quota	Utilised	% Utilised
Lion	**$630,950**	**$753,000**	**$1,383,950**	**82**	**49**	**59%**
Leopard	$714,100	$668,490	$1,382,590	530	151	28%
Zebra	$594,239	$555,744	$1,149,983	2,480	600	24%
Sable	$456,615	$309,260	$765,875	718	78	11%
Kudu	$341,092	$357,963	$699,055	2,503	289	12%
Waterbuck	$293,903	$256,133	$550,036	988	156	16%
Hippo	$310,321	$217,470	$527,791	303	83	27%
Impala	$277,198	$242,624	$519,822	8,594	1,261	15%
Other Species	$1,465,560	$1,287,845	$2,753,405			
Grand Total	**$11,099,187**	**$8,288,049**	**$19,387,236**			

7.1.3 Total trophy fees generated by land category

The ZPWMA allocated quotes to all owners and occupiers of land in terms of SI 26. Any person utilising wildlife on these properties is required to submit a TRAS2 form to process any export of trophies and other animal products. Approximately 262 companies/properties submitted returns in 2014 and 2015. From these data, it is possible to determine the income generated from trophy fees and daily rates per company. To protect the privacy of the individual companies, these data have been arranged to show the level of income generated by different land categories from trophy fees (Figure 8),

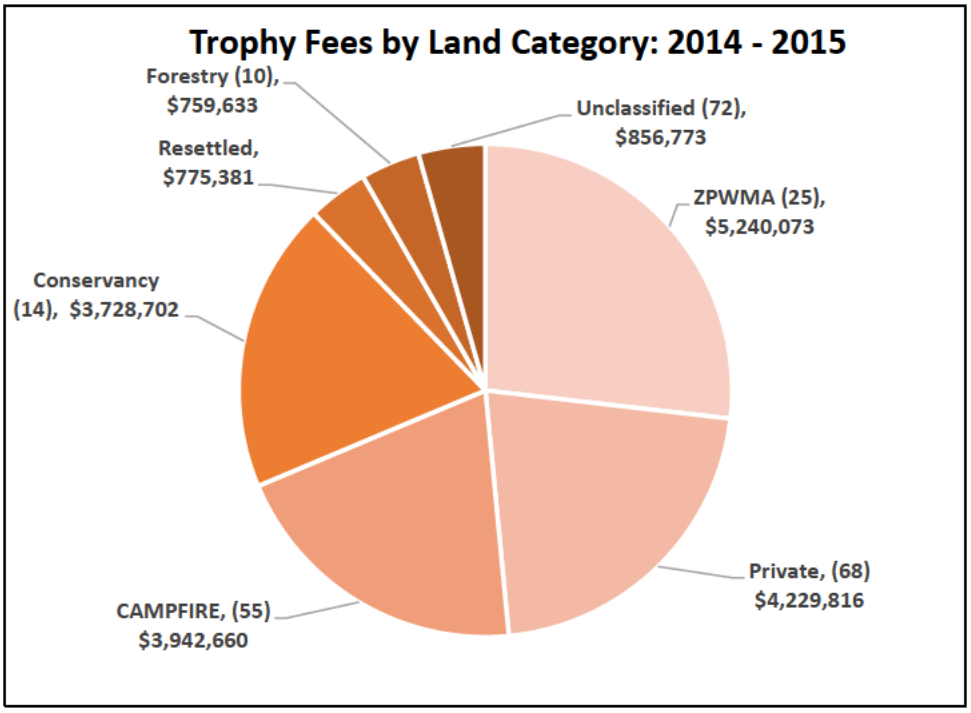


Figure 8: Hunting Trophy Fee Earnings by Land Categories (2014 - 2015). Note that from the description provided in the database, it was not possible to allocate some individual properties to a specific category. These have been recorded as unclassified (adapted from Computerised Exports Payments Exchange Control System, CEPECS - TRAS2).

Overall, approximately US$10.7 million was generated in 2014 and US$8.7 million in 2015 from the 62 species on offer. The ZPWMA represented by 25 properties that it either offers on tender to the private sector or operates as hunting areas itself generated the largest income from trophy fee sales

(US$5.2 million). The 14 Conservancies accounted for US$3.7 million while the 68 private properties are recorded as generating US$4.2 million. The CAMPFIRE areas (N=55) generated US$3.9 million.

Together with the income from daily rates (US$13,190,372 in 2014 and US$9,684,396 in 2015 (gross US$22,874,768), extracted from Computerised Exports Payments Exchange Control System, CEPECS - TRAS2), these funds are used to pay for several operational expenses including employment, law enforcement, administration and management.

7.5 Quota Setting Process

The process for quota setting follows procedures agreed to by all stakeholders (ZPWMA, 2014).

- Step 1: Allocate existing quota to each block/hunting area

The starting point for implementation of age-restrictions and adaptive quota management was to allocate existing lion quotas. This quota would then be managed adaptively in line with the age of lions hunted. In future, it is envisaged that fixed quotas for lions would fall away as quotas would be based on the age of lions hunted in the previous year.

- Step 2: Hunters complete and submit return forms and photos after each lion hunt

The data would be compiled into a database by a ZPWMA representative (currently Ms Roseline Mandisodza-Chikerema, Senior Ecologist, ZPWMA). Export permits for trophies will not be issued unless completed hunt return forms (all the required photographs and the first upper premolar) is provided to ZPWMA for aging and monitoring purposes. Furthermore, because the following year's quotas will be based on the ages of the lions hunted in the current year, operators must submit their lion hunt returns and photographs soon after the hunt. At the end of the season, all the teeth would be taken to a dentist to have x-rays conducted to allow for measurement of the size of the pulp cavity.

- Step 3: ZPWMA and Panel of experts assign an age value to each lion trophy

Lion trophies will be aged by ZPWMA, with input from lion scientists and representatives from the hunting industry at a trophy aging session. This is conducted at the end of each hunting season.

- Step 4: Calculate the next years' quotas based on a points system for the ages of lions hunted

A quota setting meeting is held where lion quotas are established for each area based on the age of lions hunted in those areas the year before. This programme commenced in 2014, and so the ages of lions hunted in 2014 will affect the lion quotas in 2015. Table 19 summaries the trend in lion quota allocations since 2002 while Table 12 provides a detailed overview of the lion trophies taken in 2015.

Table 19: Summary of lion quota allocations and offtake since 2002 (Data provided by ZPWMA)

Year	Lion Allocated Quotas	Female Offtake	Male Offtake	% Utilisation
2002	126	22	49	56%
2003	138	5	11	6%
2004	155	4	9	8%
2005	108	3	20	21%
2006	124	1	17	14%

Year	Lion Allocated Quotas	Female Offtake	Male Offtake	% Utilisation
2007	117	0	9	7%
2008	90	0	17	18%
2009	111	0	9	8%
2010	98	12	30	43%
2011	121	20	38	48%
2012	101	18	27	44%
2013	101	1	34	34%
2014	101	0	37	26%
2015	82	0	49	60%
2016	81	0	33	41%

Table 20: Analysis of lion trophies taken on various properties in 2015

Hunting Area Name	Sex	Killed Wounded	Grid Ref	Date Shot	Trophy Size
Sapi Area	M	KILLED	35l0783	03/06/2015	
Matetsi Safari Area - Unit 3	M	KILLED	307551	05/04/2015	61.31
Antoinette & Antoinette Extension	M	KILLED	187159	02/07/2015	26 7/16"
Tsholotsho District Area 2-South	M	KILLED	S1926181 E02652250	27/10/2015	25 6/8 inches
Hurungwe Safari Area - Rifa	M	KILLED	35K178113	10/05/2015	24.5
Deka Tail	M	KILLED	651 480	10/04/2015	60.38 cm
Hurungwe Safari Area - Nyakasanga	M	KILLED	s15.56.457 e029.15.584	07/06/2015	26
Msaise	M	KILLED	VN204700	14/05/2015	23
Mapari	M	KILLED	VN798124	09/06/2015	23SCI
Ngamo/Sikumi	M	KILLED	456923	09/05/2015	
Deka Safari Area	M	KILLED	278493	26/06/2015	61.5
Mbire (Guruve) South Area 2	M	KILLED	919056	09/08/2015	25.3
Bubye Valley Conservancy	M	KILLED	0194090 7625410	21/02/2015	25"
Bubye Valley Conservancy	M	KILLED	9337	29/03/2015	26"
Bubye Valley Conservancy	M	KILLED	31129	07/04/2015	25
Woodlands Farm	M	KILLED	644972	22/05/2015	25"
Bubye Valley Conservancy	M	KILLED	35K 453 159	10/05/2015	23.625
Bubye Valley Conservancy	M	KILLED	36K 908 852	25/04/2015	25"
Chewore Safari Area - North	M	KILLED	TT015643	05/06/2015	25
Bubye Valley Conservancy	M	KILLED	36K 227 593	12/05/2015	26"
Matetsi Safari Area - Unit 4	M	KILLED	4.05E+12	09/06/2015	24
Matetsi Safari Area - Unit 5	M	KILLED	865505	09/06/2015	25.25
Gunundwe	M	KILLED	822094	11/06/2015	
Bubye Valley Conservancy	M	KILLED	36K 004 971	24/06/2015	25.5625

Hunting Area Name	Sex	Killed Wounded	Grid Ref	Date Shot	Trophy Size
Bubye Valley Conservancy	M	KILLED	942 151	25/06/2015	12
Kusile District Area 1	M	KILLED	S185604.9 E0271547.4	02/07/2015	
Mokore Ranch	M	KILLED	VN110030	15/07/2015	15"
Bubye Valley Conservancy	M	KILLED	36K 229 607	29/07/2015	26"
Bubye Valley Conservancy	M	KILLED	191 623	25/07/2015	27.0625
Nyaminyami District Area 2 (Omay)	M	KILLED	657019PM	18/07/2015	24 1/8"
Matetsi Safari Area - Unit 5	M	KILLED	862 451	15/07/2015	25 8/16 inches
Matendere	M	KILLED	781021	26/07/2015	23.875
Matetsi Safari Area - Unit 1	M	KILLED	740726	13/08/2015	25
Bubye Valley Conservancy	M	KILLED	213 602	15/08/2015	15
Sango	M	KILLED	62691	23/08/2015	23.125
Sango	M	KILLED	320548	27/08/2015	
Dande Safari Area	M	KILLED	945352	13/10/2015	24in
Hurungwe Safari Area - Rifa	M	KILLED	35k062038	30/09/2015	25.25
Bedford	M	KILLED	190429	06/09/2015	
Ngamo/Sikumi	M	KILLED	456919	07/09/2015	
Bubye Valley Conservancy	M	KILLED	206 622	23/09/2015	26"
Hammond	M	KILLED	35k880103	17/10/2015	23.375
Kazuma/Panda Masuei	M	KILLED	s18.44144 & E025.64434	09/10/2015	
Nyaminyami District Area 1 (Omay)	M	KILLED	PM453354	13/11/2015	26"
Chewore Safari Area - South	M	KILLED	ST967260	25/10/2015	
Riverside Ranch	M	KILLED	35k227702	31/10/2015	24.78
Matetsi Safari Area - Unit 6	M	KILLED	18.06.55.68.25.22	03/12/2015	
Chewore Safari Area - South	M	KILLED	QN975310	06/12/2015	
Sapi Area	M	KILLED	Mtawatawa	11/06/2015	24"

7.6 POINTS SYSTEM FOR ADAPTIVELY MANAGING LION QUOTAS IN ZIMBABWE

The points system used to adaptively manage lion quotas has been developed following similar systems that have been implemented in Tanzania and northern Mozambique. The systems that are in place in Tanzania and Niassa differ slightly, but both lion quotas are set per the age of the lions harvested during the previous hunting season (Begg and Begg, 2008; Tanzania Wildlife Division 2013). The Tanzanian system is more punitive with significant quota reductions, trophy confiscation and fines for non-compliance, whereas the Niassa system is more accommodating but nevertheless can result in quota reductions if five-year-old lions are hunted. The latter was aimed at a means of accommodating the difficulty of telling five-year-old lions apart from four year olds.

After reviewing the Tanzanian and Mozambican age restriction systems and debating possible models for application in Zimbabwe, an adaptive quota management system for lion hunting based on the ages of lions hunted was agreed on in July 2013 in Harare, Zimbabwe, during a meeting hosted

by the Zimbabwe Parks and Wildlife Management Authority (ZPWMA) and an independent non-governmental conservation organisation. The approach adopted by Zimbabwe recognises four as opposed to three key age categories (Table 21).

Table 21. Proposed points system for lion age restrictions and quota setting in Zimbabwe

	≥6 years	**No trophy**	**5 years' old**	**4 years' old**	**<4 years**	**Failure to submit hunt return/incomplete hunt returns**
For quotas of 3/more	4	3	3	2	-3	0
For quotas of 2	4	3	3	2	0	0
For quotas of 1	6	3	3	2	0	0
Quota setting process	These points are added up and divided by 3 to yield the quota for next year					

During 2013, operators were requested to submit hunt returns and photos as a trial run to get the system up and running. In 2014 operators were requested to do the same but were informed that the age of the lions hunted in 2014 would determine their lion quotas in 2015. The 2015 lion hunt results would thus also determine the 2016 quota. The key distinction of the Zimbabwean system is that the quota will not be affected if they hunt animals that are five years old. This position was adopted after considering various the population models that suggested that the hunting animals of five years of age or older is predicted to be comparatively safe from a population perspective (Whitman et al. 2007). Moreover, after reviewing aging techniques, the consensus was that professional hunters could be distinguish between lions that are five or above. The system therefore rewards operators with increased quotas if they hunt animals of six years and older, but it does not penalize them if they hunt animals of five years. Neither are they penalised if they do not shoot a lion that they have on quota, however, the quotas will be reduced if they hunt animals younger than five years or if they failed to complete hunt returns.

Lions are aged by triangulating multiple different aging characteristics, including:

- The degree of facial scarring;
- The teeth colour and degree of wear;
- The mane development (particularly regarding the shape around the ear and the mohawk);
- Through post mortem analysis of the width of the pulp cavity of the second premolar (which becomes narrower with age).

7.6.1 Results of the Adaptive Lion Quota Management System: 2013 to 2016

In 2013, only 28% of the lions hunted were 5 years or older, in 2014 that figure had risen to 49% and in 2015 to 77.3% (Figure 5). The proportion of lions hunted that were less than 5 years of age dropped overall between 2013 and 2015 (Figure 9).

In 2015 the Zimbabwe national lion hunting quota was set at 82 lions. Of this 82, only 49 were hunted in 2015, and based on the resultant score from aging the trophies, and the fact that operators chose not to hunt lions of inadequate age (see Figures 9, 10 and 11), the recommended quota for 2016 was set at 81. In 2015 there was a marked increase in the age of lions hunted. Notably, only one lion of <4 years of age was hunted and the large majority of lions were 5 years or older (Figure 9).

As was agreed upon at the 2013 lion management meeting in Harare, the CAMPFIRE areas in which lions occur are currently exempted from the age restrictions. This approach was adopted as a means of ensuring that impoverished communities obtain the opportunity to benefit from the presence of lions, recognising the potential negative impacts the species has on the livelihoods of livestock farmers.

Using these figures and estimating the average value of a lion safari at approximately US$ 80,000 then a 50% offtake would generate approximately US$ 2,800,000 annually. If management costs are approximately $150 km^2, then the lion safaris alone can support 18,600 km^2 of wildlife habitat in Zimbabwe.

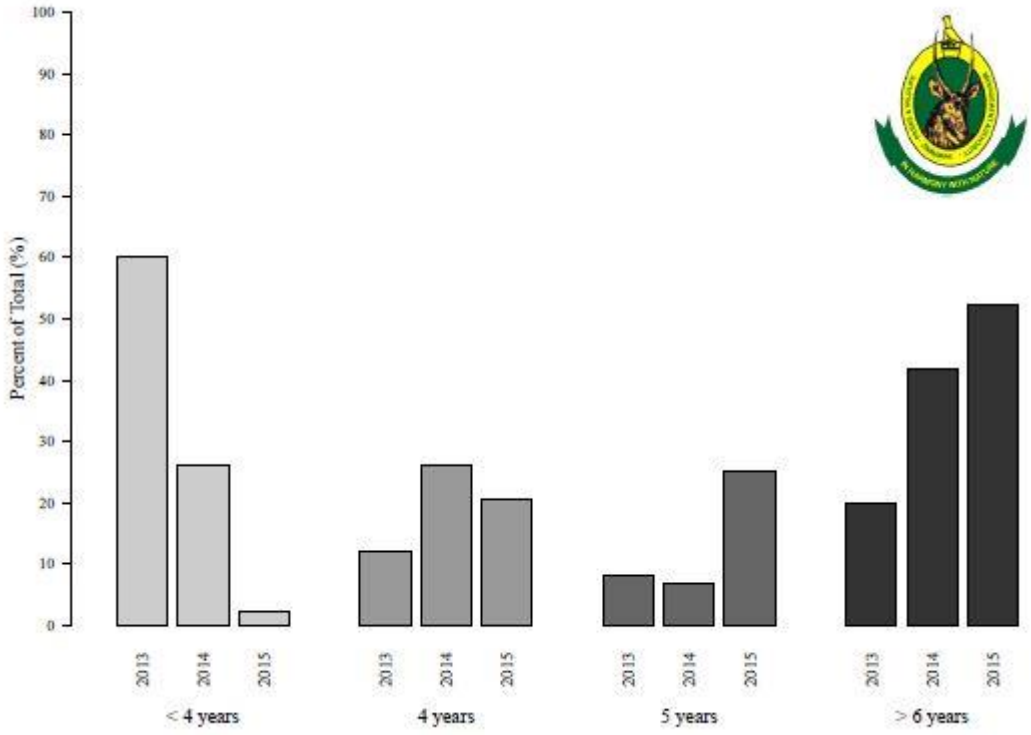


Figure 9: The percentage of lions hunted in each age class in 2013, 2014 and 2015 in Zimbabwe.

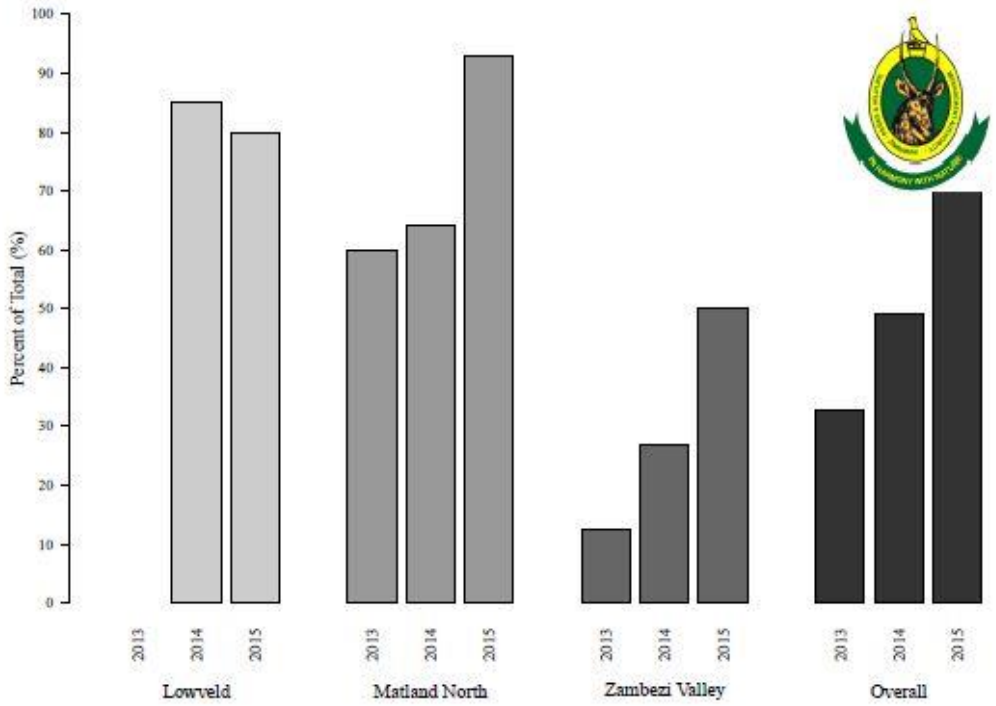


Figure 10: The proportion of lions hunted that were 5 years or older in the three main lion-hunting areas of Zimbabwe.

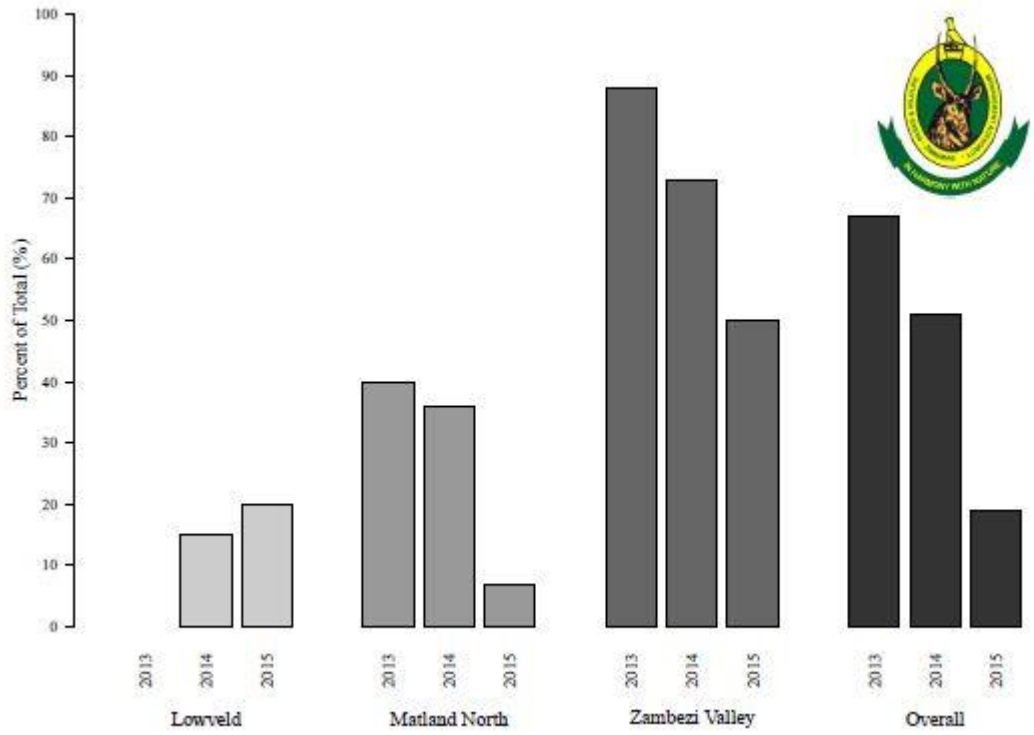


Figure 11: The proportion of lions hunted that were less than 5 years of age in the three main lion-hunting areas of Zimbabwe.

7.6.2 Case study: Safari Hunting surrounding Hwange National Park

The Hwange National Park is surrounded by hunting areas that fall under the Authority, Forestry Land, Private Land and Communal Land. The ZPWMA is responsible for setting and administrating quotas in conjunction with stakeholders for the safari areas, forestry areas, communal lands and private properties.

The Matetsi Safari Area to the north of Hwange National Park was established in the 1970s when several unsuccessful private sector mixed faming properties were expropriated, compensated and the resultant block of land turned over to safari hunting – a largely untried venture at that time on a large scale. An intensive monitoring system was set in place to gauge the effectiveness of the scheme and this continues to this day (Crossmary et al. 2013, Figure 12). The seven concessions (six given over to safari hunting) are leased on five year terms and concessionaires pay a 5 year "right to lease" fee, an annual rental, a fixed quota fee (payable if animals are shot or not) and a supplementary quota fee which allows additional animals to be bought as per need.

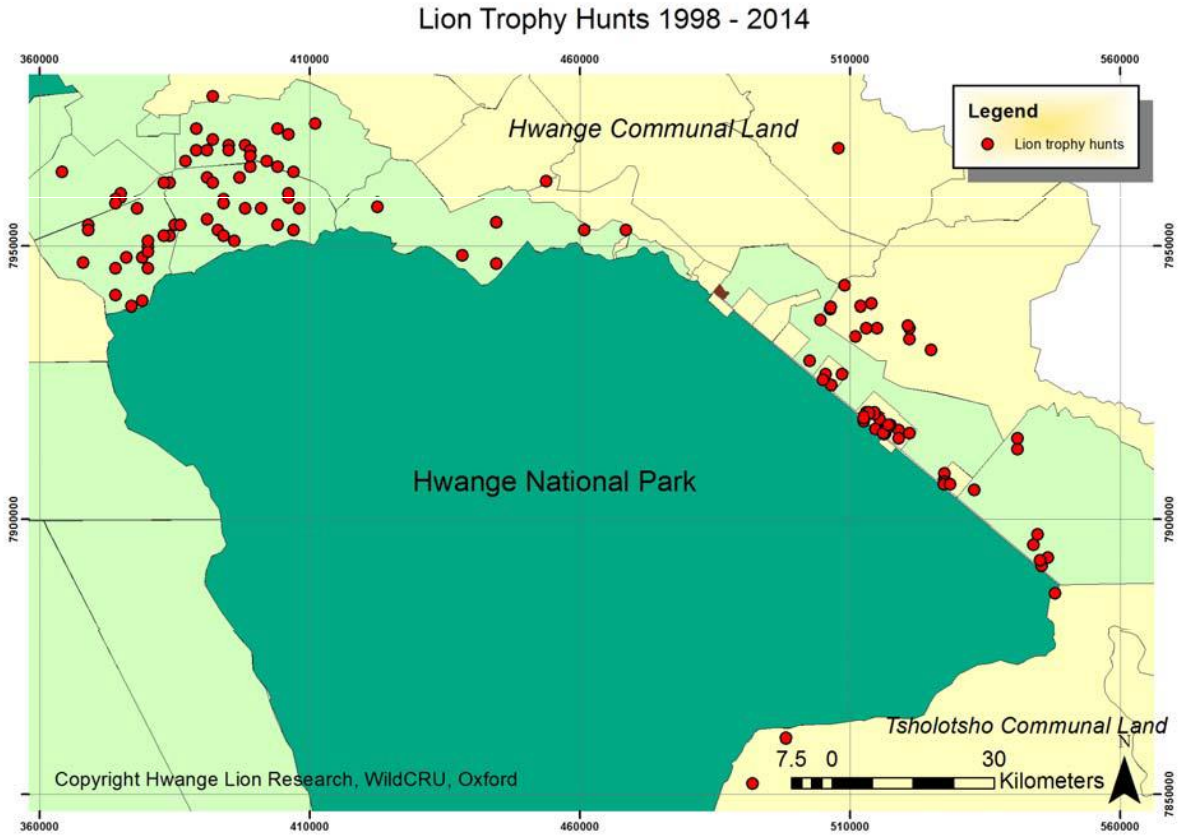


Figure 12: Record of where lion have been hunted on the land surrounding the Hwange National Park since 1998 (data extracted from the Hwange National Park Management Plan).

8 THREATS AND MITIGATION

The consensus of the scientific and animal welfare community is that the populations of lion in Africa has declined by 43% in the last two decades, with the greatest declines having occurred in west Africa. The exception to this are the populations of southern Africa, notably South Africa, Namibia, Botswana and Zimbabwe that are home to 24- 33% of the overall population has increased (Funston et. al. 2016).

Nonetheless, as is the case in other range states, the greatest threats to lion in Zimbabwe are from habitat loss, snaring and retaliatory killings where livestock are involved.

8.1 HUMAN-LION CONFLICT

The main source of illegal killing of lions is a result of Human-Lion conflict. The human population of Zimbabwe has increased since 1960 (estimated at 13 million). There is considerable pressure to convert land to agro-pastoral production, and the pressure is expected to increase. It is not unexpected therefore that the incidence of Human-Lion conflict will increase. ZPWMA records show that 200 attacks occurred on humans and 150+ on livestock (cattle, goats, sheep, dogs etc.) were killed in 2015 (see Table 13 above).

Retaliation for these livestock losses is usually done poisoning or hunting. The exact number of lions killed in this way is difficult to assess, but may number over 50/year. These indiscriminate killings pose the most significant threat to the species, and is of major concern to the management authorities. For example, the Area Manager for Hwange National Parks reported that 6 lions were killed on the Hwange National Parks boundary in 2016, and the Authority responded to several problem animal attacks on livestock.

In accordance with the Parks and Wildlife Act of 2001 when a lion attacks a human or kills livestock, it shall be eliminated. However, despite the numerous incidents reported across the country, less than 10 lions are killed through official "problem animal control" (PAC).

8.2 HABITAT LOSS

Zimbabwe supports substantial populations of lions outside of its protected areas and extensive conservancies. Moreover, despite its expanding human population, many of the protected areas are still intact however, the threat to lions from habitat loss exists in the Sebungwe and the South East Low Veld where the fragmented nature of the protected areas is compounded by an increasing human and livestock populations surrounding these areas. In these areas, habitat loss, reduction in prey populations and killing of problem lions are the major threats to long term lion survival.

Due to the large size of the protected area system in the Zambezi Valley and North West Matabeleland, threats are limited to lion range which extends into adjacent settled areas. The huge natural prey base in these protected areas, reduced killing of problem animals associated with lions preying on livestock in adjacent settled areas.

The potential and real loss of habitat and the fragmentation of range and conflicts with people in the absence of effective incentive mechanisms to maintain such habitat is probably the second greatest threat to lions after retaliatory killings. Increasing livestock numbers is reducing the available habitat in buffer areas adjacent to the protected areas, and increasing the incidents of human-lion conflicts. Lions are being more and more regarded as a liability and economic cost to rural communities. Reversing this trend is difficult under normal circumstances, and this has been made that much more difficult with the cessation of lion hunting. Integrating income from lions into rural economies, and demonstrating that lions contribute to the welfare and development of people is regarded as one strategy to mitigate against this. The involvement and empowerment of rural people in natural resource management through the CAMPFIRE programme that strives to provide economic and financial incentives through sustainable use, is one of the main driving forces behind changes in attitudes towards wildlife in communities where lion-livestock conflicts occur.

8.3 ILLEGAL TRADE IN LION PRODUCTS

Very few lions are poached in Zimbabwe (not to be confused with retaliatory killings). Records, mainly from anti-poaching reports, are for impoundment of body derivatives such as skins, teeth/claws, body

fats and bones. These may be sought after for local traditional medicinal use. Poaching mainly occurs along the boundaries of the protected areas where lions are incidentally snared as non-target prey.

The illegal trade in lions and their products (i.e. bone trade) is very insignificant. There are no records of people found in possession of illegally acquired lion specimens in Zimbabwe, and anyone found in possession of illegally acquired lion specimens is required to pay a fine US$5000 or faces a mandatory jail sentence. On conviction for lion poaching, courts may ask the accused to pay a compensation fee of US$20 000.

8.4 BUSHMEAT POACHING

Poaching for bushmeat is an important livelihood component of rural communities in Zimbabwe and a vast literature exists on this subject (see Lindsey et. al. 2015a and 2015b). Poverty stands as the major driver of illegal hunting, and the livelihoods of illegal hunters have been augmented considerably through revenue generated from bushmeat sales. Illegal hunters use bushmeat both for supplementing household protein and for economic gain.

Poaching for bushmeat does not seem to have impacted directly the overall lion's status in Zimbabwe, but more research is needed to fully understand its impact on lion. However, lions are often inadvertently caught in snares set for animals targeted by bushmeat poachers. Where possible, lions caught in snares are captured and treated (Figure 13).





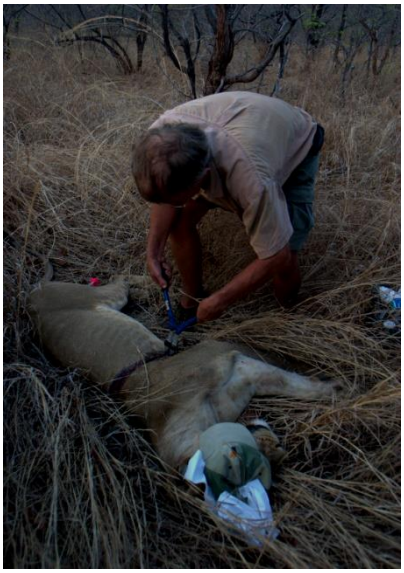




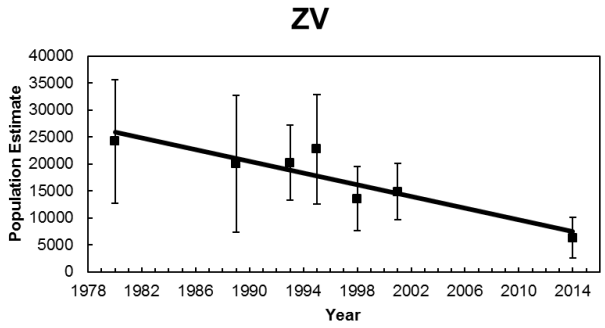
Figure 13: Young lioness being treated by the Victoria Falls Conservation Trust after a snare was removed from around the chest (Source: S. Edwards)

8.5 PREY ABUNDANCE

The extent to which bushmeat poaching outside of the Parks Estate is depleting lion's prey is not known. Prey abundance is still high in all protected areas where lions occur, and as abundance of prey species is highly correlated with lion density (Hayward et al 2007), data on the main prey species for lion, extracted from the 2014 aerial surveys of elephants and other large herbivores (Dunham et. al., 2015, 2015a, b, c, d) are shown in below (ZV = Zambezi Valley, NW Mat = North West Matabeleland).

The overall long term trends show that most population status of most prey species has declined in recent years. There are many possible explanations for these declines, but probably the most critical factor has been droughts, especially that experienced in 2005.

Buffalo


ZV
Population Estimate
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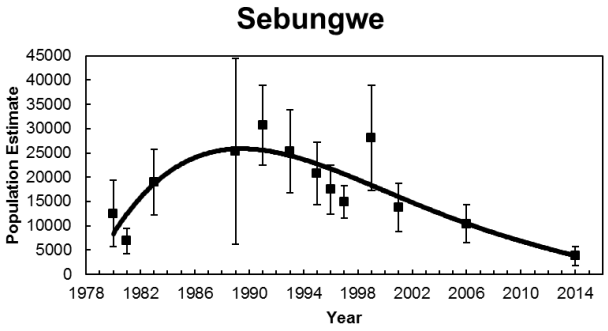
35000
30000
25000
20000
15000
10000
5000
0
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year


Sebungwe
Population Estimate
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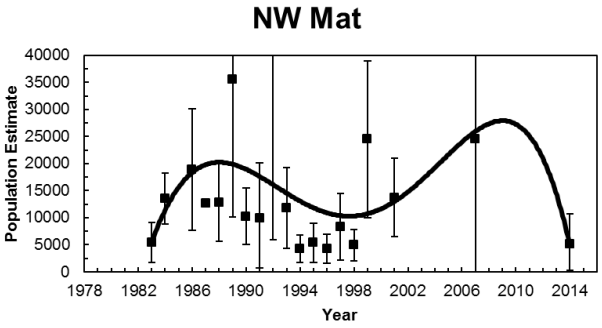
30000
25000
20000
15000
10000
5000
0
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year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Population Estimate
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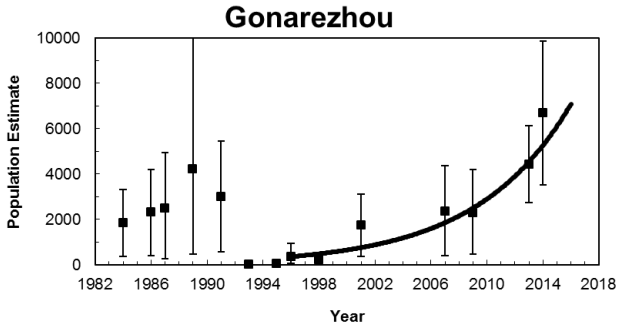
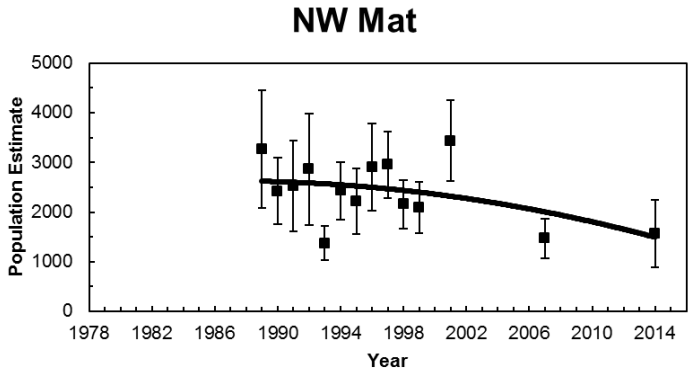
30000
25000
20000
15000
10000
5000
0
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year


Gonarezhou
Population Estimate
10000
8000
6000
4000
2000
0
1982 1986 1990 1994 1998 2002 2006 2010 2014 2018
Year

Giraffe


NW Mat
Population Estimate
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4000
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1978
1982
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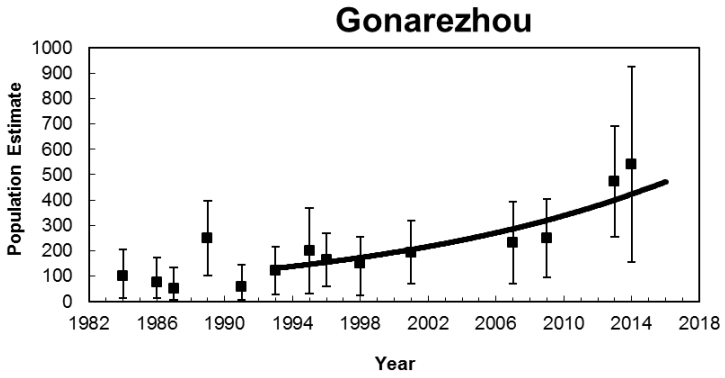
1994
1998
2002
2006
2010
2014
Year


Gonarezhou
Population Estimate
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1982
1986
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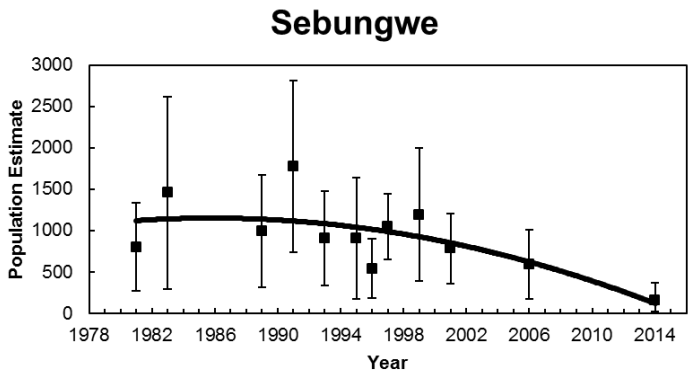
2002
2006
2010
2014
2018
Year

Sable


Sebungwe
Population Estimate
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2000
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500
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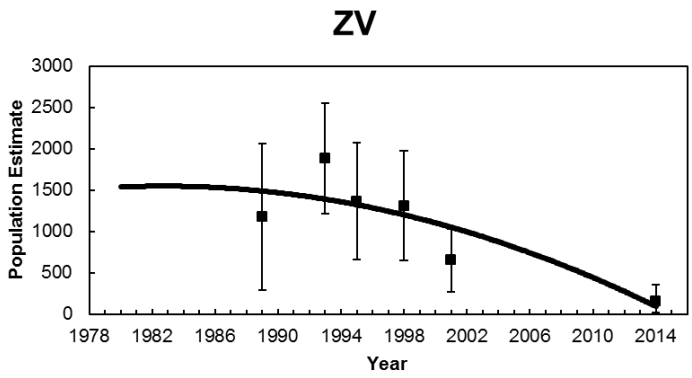
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year


ZV
Population Estimate
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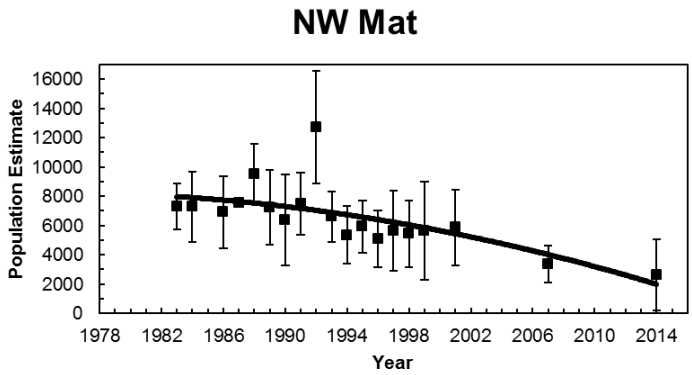
2000
1500
1000
500
0
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year


NW Mat
Population Estimate
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12000
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8000
6000
4000
2000
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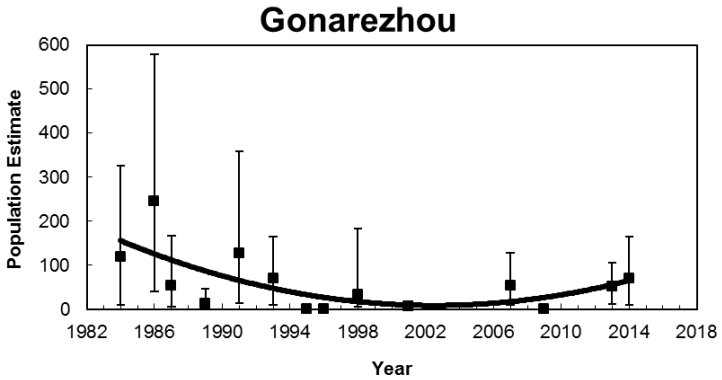
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year


Gonarezhou
Population Estimate
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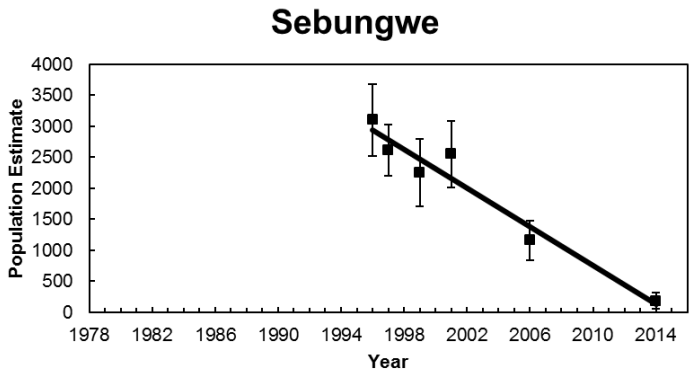
400
300
200
100
0
1982 1986 1990 1994 1998 2002 2006 2010 2014 2018
Year

Kudu


Sebungwe
Population Estimate
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3000
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2000
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1000
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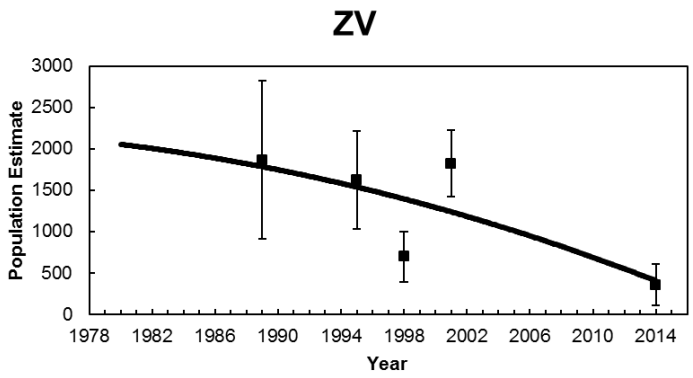
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year


ZV
Population Estimate
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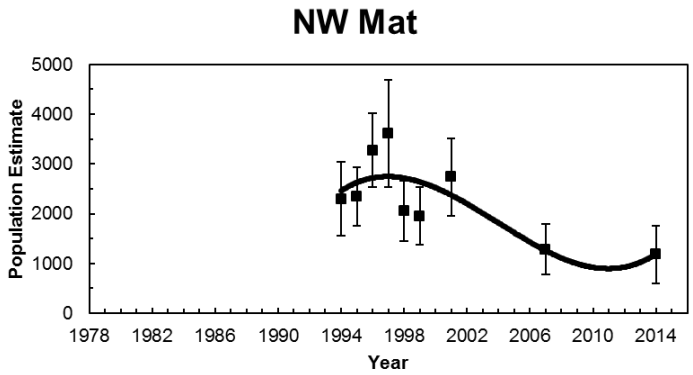
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year


NW Mat
Population Estimate
5000
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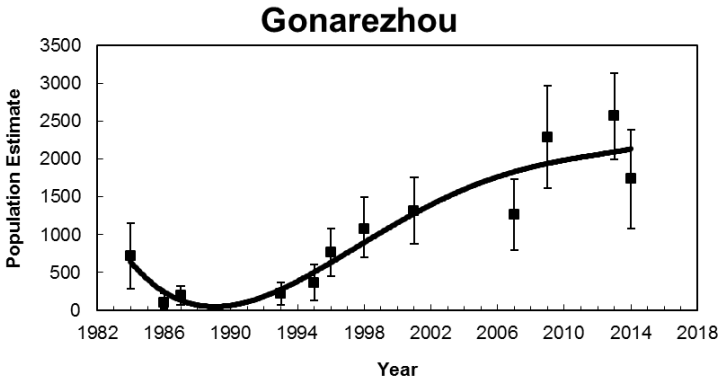
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year


Gonarezhou
Population Estimate
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2500
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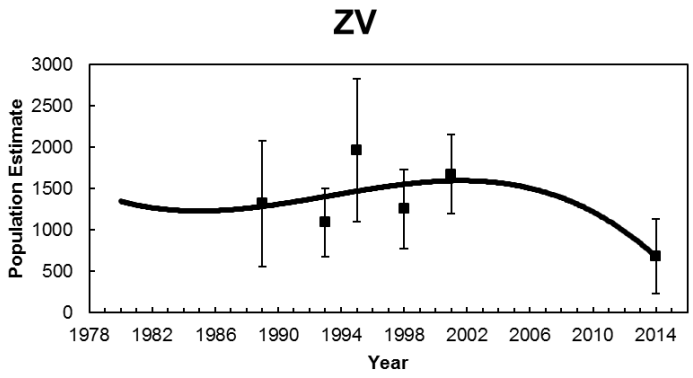
1982 1986 1990 1994 1998 2002 2006 2010 2014 2018
Year

Zebra


ZV
Population Estimate
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2500
2000
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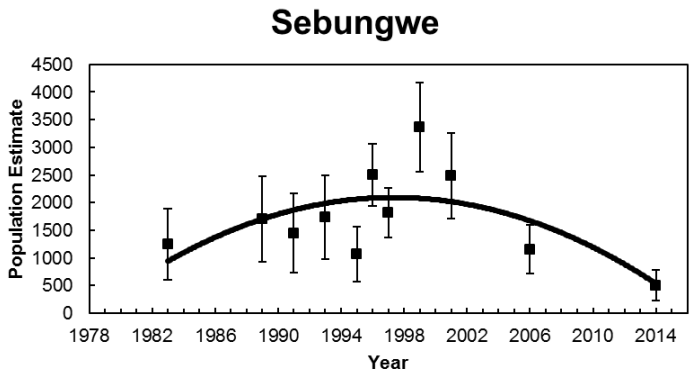
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year


Sebungwe
Population Estimate
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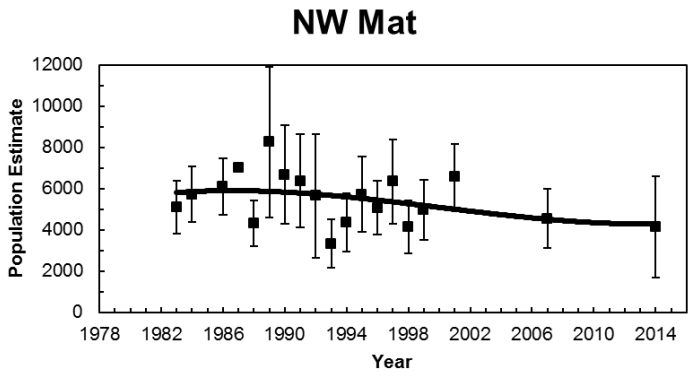
3500
3000
2500
2000
1500
1000
500
0
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year


NW Mat
Population Estimate
12000
10000
8000
6000
4000
2000
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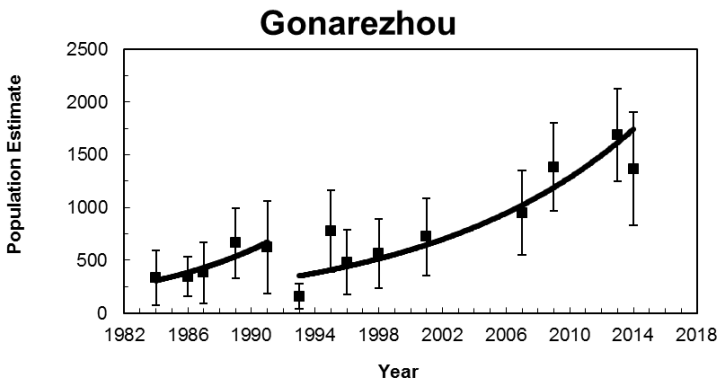
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year


Gonarezhou
Population Estimate
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2000
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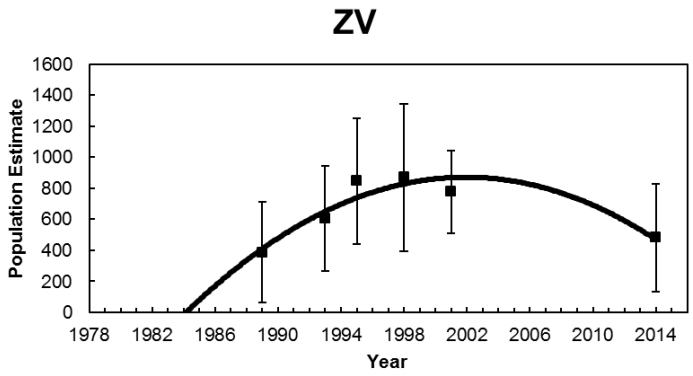
1000
500
0
1982 1986 1990 1994 1998 2002 2006 2010 2014 2018
Year

Waterbuck


ZV
Population Estimate
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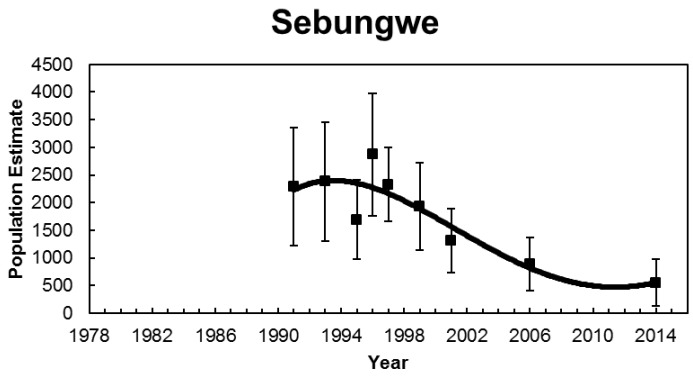
Year


Sebungwe
Population Estimate
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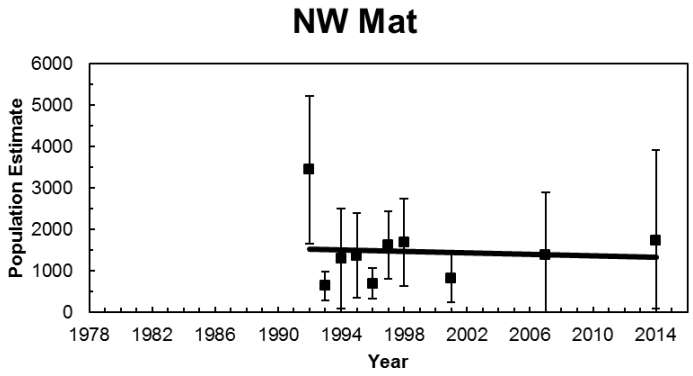
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year


NW Mat
Population Estimate
6000
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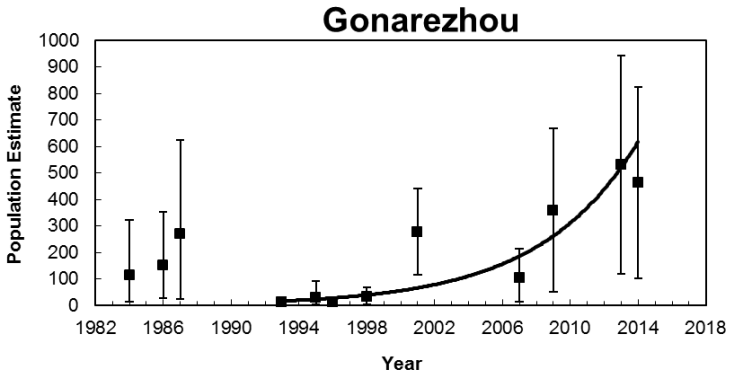
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year


Gonarezhou
Population Estimate
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1982 1986 1990 1994 1998 2002 2006 2010 2014 2018
Year

9 ASSESSMENT OF THE ENHANCEMENT AND NON-DETRIMENT FINDINGS

The assessment of the enhancement and non-detrimental findings for lion in Zimbabwe is presented here using the "IUCN SSC GUIDING PRINCIPLES ON TROPHY HUNTING AS A TOOL FOR CREATING CONSERVATION INCENTIVES. VER. 1.0. IUCN SSC (2012)" as a guide. Zimbabwe recognises the importance of these principles to guide and manage trophy hunting as a legal, regulated conservation activity which provides a critical tool to secure a sound social, economic and ecological conservation scenario.

Biological Sustainability: Trophy hunting can serve as a conservation tool when it:

	Principle	**Remarks**
1	***Does not contribute to long-term population declines of the hunted species or of other species sharing its habitat, noting that a sustainably harvested population may be smaller than an unharvested one***	Considering the latest available estimate of lion population size in Zimbabwe (1,800 – 2,000), trophy hunting harvests a yearly mean of 2.7% of adult male lions. This figure has decreased since the establishment of age restriction rules on lion hunting. This low offtake is sustainable and generates significant financial and other benefits to ZPWMA, Communities and Private Sector.
2	***Does not substantially alter processes of natural selection and ecosystem function; that is, it maintains "wild populations of indigenous species with adaptive gene pools." This generally requires that hunting offtake produces only minor alterations to naturally occurring demographic structure. It also requires avoidance of breeding or culling to deliberately enhance population-genetic characteristics of species subject to hunting that are inconsistent with natural selection***	Safari hunting in does not substantially alter natural selection or ecosystem processes. The limited quota, as further limited by age restrictions, ensures that hunting offtakes do not negatively affect natural processes. This age-based policy was adopted in part to mitigate any social or population impacts from limited safari hunting. (Whitman et al. 2004).
3	***Does not inadvertently facilitate poaching or illegal trade of wildlife***	Safari hunting in Zimbabwe does not facilitate poaching or illegal trade. Poaching and illegal trade in lion products is currently very low suggesting that the existence of licensed, regulated hunting is helping control poaching and not facilitating it. Hunting operators are in the frontlines against poaching, and are obligated through their concession lease agreements to assistance with anti-poaching. Operators spend significant resources on this, and work in close cooperation with the ZPWMA to combat all forms of illegal wildlife trade. Even where anti-poaching is not a legal prerequisite, operators fund their own anti-poaching teams and support government rangers and community scouts e.g. in Sengwa and Dande Safari Area

	Principle	Remarks
4	***Does not artificially and/or substantially manipulate ecosystems or their component elements in ways that are incompatible with the objective of supporting the full range of native biodiversity***	Hunting in Zimbabwe has created financial incentives for the development and retention of wildlife across Safari Areas, Forestry Areas, Communal CAMPFIRE Areas and private Conservancies thereby supporting biodiversity over 145,000km^2 where hunting is a primary land use. Hunting areas on private and communal land outside of the protected areas also serve as buffer zones for many national parks and safari areas which would be converted to other land uses if these were abandoned.

Net Conservation Benefit: Trophy hunting can serve as a conservation tool when it

	Principle	Remarks
1	***Is linked to identifiable and specific parcels of land where habitat for wildlife is a priority (albeit not necessarily the sole priority or only legitimate use); and on which the "costs of management and conservation of biological diversity [are] internalized within the area of management and reflected in the distribution of the benefits from the use"***	Zimbabwe has identified Safari Areas within the Parks Estates where maintaining habitats and wildlife populations is the priority. These gazetted protected areas cover approximately 17,000km^2 where, without safari hunting, it would be difficult to secure and maintain natural ecosystems and prey bases for lions. In addition to these areas, lion occur on 66% (approximately 11,000km^2) of the land set aside as Conservancies. The operational and law enforcement costs incurred by hunting companies on a yearly basis ranges from US$300,000 to US$500,000 per hunting concession, which includes the expense of camps, salaries, anti-poaching, fuel, community assistance, etc. Many of the government's costs of maintaining Safari Areas are transferred to the private sector through the obligations of their concession agreements. Revenues from hunting in communal CAMPFIRE areas are used to support a range of social services (e.g. schools, clinics, irrigation schemes etc.) while operators cover the costs of anti-poaching, maintenance and development, and contributions to communities living nearby (e.g. through boreholes, grinding mills etc.).

		In private hunting areas and conservancies, the costs and benefits of wildlife in the area are internalized and distributed within the area of management. Critically, most of the Conservancies have elected to manage and conserve endangered species, such as black rhino, and offset the costs of this by conducting sustainable hunting of lion and other key trophy species.
2	***Produces income, employment, and/or other benefits that generate incentives for reduction in pressures on populations of target species, and/or help justify retention, enhancement, or rehabilitation of habitats in which native biodiversity is prioritized. Benefits may create incentives for residents to co-exist with such problematic species as large carnivores, herbivores competing for grazing, or animals considered to be dangerous or a threat to the welfare of humans and their personal property***	Hunting produces direct and indirect income, employment, and other benefits that generate incentives that reduce the threats to wildlife populations. Approximately US$44 million accrued to the country from the revenues of trophy hunting over the last two years. This could have been 5% higher if it were not for restrictions on the export of elephant and lion trophies. This revenue pays for the daily wildlife conservation work in all sectors of the wildlife industry, including research projects, surveys, anti-poaching, and other services. Of this amount, approximately 20% is paid directly to the ZPWMA which is then used to support its management activities, including anti-poaching budgets. Local communities benefit from hunting income through leasing the right to hunt and the sale of trophy fees in CAMPFIRE areas as well as from voluntary contributions and meat. Over the last 6 years, payments from hunting operations generated approximately US$16 million. The nature of the hunting industry does not require large numbers of people to be employed. Nonetheless, the average hunting company employs approximately 80 people on a permanent basis and 20 on a seasonal basis. This equates to approximately 3,000 people who would not otherwise secure any form of employment because of the lack of opportunities in the remote areas where hunting takes place.
3	***Is part of a legally recognized governance system that supports conservation adequately and of a system of implementation and enforcement capable of achieving these governance objectives***	All wildlife species in Zimbabwe, including the African lion, are protected under the Parks and Wildlife Act of 1996 (Chapter 20:14) as amended by Act Number 19 of 2001 which came into operation on the 1st of June 2002 through a Statutory Instrument 144C of 2002. The Act that was originally passed by Parliament in 1975 was a unique move in Africa, if not globally, that promoted the rapid development of the country's wild life industry and lead to the partial

		extension of the principle to the Communal Lands through the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) in the 1980s. The Act provided a legal basis for the devolution of Authority through granting Appropriate Authority Status to the communal areas to manage the wildlife resources for their own benefit. The Act was subsequently revised in 1996 and 2001 with the latest revision paving the way for the establishment of the current Parks and Wildlife Management Authority to replace the former Department of National Parks and Wild Life Management. Following the introduction of the Parks and Wild Life (General) (Amendment) Regulations, 1998 (No.2), i.e. Statutory Instrument 26 of 1998, the administration of the wildlife industry experienced increasing centralisation of controls on wildlife management and utilisation on alienated and communal land. The Parks and Wildlife Management Authority is mandated by the Parks and Wildlife Act [Chapter 20:14], with the responsibility of conserving Zimbabwe's wildlife heritage through effective, efficient and sustainable protection and utilisation of natural resources for the benefit of present and future generations. The Authority was established to allow it to retain the revenue that it generates to fund its operations and thereby reducing its dependence on Treasury. This entailed introducing a commercial dispensation and putting in place effective revenue generation and financial management systems. The ZPWMA has the mandate to manage the entire wildlife population of Zimbabwe, whether on state, private and communal land.

Socio-Economic-Cultural Benefit

	Principle	**Remarks**
1	***Is premised on appropriate resource assessments and/or monitoring of hunting indices, upon which specific quotas and hunting plans can be established through a collaborative process. Optimally, such a process should (where relevant) include local communities and draw on local/indigenous knowledge. Such resource assessments (examples might include counts or indices of population performance***	Zimbabwe implements an adaptive quota setting quota system that uses inputs from monitoring data and input from a variety of stakeholders including ZPWMA field and research staff, local communities, hunting operators, and independent biologists. Quotas are set based on population estimates or trend analyses, monitoring data, hunt return data, research work and indices as may be reflected in various reports by field personnel.

	such as sighting frequencies, spoor counts) or hunting indices (examples might include trophy size, animal age, hunting success rates and catch per hunting effort) are objective, well documented, and use the best science and technology feasible and appropriate given the circumstances and available resources	For lions, specifically, the ZPWMA together with the Safari Operators Association (SOAZ), the Zimbabwe Professional Hunters Association (ZPHGA) and invited independent scientists (such as Panthera) review the returns from the current hunting season and assign points as per the lion aging criteria. The overall quotas allocated and actual offtake have been reduced in recent years as a precautionary measure, including implementing moratoriums in some regions where lion densities have declined. These measures, i.e., age, population trends, maximum overall numbers and levels of utilisation has resulted in lower quotas thus underlining Zimbabwe's commitment to sustainable hunting.
2	***Involves adaptive management of hunting quotas and plans in line with results of resource assessments and/or monitoring of indices, ensuring quotas are adjusted in line with changes in the resource base (caused by ecological changes, weather patterns, or anthropogenic impacts, including hunting offtake)***	Quotas are set adaptively in line with the results of monitoring trends and on regulatory compliance. If an underage lion is harvested, the quota for that area is removed in the next season to allow the population to age and to penalize the non-compliance. In this way, Zimbabwe ensures responsible and sustainable offtakes that have limited impact on the lion population.
3	***Is based on laws, regulations, and quotas (preferably established with local input) that are transparent and clear, and are periodically reviewed and updated***	Safari hunting in Zimbabwe is regulated through the National Parks and Wildlife Act and supporting Regulations that specify when, where and how animals are hunted. Both the professional hunters and the hunting client are licensed in terms of these regulations, and all returns are lodged electronically and tracked through the Reserve Bank TRAS-2 system. As described above, quotas are established in a transparent and participatory way.
4	***Monitors hunting activities to verify that quotas and sex/age restrictions of harvested animals are being met***	The monitoring of the lion hunting is carried out through the implementation of a specific database and a specific safari return form. All hunting permits issued by (and compulsorily returned to) the ZPWMA are registered on a specific database that has been developed under the auspices of the Exchange Control Division of the Reserve Bank that records all parameters related to hunting safaris, including records of lion hunting. The database is accessible to the ZPWMA who can extract reports on all lion hunting activities for all areas in the country. Since 2013, all professional hunters conducting lion hunting safaris are required to fill in the return form for both successful and unsuccessful safaris that

		captures a broad range of general information on the safari (client name, duration, date, payments etc. For the successful lion hunting safaris, additional information related to hunting effort and success, trophy skull measures (total length and width) and specified photographs are taken of the physical features (mane etc.) and upper and lower jaws. These return forms and trophy photographs are compulsory. No CITES export permit can be issued without compliance. All data forms are reviewed by the ZPWMA together with a committee appointed by the SOAZ and ZPHGA to ensure the offtakes and subsequent exports are not detrimental to the survival of the species. Zimbabwe also requires that a ZPWMA ranger accompany all lion safaris both on state land and private land.
5	***Produces reliable and periodic documentation of its biological sustainability and conservation benefits (if this is not already produced by existing reporting mechanisms).***	The Exchange Control Division of the Reserve Bank publishes a detailed report that summarises all data related to sport hunting. This includes country of origin of clients, gross income from daily rates and trophy fees (by company), average trophy and safari values, and the contribution of key species to the overall income generated through hunting. The ZPWMA also produces annual reports that highlight the performance of the hunting industry, listing the challenges that it faces. It also submits periodic reports to CITES.

Accountable and Effective Governance

	Principle	**Remarks**
1	***Is subject to a governance structure that clearly allocates management responsibilities***	The governance structure is described in the Parks and Wildlife Act and its subsidiary regulations that clearly provides for institutional arrangements and administration defining the management responsibilities within the relevant Government Authority.
2	***Accounts for revenues in a transparent manner and distributes net revenues to conservation and community beneficiaries according to properly agreed decisions;***	The equitable distribution of costs and benefits take into consideration the role of stakeholders in relation to the land category. Benefit sharing to communities under the CAMPFIRE programme is determined through an approved ratio that channels 55% of all income from hunting to the Ward level. This institution is monitored at the local level by the Rural District Councils that guide Ward

		Wildlife Committees with respect to community projects and services. At national level this is monitored by Ministry of Rural Development, Preservation and Promotion of Culture and Heritage Safari operators contribute substantially and voluntarily, over and above the prescribed fixed contribution, especially where this involves anti-poaching efforts and community developments. They provide funding, equipment and the technical expertise for repairs, transportation, and other social services (schools, boreholes). In addition, hunting companies collaborate with both ZPWMA and District anti-poaching teams to remove snares, participate in serious wildlife crime investigations and arrest poachers.
3	***Takes all necessary steps to eliminate corruption;***	Anti-corruption efforts in Zimbabwe are governed by the following legislation: • The Prevention of Corruption Act (1983); • Public Service Act (1995); • The Ombudsperson Amendment Act (1997); • Anti-Corruption Commission Bill (2004); • The Criminal law (Codification and Reform) Act (2004); • Bank Use Promotion and Suppression of Money Laundering Act (2004); • Criminal Procedure and Evidence Amendment Act (2004); and • Criminal Law (Codification and Reform) Act of 2006 The Zimbabwean Anti-Corruption Commission (ACC) was established after the passing of the Anti-Corruption Commission Bill in June 2004. The Commission is a signatory to the Southern Africa Development Community (SADC) Protocol as well as the African Union (AU) and United Nations Convention on Anti-Corruption.
4	***Ensures compliance with all relevant national and international requirements and regulations by relevant bodies such as administrators, regulators and hunters.***	The CITES Management Authority of Zimbabwe, the ZPWMA, ensures compliance of safari hunting to CITES guidelines and provisions.

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11 APPENDICES

11.1 ANNEX I: SUMMARY OF NATIONAL PARKS ESTATE, FORESTRY, COMMUNAL AND PRIVATE LAND WHERE LION ARE KNOWN TO OCCUR

1. National Parks Estate

Type of Land	Name of Park	District	Area (hectares)	Presence of lion
NP	Chizarira	Binga	191,000	Yes
NP	Gonarezhou	Chiredzi	505,000	Yes
NP	Matusadonha	Nyaminyami	140,700	Yes
NP	Chimanimani	Chimanimani	17,110	No
NP	Mana Pools	Hurungwe	219,600	Yes
NP	Kazuma Pan	Hwange	31,300	Yes
NP	Hwange	Hwange	1,465,100	Yes
NP	Victoria Falls "A"	Hwange	1,904	No
NP	Victoria Falls "B"	Hwange	436	No
NP	Zambezi	Hwange	56,010	Yes
NP	Rhodes Nyanga	Nyanga	47,150	Migratory
NP	Rhodes Matopos	Matobo	42,400	No
Total Area National Parks (ha)			**2,717,710**	
Botanical Gardens	Pioneer Reserve	Beitbridge	38	No
Botanical Gardens	Tolo River Reserve	Beitbridge	44	No
Botanical Gardens	South Camp Reserve	Beitbridge	26	No
Botanical Gardens	Chisekera Hot Springs	Chiredzi	95	No
Botanical Gardens	Mawari Raphia Palm	Mt. Darwin	34	No
Botanical Gardens	Tingwa Raphia Pan	Mt. Darwin	290	No
Botanical Gardens	Haroni Forest	Chimanimani	20	No
Botanical Gardens	Rusitu Forest	Chimanimani	150	No
Botanical Gardens	Sebakwe Acacia Karoo	Kwekwe	60	No
Botanical Gardens	Sebakwe Great Dyke	Kwekwe	165	No
Botanical Gardens	Sebakwe Mountain Acacia	Kwekwe	53	No
Botanical Gardens	Mazowe "A"	Harare	43	No
Botanical Gardens	Mazowe "B"	Harare	3	No
Botanical Gardens	Bunga Forest	Mutare	495	No
Botanical Gardens	National Botanic Garden	Harare	67	No

Type of Land	Name of Park	District	Area (hectares)	Presence of lion
Botanical Gardens	Vumba Botanic Garden	Mutare	200	No
Botanical Gardens	Ewanrigg Botanic Garden	Goromonzi	286	No
Total Area of Botanical Gardens and Botanical Reserves:			**2,069**	
Sanctuary	Maninii Pan	Chiredzi	300	No
Sanctuary	Melsetter Eland	Chimanimani	1,800	No
Sanctuary	Mbaze Pan	Nkayi	40	No
Sanctuary	Nyamanyetsi (Nyamanechi)	Guruve	2,840	No
Sanctuary	Mushandike	Masvingo	12,900	No
Sanctuary	Rhodes - Bulawayo	Matobo	1,100	No
Total Area Sanctuaries			**18,980**	
Safari Area	Tuli	Beitbridge and Gwanda	41,600	Yes
Safari Area	Chete	Binga	108,100	Yes
Safari Area	Chipinga (Chipinge)	Chipinge	26,100	No
Safari Area	Malapati (Malipati)	Chiredzi	15,400	Yes
Safari Area	Chinsa	Gokwe	171,300	Yes
Safari Area	Hartley (Chegutu)	Chegutu	44,500	No
Safari Area	Charara	Kariba and Hurungwe	169,200	Yes
Safari Area	Hurungwe	Hurungwe	289,400	Yes
Safari Area	Doma	Makonde	94,500	Yes
Safari Area	Umfurudzi	Shamva	76,000	No
Safari Area	Dande	Guruve	52,300	Yes
Safari Area	Chelvore (Chewore)	Hurungwe	339,000	Yes
Safari Area	Sapi	Hurungwe	118,000	Yes
Safari Area	Deka	Hwange	51,000	Yes
Safari Area	Matetsi	Hwange	295,500	Yes
Total Area of Safari Areas:			**1,891,900**	
Recreational	Chibwatata	Binga	6	No
Recreational	Kavira	Binga	50	No
Recreational	Lake Kariba	Binga, Nyaminyami and Hwange	287,200	Yes

Type of Land	Name of Park	District	Area (hectares)	Presence of lion
Recreational	Ngezi	Kadoma	5,800	No
Recreational	Umfuli (Mfurudzi	Chegutu	12,700	No
Recreational	Lake Robertson (Manyame Lake)	Chegutu, Makonde and Harare	11,200	No
Recreational	Lake Cunningham	Insiza	4,172	No
Recreational	Chinhoyi Caves	Makonde	120	No
Recreational	Manjirenji	Zaka	3,400	No
Recreational	Bangala	Zaka and Masvingo	2,700	No
Recreational	Sebakwe	Kwekwe	2,600	No
Recreational	Robert McIlwaine (Chivero)	Harare	6,180	No
Recreational	Umzingwane	Umzingwane	1,233	No
Recreational	Kyle (Mutirikwi)	Masvingo	16,900	No
Recreational	Lake Matopos	Matobo	2,900	No
Total Area of Recreational Parks, Lakes and Dams			**357,161**	

Total Area National Parks (ha)	2,717,710
Total Area of Botanical Gardens and Botanical Reserves:	2,069
Total Area Sanctuaries	18,980
Total Area of Safari Areas:	1,891,900
Total Area of Recreational Parks, Lakes and Dams	357,161
Total Ha	**4,987,820**

2. Forestry Land

Land	Name	District	Area (ha)	Presence of lion
Forestry Areas	Fuller	Hwange	23,300	Yes
Forestry Areas	Panda Masuie	Hwange	33,500	Yes
Forestry Areas	Kazuma	Hwange	24,000	Yes
Forestry Areas	Mvutu	Hwange	2,100	No
Forestry Areas	Sikumi	Hwange	54,400	Yes
Forestry Areas	Gwayi	Lupane	144,265	Yes
Forestry Areas	Lake Alice	Lupane	39,000	No
Forestry Areas	Ngamo	Lupane	102,900	Yes

Land	Name	District	Area (ha)	Presence of lion
Forestry Areas	Chisengu	Lupane	4,006	No
Forestry Areas	Glencoe	Lupane	2,050	No
Forestry Areas	Lionhills	Lupane	2,747	No
Forestry Areas	Martin (i)		400	No
Forestry Areas	Martin (ii)		4,400	No
Forestry Areas	Mudima		6,355	No
Forestry Areas	Nyambewa		5,484	No
Forestry Areas	Tandai		5,450	No
Forestry Areas	Tarka		4,343	No
Forestry Areas	Gwampa	Nkayi	47,000	No
Forestry Areas	Chesa	Nkayi	14,250	No
Forestry Areas	Inseze	Nkayi	35,200	No
Forestry Areas	Inseze Extension	Nkayi	8,400	No
Forestry Areas	Umgusa	Nkayi	32,200	No
Forestry Areas	Umzibani	Nkayi	2,471	No
Forestry Areas	Kavira	Binga	28,200	Yes
Forestry Areas	Mzolo	Binga	67,200	No
Forestry Areas	Sijarira	Binga	25,600	Yes
Forestry Areas	Bembesi	Binga	55,100	No
Forestry Areas	Molo	Binga	2,900	No
Forestry Areas	Mtao	Chirumanzu	8,170	No
Forestry Areas	Chirindu	Chirumanzu	950	No
Forestry Areas	Gungunyana	Chirumanzu	1,650	No
Forestry Areas	Mafungabusi	Chirumanzu	82,100	No
Forestry Areas	Mudzongwe	Chirumanzu	1,420	No
Forestry Areas	Ungwe	Chirumanzu	567	No
Forestry Areas	Nyangu	Chirumanzu	16,600	No
Forestry Areas	York	Chirumanzu	1,455	No
Forestry Areas	Banti	Mutare	2,219	No
Forestry Areas	Stapleford	Mutare	24,600	No
Rhodes Estate	Erin	Nyanga	10,700	No
Rhodes Estate	Sauerdale North	Nyanga	214	No

Land	Name	District	Area (ha)	Presence of lion
Total Forest Areas (ha)			**927,866**	

3. CAMPFIRE Districts

District	Natural Region	Total Area (km^2)	Area of CF Wards (km^2)	Number of Wards	CF Wards	District Pop (persons)	Presence of lion
Beitbridge	5	12,935	4,595	21	6	80,946	Migratory
Binga	3,4&5	12,308	7,930	27	21	87,802	Migratory
Bubi	4	5,547	88	12	2	36,614	Migratory
Bulilimamangwe	4&5	12,574	1,530	33	10	156,641	Migratory
Chaminuka	2a,2b,3,4&5	2,752	380	26	2	94,047	No
Chimanimani	1,2a,3,4&5	3,419		28		110,836	No
Chipinge(Gazaland)	1,2a,3,4&5	5,223	408	33	2	336,893	Migratory
Chiredzi(Gaza Khomanani)	5	17,748	3,633	32	9	183,228	Yes
Chiweshe(Mazowe)	2a	4,482	375	29	5	198,319	No
Gokwe North	3,4&5	7,359	2,523	25	4	164,558	Migratory
Gokwe South	3&4	11,138	1,308	28	6	238,581	Migratory
Goromonzi	2a	2,504		26		147,126	**No**
Mbire (Guruve)	2a,3&4	7,810	4,215	28	14	135,637	Yes
Gwanda	4&5	10,792	2,283	23	6	112,984	No
Hurungwe	2a,3,4&5	19,895	2,793	40	9	246,902	Yes
Hwange	4&5	29,934	4,021	27	15	71,707	Yes
Hwedza	2b&3	998				69,981	No
Kusile(Lupane)	3&4	7,780	2,885	24	11	94,469	Migratory
Marondera	2a&2b	3,554		24		104,601	No
Matobo	4&5	7,278	1,233	26	4	89,281	No
Mudzi	4	4,222	1,009	18	2	109423	No
Mutoko	2b,3&4	4,052		29		122,941	No
Muzarabani	2a,3&4	4,322	2,540	17	9	69,851	Migratory
Mwenezi	4&5	12,933		31		101,354	Migratory
Nkayi	4	5,333	2,628	23	6	113,302	Migratory
Nyaminyami(Kariba)	4&5	6,327	3,532	16	11	27,717	Yes
Nyanga	1,2b,3&4	5,738	253	37	1	128,439	Migratory
Pfura(Mt. Darwin)	2a,2b,3&4	1,771				164,362	No
Rushinga	3&4	2,408		17		75,332	No
Tsholotsho	4	7,823	5,354	20	8	111,828	Yes
UMP Zvataida	2b,3&4	2,682	619	15	2	86,302	No
Umzingwane	4	1,074				62,954	No

District	Natural Region	Total Area (km²)	Area of CF Wards (km²)	Number of Wards	CF Wards	District Pop (persons)	Presence of lion
Zivagwe	4	2,363				65,752	No
TOTAL/AVERAGE		247,078	56,135	735	165	4,000,710	

4. Conservancies

	Name of Conservancy	District	Area (hectares)	Presence of lion
Conservancies	Malilangwe	Chiredzi	40,000	Yes
Conservancies	Save	Chiredzi	344,200	Yes
Conservancies	Chiredzi River	Chiredzi	28,500	No
Conservancies	Bubye Valley	Matabeland South	374,000	Yes
Conservancies	Bubiana	Matabeland South	130,000	No
Conservancies	Gwayi	Hwange	150,897	Migratory
Conservancies	Midlands Black Rhino	Midlands	85,000	No
Other	Matetsi Farms	Hwange	155,627	Migratory
Total Area of Conservancies			**1,308,224**	

11.2 ANNEX II: SUMMARY OF PRIMARY LEGISLATION AND REGULATIONS

11.2.1 The Policy for Wild Life of 1992

This policy provides for Government to maintain a protected area network known as the Parks and Wild Life Estate for the conservation of the nation's wild resources and biological diversity. According to the policy, government will use the Estate to promote a rurally based wild life industry and will harmonise the management of the Estate with the efforts of neighbouring communities that are developing wild life as a sustainable form of land use. The policy vests executive responsibility for the Parks and Wildlife Estate in the Department of National Parks and Wild Life Management (DNPWLM). It provides for the following categories of protected area: National Park; Safari Area; Sanctuary; Recreational Park, Botanic Reserve and Botanic Garden.

- The objectives of the Parks and Wild Life estate will be to:
- Preserve representative samples of Zimbabwe's aquatic and terrestrial flora and fauna and their physical environments;
- Protect areas of scenic beauty and special interest;
- Preserve rare, endangered and endemic species;
- Conserve water catchments;
- Provide opportunities for public education and the advancement of scientific knowledge;

and, without prejudice to any of the above:

- Encourage public use related to the enjoyment and appreciation of these areas; and
- Generate economic activity within the Estate and surrounding areas to enhance rural development.

The policy commits the DNPWLM to an adaptive management strategy in which research and monitoring are incorporated as integral components of management. It states that where sport

hunting is an objective in a protected area, quotas will be set to the maximum sustainable level at which trophy quality can be maintained and the hunting can be marketed. In terms of the policy the emphasis of tourism in parks should be low density and high quality tourism. An EIA must be carried out for major developments such as construction of roads, powerlines, buildings or dams.

With respect to Wildlife Conservation, the Policy states that the Government of Zimbabwe aims to encourage the conservation of wild animals and their habitats outside the Parks and Wild Life Estate recognising that this is only likely to be successful if wild life can be used profitably and the primary benefits accrue to people with wild life on their land. "*Recognising that much of Zimbabwe does not consist of good arable land, Government regards wild life management in all its diverse forms as a legitimate land use which may be the most appropriate or highest-valued form of development in many areas*". The policy also states that Government will take the necessary legal and enforcement measures to prevent the illegal use of wildlife.

Addressing community rights to natural resources the Policy states that government intends to "*transform land use in remote communal areas through its Communal Areas Management Programme for Indigenous Resources (CAMPFIRE), under which rural peoples have the authority to manage their wild life and other natural resources and benefit directly from so doing*". Further government will "*ensure that wildlife is not undervalued to the people living with it by permitting them to use it sustainably for their own gain as they are able to do with other natural resources and agricultural products*".

The policy states that the mechanism for communities to gain rights over wild life will be through the granting of Appropriate Authority to Rural District Councils (under the Parks and Wildlife Management Act of 1975). For this authority to be granted, the Minister will require:

1. An acceptable management plan from councils in which objectives for wild life are stated and preliminary intentions for achieving these objectives are outlined;
2. An acceptable institutional plan which outlines clearly the methods by which councils intend a) to involve wild life producer communities in district level management and b) to devolve the decision-taking process in local wild life management and the distribution of wild life benefits to producer communities;
3. The department to assist councils in managing their wild life and to coordinate the activities of NGOs who are assisting councils;
4. The approval by the department of all annual quotas of wild life killed or sold in communal lands during the interim period while councils develop their management capacity;
5. The presentation of annual reports from Councils to the Director and to their constituents detailing the year's performance in wild life management in their district.

The policy provides for the Minister to withdraw Appropriate Authority from a council not conforming to conditions and objectives under which it was granted.

11.2.2 Wildlife Based Land Reform Policy

In 2004 there was a move to revise the Policy for Wildlife to cater for the Land Reform programme. The revised policy, known as the Wildlife-Based Land Reform Policy, has not however been formally accepted by Government. Nonetheless, it is important to summarise what was envisioned at that time since this has influenced the way the management of wildlife outside of the Parks Estate has unfolded.

The vision of this reformed policy is to ensure profitable, equitable and sustainable use of wildlife resources, particularly in areas where agricultural potential is limited. It states that "*the policy has*

been developed in the context of Zimbabwe's Land Reform Programme and is underpinned by recognition that wildlife is a viable land-use option, that it can facilitate attainment of equity objectives and that it is feasible. This policy is complemented by existing natural resources legislation and the state protected area system."

The policy also states that the key issues that were taken into consideration were:

- The State will continue to make provision for wildlife management outside the protected area system, including setting aside certain core zones for wildlife production. Wildlife should be the only permitted primary land use option in these areas.
- Outside core zones, wildlife production, amongst other land use options, will be encouraged. The most profitable and ecologically sustainable land use option must be allowed to evolve in response to changing economic influences, notwithstanding the need to ensure food security in these areas.
- The scale of wildlife operations must be allowed to vary from intensive to extensive, depending on agro-ecological settings.
- All beneficiaries of wildlife operations, whether individually or jointly, must equitably share the costs of production.
- Wildlife management responsibility and authority must be devolved to the most appropriate level for efficient resource management and production incentives must be maximized for landholders.
- Security of tenure over resources is key to successful wildlife-based land reform. These core areas should be identified.

The aims of the Wildlife-Based Land Reform Policy are listed as:

1. To facilitate the indigenisation of the wildlife sector and to ensure more equitable access by most Zimbabweans to land and wildlife resources and to the business opportunities that stem from these resources.
2. To maintain a proportion of land outside state protected areas under wildlife production.
3. To enhance diversity of land uses through wildlife production.
4. To promote secure and equitable tenure.
5. To develop and implement appropriate institutional arrangements for wildlife-based land reform.

The policy recognized that wildlife production can be at different scales, which are dependent on several factors that include the type of wildlife, management regime and ecological conditions. Three categories are highlighted in the policy:

1. Intensive production systems with captive or semi-captive species such as crocodiles and ostriches (1 – 100 hectares).
2. Semi-intensive to semi-extensive production systems with free-ranging "plains game" populations (1,000 to 10,000 hectares).
3. Extensive production systems incorporating "big game" populations (over 10,000 hectares).

The Wildlife Based Land Reform Policy promotes two land redistribution models:

1. A state leasehold approach which is based on the reallocation of leasehold leases.
    a. This approach entails the acquisition of the entire land-holding with compensation for infrastructure, wildlife, etc.,

   b. The land will be reallocated to lessees under terms and conditions that will ensure sustainable wildlife management, on-going investment and capacity-building in that area.
2. A corporate equity model that involves transfer of shares within a land-owning company.
   a. The transfer of shares will be in accordance with the Indigenisation goals and sound business principles;
   b. Proposals from stakeholders must outline realistic ways in which new entrants can increase their shareholdings well beyond an initial level, over a reasonable time scale.
   c. The proposals must make provision for immediate allocation of shareholdings to new participants.

The Policy document also acknowledges that the two approaches can be applied in combination and shall be considered on a case by case basis, and that the State may from time to time consider other approaches that meet the objectives of the Wildlife Based Land Reform Policy.

11.2.3 Parks and Wild Life Act Chapter 20:14 of 1996 as amended in 2001:

This is the pivotal Act with respect to wildlife management in Zimbabwe. The Act includes the following sections:

1. Parks and Wildlife Board
2. Parks and Wildlife Estate and Parks and Wildlife Land
3. National Parks
4. Botanical Reserves and Botanical Gardens
5. Sanctuaries
6. Safari Areas
7. Recreational Parks
8. Specially Protected Animals
9. Specially Protected Indigenous Plants
10. Indigenous plants
11. Hunting, removal, viewing and sale of animal products
12. Protection of animals and Indigenous plants on alienated land
13. Fish Conservation
14. Evidence, prevention and detection of offences and additional penalties and forfeitures
15. Inspectors, Officers, employees and advisory committees
16. General

The Act also defines the different types of land (Alienated land):

a. “Private Land” means land the ownership of which is vested in any person other than the President.
b. “State Land” means land vested in the President other than Communal Land or trust land vested in the President.
c. “Trust land” means any land, other than Communal land held in trust by the President or a statutory body or by a person, whether solely or jointly with others, by virtue of his being the holder of some office in a statutory body.

The Parks and Wildlife Act of 1975 (as amended) states that the purposes of National Parks are:

1. To preserve and protect the natural landscape and scenery.
2. To preserve and protect wild life and plants and the natural ecological stability of wild life and plant communities for the enjoyment, education and inspiration of the public.

Establishment of Protected Areas: The Act enables the President to declare National Parks on State land or Trust Land if the trustees give their consent (Section 22). The Act enables the Minister acting on the authorisation of the President to acquire land for the Parks and Wild Life Estate either compulsorily or by agreement in terms of the procedures contained in the Communal Land Act and the Land Acquisition Act. The Act gives the Minister the power to manage National Parks, control entry and authorise or restrict certain activities and carry out various conservation measures. The Act provides for the provision of facilities and services for tourists in National Parks or to lease out such facilities or services. The Act allows the Minister to issue a permit for hunting in National Parks.

The Act makes provision for the establishment of Botanical Reserves and Botanical Gardens (Section 26) on State Land or Trust Land for the preservation and protection of rare or endangered indigenous plants or representative plant communities for the enjoyment, education and benefit of the public.

A third category of protected area is a Sanctuary which may be established by the President on State Land or Trust Land (Section 31) to afford special protection to all animals or a particular species of animal in the sanctuary for the enjoyment and benefit of the public. The Minister may provide tourism facilities and services in a Sanctuary or lease facilities or services. The Minister may also issue permits for hunting or the removal of game from a sanctuary for certain purposes.

In terms of the Act the President may establish Safari Areas on State Land or Trust Land as part of the Parks and Wild Life Estate (Section 36) for the preservation and protection of the natural habitat and the wild life in these areas in order that facilities and opportunities may be afforded to the public for camping, hunting, fishing, photography, viewing of animals, bird watching and similar activities. The Minister may lease sites in safari areas for various purposes and may grant hunting or other rights. Hunting or removal of wildlife in a safari area may only take place with a permit.

The fifth category of protected area provided for by the Act is a Recreational Park (Section 41), which may be established by the President for the purpose of preserving and protecting the natural features for the enjoyment, benefit and recreation of the public. The Minister may designate areas within Recreational Parks which can be alienated or leased for the provision of tourism facilities and services.

Prospecting and mining are prohibited in National Parks, Botanical Reserves, Botanical Gardens, Sanctuaries or Recreational Parks without a permit issued by the Minister and with the consent of the Minister of Mines (Section 119). The Environmental Management Act of 2002 also makes provision for land to be acquired by the State for conservation purposes. According to Section 109 the President may acquire land or set land aside for the improvement or proper management of the environment. In the absence of an agreement with the land owner the President may acquire the land in accordance with the procedures under the Land Acquisition Act. The President may set aside any area of Communal Land for the conservation or improvement of natural resources or for the protection of irrigation works or sources of water supplies provided that no such area shall be set aside until the Minister responsible for the administration of the Communal Land Act is satisfied that suitable provision has been made elsewhere for the inhabitants who will be affected by the setting aside of the area (Section 110).

Specially Protected Animals and Plants: The Act makes provision for the Minister to declare certain animals as specially protected (Section 44). In terms of the Act, no-one may hunt, have in their possession, or sell a live specially protected animal or the meat or trophy from such an animal without a permit. The trophy of any specially protected animal must be surrendered to the state if not obtained by a permit. The Act specifies the purposes for which the Minister may issue a permit for use of

specially protected animals (Section 46), but provides the Minister with some flexibility as he/she may issue a permit for any purpose which in the opinion of the Minister is in the interests of the conservation of animals.

The Act also makes provision for the declaration of specially protected indigenous plants (Section 49). No person may pick a specially protected plant without a permit, although the owners or occupiers of land or a person acting under their authority may pick a specially protected plant for cultivation, forestry, building construction or the construction of roads and other infrastructure. No person may sell a specially protected plant without a permit unless the person is a recognised dealer in specially protected indigenous plants or a member of a recognised horticultural society and the purchase is from a member of the same or other recognised society. The Act specifies the purposes for which the Minister may issues permits for the picking or sale of specially protected indigenous plants. The Act also stipulates that no person may pick or sell indigenous plants without a permit (Section 55) provided that the appropriate authority for any land may pick or sell or authorise others to pick or sell indigenous plants (Section 56). If the Minister deems it necessary for the conservation of an indigenous plant, the Minister may prohibit the picking or selling of that plant (Section 57).

Hunting and removal of animals: The Act prohibits hunting, removal of an animal or any part of an animal or the sale of an animal without a permit unless by an appropriate authority for the land (Section 59), which is the owner of freehold land, a Rural District Council on communal land, the Forestry Commission on state forests and the DNPWLM on the parks and Wildlife Estate. The appropriate authority for the land may issue permits to others to use the wild life (except for specially protected species). If the Minister deems it necessary for the conservation of a animal, he/she may prohibit the hunting or removal of such animals in a specific area (Section 60) and may serve a notice to prohibit a specific person from hunting, conducting photographic tourism, or being in the possession of a weapon used for hunting save for self-defence. The Minister does not have to give reasons for such prohibitions. The Act enables the killing of an animal without a permit for self-defence (Section 61).

The Act prohibits anyone from conducting of hunting or photographic safaris within the parks and wild life estate or on forest land without holding a professional hunter's licence or a professional guide's licence (Section 65). No person may manufacture an article from a trophy, process a trophy or sell or otherwise dispose of a trophy or an article manufactured from a trophy from an animal that has been hunted in contravention of the Act (Section 73).

If the Minister believes it in the interests of conservation, he/she may declare any animal that is not a specially protected animal as a protected animal and any indigenous plant that is not a specially protected plant as a protected plant (Section 77) on alienated land within the area of an environment committee established in terms of the Environmental Management Act of 2002 and the Rural District Councils Act of 1988. No person may, without a permit, hunt an animal or pick an indigenous plant that has been declared protected. The Minister may also restrict the extent of hunting animals or picking of indigenous plants on alienated (private freehold) land in the area of an environment committee if the Minister believes that the hunting of animals or picking of plants is unsustainable. The Minister may authorise an environment committee to reduce the numbers of problems animals on any alienated land within its area if the number of such animals is sufficient to cause excessive damage or nuisance. Section 79 gives environment committees the power to restrict hunting on alienated land if it believes that hunting is unsustainable.

The Minister may declare any person to be the appropriate authority for any waters (Section 83) and may declare controlled fishing waters (Section 84) for which the Minister may make regulations for

the control, regulation, restriction of prohibition of fishing. Unless the Minister designates areas of water where a permit is not required, no-one except the appropriate authority for that water may fish in any water without a permit. Section 87 regulates the means of fishing by prohibiting the use of explosives, firearms and poisons. Section 88 controls the introduction into any water of fish and plants that are not native to that water. No-one except the appropriate authority for a water may fish commercially and sell the fish without a permit (Section 90). The minister may ban fishing by specific persons in any area in the interests of conservation (Section 96).

Enforcement: The Act provides for the powers of conservation officials, and police officers in relation to enforcing the Act. It provides for penalties for various offences and for the Minister to make regulations on a wide range of issues and activities. The Act provides for the highest penalties to be awarded for the unlawful killing of a rhinoceros or other specially protected game specified by the Minister in an
official notice and for the unlawful possession or trade in rhino horn, ivory or the trophy of any other specially protected animal specified by the Minister in an official notice (Section 128).

The Environmental Management Act of 2002 provides the Minister responsible for the Environment to regulate the use of wetlands. In terms of Section 113 of the Act the Minister may declare any wetland to be an ecologically sensitive area and may impose limitations on development in or around such area. Further, no person may without authorisation in terms of the Act:

a. reclaim or drain any wetland;
b. disturb any wetland by drilling or tunnelling in a manner that has or is likely to have an adverse impact on any wetland or adversely affect any animal or plant life therein;
c. introduce any exotic animal or plant species into the wetland. Section 114 enables the Minister to serve an order on the owner, occupier or user of land under which they must take measures, construct such works or refrain from specific activities in order to protect the environment.

Biological Diversity: Further the Act enables the Minister to take such measures as may be necessary for the conservation of biological diversity and the implementation of Zimbabwe's obligations under the United Nations Convention on Biological Diversity adopted in 1992 and may, in so doing (Section 116):

a. identify the components of the biological diversity of Zimbabwe;
b. determine the components of biological diversity which are threatened with extinction;
c. prepare and maintain an inventory of the biological diversity of Zimbabwe;
d. determine actual and potential threats to the biological diversity and devise such measures as are necessary for preventing, removing or mitigating the effect of those threats;
e. devise measures for better protection and conservation of rare and endemic species of wild fauna and flora;
f. develop national strategies, plans and programmes for the conservation of the biological diversity of Zimbabwe;
g. promote the integration of conservation and sustainable use of biological diversity into relevant sectoral policies, plans and programmes;
h. require in writing any developer, including the government, to integrate the conservation and sustainable utilisation of the biological diversity in any project the implementation of which has or is likely to have detrimental effects to the biological diversity of Zimbabwe;
i. protect indigenous property rights of local communities in respect of biological diversity with scientific knowledge;

j. support the integration of traditional knowledge on conservation of biological diversity with scientific knowledge;
k. prohibit or restrict access by any person to or the exportation of any component of the biological diversity of Zimbabwe.

The Minister may also take such action or measures as may be necessary for the conservation of the biological diversity of a specific locality and may:

a. promote such land use methods as are compatible with the conservation of the biological diversity of that locality;
b. select and manage environmental protection areas for the conservation of the various terrestrial and aquatic ecological systems;
c. establish and manage buffer zones near environmental protection areas;
d. prohibit or control the importation of and introduction into the wild of exotic animal and plant species;
e. identify, promote and integrate traditional knowledge into the conservation and sustainable utilisation of the biological diversity of that locality; and
f. determine special measures for the protection of species, ecosystems and habitats faced with extinction.

Community rights to natural resources: The Act provides for land holders to acquire rights over wildlife through the granting of "appropriate authority" status. Thus, the owners of private freehold land are deemed to be the appropriate authority over wildlife on their land (Section 2). Communities acquire rights over wildlife through Rural District Councils (RDCs). A 1982 amendment to the Act provides for the Minister to appoint an RDC as the appropriate authority for wild life on the communal land within the jurisdiction of the RDC (Section 108). The Act states that no person may hunt any animal on any land or remove any animal or part of an animal except in term of a permit issued by the appropriate authority for that land [Section 59(2)]. The appropriate authority may hunt any animal on the land, remove any animal or part of an animal from the land and may issue permits to others to hunt or remove animals from the land. RDCs are then expected to apply the guidelines contained in the 1992 Wildlife Policy to devolve the decision-taking process in local wild life management and the distribution of wild life benefits to producer communities (i.e. smaller and more localised groups of people with wildlife on their land). Further policy guidelines state that RDCs
are expected to distribute a percentage of income derived from wildlife use to producer communities and to allow these communities to be responsible for several wildlife management activities. Because of the existing administrative system of local government, producer communities had to be represented by Ward Development Committees (WADCOs) and Village Development Committees (VIDCOs) which are advisory bodies to Councils.

In this way, various legal entities are granted authority over wildlife outside the Parks Estate. These authorities include private land-owners (where the land is held under an agreement of purchase or lease), forest land (such as Forestry Commission estates). For Communal Land, the Rural District Councils (RDC) may be appointed the Appropriate Authority. The Minister of Environment grants this authority, with input from the Zimbabwe Parks and Wildlife Management Authority. If appropriate authority is not granted, the authority remains vested in Central Government. This Appropriate Authority clause in the Act, paved the way for the implementation of the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE)[3].

Statutory Instruments: There are several statutory instruments (SI) that regulate the wildlife sector:

[3] Note that the CAMPFIRE programme is about to undergo a comprehensive review that will impact on future policies.

- SI 362 of 1990: This legislation provides in sections 66-75 for the Regulation of Manufacture, Processing and Dealing in trophies.
- SI 76 of 1998: Parks and Wild Life (Import and Export) (Wild Life) Regulations specifically deals with Import and Export of wildlife products. This legislation was enacted to ensure compliance with CITES requirements for export and import of wild flora and fauna. These provide for the following:
    - Section 3 deals with the Control of Import and Export of wild life and trophies and lays down a general prohibition on the import into or export from Zimbabwe of any "wild life" or trophy of "wild life" except in accordance with either a certificate issued in terms of section 5 by the Director or Director of Customs, or an open general permit:
    - Section 5 deals with Permits and Certificates and is consistent with CITES legislation.
    - Section 15 deals with Offences and Penalties. Any person who contravenes any of the provisions of subsection 1 shall be guilty of an offence, and liable to a fine or imprisonment. To effectively ensure compliance, the Zimbabwe Parks and Wildlife Management Authority deployed a permanent team of officers based at all ports of exit and entry to assist border control officials in monitoring and inspection of all wildlife exports.
- SI 26 of 1998: The regulation provides for the monitoring of all hunting activities in the country to ensure compliance by all Safari Operators and international clients and to ensure that the TR2 Form. (Tourism Hunting Return Form) is duly completed.
- Trapping of Animals (Control) Act Chapter 20:21: The Act provides for the control, restriction and regulation of the construction, possession and use of certain traps for the purpose of trapping animals; to control the sale and disposal of certain animals, to include lions and to provide for matters incidental to or connected with the foregoing.
- SI 92 of 1992: Parks and Wild Life (Payment for Hunting of Animals and Fish) Notice, 2009: This instrument provides for compensation values of various wildlife forms to include animals and fish. It acts as an additional deterrent measure in matters where poaching cases are being dealt with in accordance with the law. The compensation value for illegal hunting of lion is USD 5 000, 00.
- SI 93 of 2009: Parks and Wild Life (Payment for Trapping of Wild Animals) Notice, 2009. This instrument provides for the payment of compensation to the state or game owners in the event that one is convicted for illegally trapping wild animals on various land categories. The compensation value for illegal hunting of lion is USD 5 000, 00.
- SI 40 Of 1994: Parks and Wildlife (Appropriate Authorities for Communal Land) Notice, 1994. This SI facilitates the granting of Appropriate Authority status to various Rural District Councils. This legislation devolved authority to Rural District Councils and gave rights to local communities to sustainable utilize wildlife and other natural resources in their areas of jurisdiction.

11.2.4 The Rural District Councils Act Chapter [29:13] 2002

The Rural District Councils Act is important in the wildlife sector as it provides for a legal entity (in Communal Lands) responsible for wildlife resources. Since the land in Communal areas is not privately owned by the communities and given that most of the communities do not constitute a legal entity, the Appropriate Authority status is conferred to the Rural District Councils (RDCs). Thus the RDCs act as custodians of the wildlife resources on behalf of the communities.

Efforts are now underway in some areas to form Community Development Trusts. There is scope for these Community Development Trusts to be used as vehicles to further devolve authority from the District level to the sub-district level, which will provide more income at a community level and therefore increase conservation support from the community as they will have a true vested interest.

The feasibility of granting Appropriate Authority to these Trusts in Zimbabwe needs to be assessed and piloted. The major challenge with these Trusts is that of financial sustainability as they do not have adequate funds to cater for their activities. Capacity-building of all Trust members is also a key requirement to ensure institutional sustainability.

In the Rural District Councils Act, there are three key terms that will be described further: Ward, Ward Development Committee and Communal Land. According to the Act, a "Ward" (an administrative unit) means a ward into which a council area is divided or re-divided. Several villages make up a ward. In the Act, a "Ward Development Committee" means a village development committee established in terms of Section 58 of the Act. A Ward Committee is made up of members who are elected from the community to represent the community in discussions/meetings with the Rural District Council. The Act further defines three different types of Wards. These are, Commercial Ward, Communal Ward and Resettlement Ward. The Commercial Ward is a large-scale commercial ward or a small-scale commercial ward. A Communal Ward is a ward consisting wholly or mainly of Communal Land. A Resettlement Ward is a ward consisting wholly or mainly of Communal Land (as in the case of the Communal Ward). It is important to establish whether in practice, the RDCs make
this distinction of the wards or whether they are all considered simply just as wards.

The "Communal Land" is defined as any land that is Communal Land in terms of the Communal Land Act [Chapter 20:04]; and any other land that was within the area of a district council on the 19th August 1988.

11.2.5 The Forest Act of 1948

This Act establishes the Forestry Commission and places demarcated forests under its control. The commission is responsible for the control, management and exploitation of state forests including the leasing of timber harvesting rights. The Act also gives the Minister the power to regulate the commercial use of timber from indigenous trees on other land.

As the appropriate authority for the Forest Areas, the Commission is also responsible for the management and conservation

11.3 Annex III: Analysis of Total Revenue by Country of Destination

Destination	2014	2015	Total
United States	$14,485,835	$11,942,785	$26,428,620
Russian Federation	$1,444,729	$861,925	$2,306,654
China	$1,416,196	$441,759	$1,857,955
Germany	$1,100,534	$698,450	$1,798,984
Canada	$620,852	$474,935	$1,095,787
South Africa	$513,070	$576,035	$1,089,105
France	$825,975	$158,291	$984,266
Australia	$671,527	$259,136	$930,663
Spain	$488,616	$321,064	$809,680
Austria	$519,322	$201,073	$720,395
India	$302,653	$241,741	$544,394
United Kingdom	$357,317	$183,888	$541,205
Italy	$181,956	$343,197	$525,153
Hungary	$418,824	$104,262	$523,086
Mexico	$252,263	$266,543	$518,806

Destination	2014	2015	Total
Norway	$300,645	$119,831	$420,476
Denmark	$132,690	$194,435	$327,125
Switzerland	$171,991	$123,828	$295,819
Sweden	$196,575	$80,014	$276,589
Ukraine	$80,432	$163,604	$244,036
Czech Republic	$104,450	$137,456	$241,906
Neatherlands	$89,042	$105,227	$194,269
Nigeria	$171,830	$0	$171,830
Bulgaria	$21,865	$123,469	$145,334
Argentina	$106,529	$24,888	$131,417
Finland	$65,768	$63,223	$128,991
Brazil	$56,785	$59,886	$116,671
Honduras	$104,683	$0	$104,683
Poland	$38,911	$62,015	$100,926
New Zealand	$17,880	$81,127	$99,007
Mauritius	$56,225	$36,945	$93,170
Chile	$91,374	$0	$91,374
Belgium	$9,340	$80,355	$89,695
Portugal	$78,470	$0	$78,470
Columbia	$77,944	$0	$77,944
Slovakia	$69,420	$0	$69,420
Botswana	$59,401	$0	$59,401
Pakistan	$54,208	$0	$54,208
Namibia	$20,298	$18,862	$39,160
Latvia	$37,611	$0	$37,611
Estonia	$12,078	$23,586	$35,664
Slovenia	$20,620	$11,200	$31,820
Kenya	$14,302	$16,957	$31,259
Dominican Republic	$30,463	$0	$30,463
Belarus	$0	$29,430	$29,430
Kazakhstan	$0	$28,460	$28,460
Romania	$0	$20,112	$20,112
United Arab Emirates	$19,629	$0	$19,629
Lao Peoples Democratic Republic	$15,000	$0	$15,000
Bolivia	$0	$11,553	$11,553
Lithuania	$9,164	$0	$9,164
Costa Rica	$5,900	$0	$5,900
Qatar	$4,896	$0	$4,896
Grand Total	**$25,946,088**	**$18,691,547**	**$44,637,635**

11.4 ANNEX IV: ANALYSIS OF TOTAL REVENUE BY SPECIES

Species	$2,014	$2,015	Total	2015 Quota	Utilised	% Utilised
Buffalo	$2,528,559	$1,962,570	$4,491,129	1,635	482	29%
Elephant (Tusks)	$2,042,610	$1,447,090	$3,489,700	246	64	26%
Elephant (Tuskless)	$1,444,040	$229,860	$1,673,900	462	113	24%
Lion	$630,950	$753,000	$1,383,950	82	49	59%
Leopard	$714,100	$668,490	$1,382,590	530	151	28%
Zebra	$594,239	$555,744	$1,149,983	2,480	600	24%
Sable	$456,615	$309,260	$765,875	718	78	11%
Kudu	$341,092	$357,963	$699,055	2,503	289	12%
Waterbuck	$293,903	$256,133	$550,036	988	156	16%
Hippo	$310,321	$217,470	$527,791	303	83	27%
Impala	$277,198	$242,624	$519,822	8,594	1,261	15%
Crocodile	$284,650	$202,705	$487,355	211	70	33%
Eland	$179,470	$187,990	$367,460	1,659	132	8%
Wildebeest	$180,665	$170,350	$351,015	2,189	220	10%
Giraffe	$158,385	$157,410	$315,795	880	135	15%
Nyala	$130,840	$117,175	$248,015	174	38	22%
Bushbuck	$116,011	$94,936	$210,947	1,082	125	12%
Warthog	$98,975	$89,820	$188,795	3,060	208	7%
Hyeana	$75,648	$54,503	$130,151	1,702	118	7%
Klipspringer	$44,130	$40,441	$84,571	823	59	7%
Bush Pig	$18,226	$30,370	$48,596	1,972	69	3%
Tsessebe	$19,800	$19,500	$39,300	186	15	8%
Baboon	$24,909	$13,664	$38,573	8,017	264	3%
Reedbuck	$23,265	$12,731	$35,996	371	20	5%
Steenbok	$13,790	$15,070	$28,860	927	31	3%
Jackal	$9,656	$15,889	$25,545	2,179	105	5%
Civet	$8,850	$11,368	$20,218	1,034	29	3%
Grysbok	$9,435	$8,585	$18,020	632	31	5%
Eland	$16,750	$0	$16,750	1,659	132	8%
Genet	$6,020	$14,183	$20,203	1,136	38	3%
Duiker, Grey	$2,774	$12,523	$15,297	2,005	53	3%
Duiker, Blue	$7,991	$0	$7,991	-	-	-
Honey Badger	$3,681	$3,625	$7,306	622	15	2%
Wild Cat	$3,160	$4,180	$7,340	812	19	2%
Guinea Fowl	$5,496	$968	$6,464	29,174	121	0%
Porcupine	$4,123	$1,473	$5,596	857	9	1%
Serval	$2,670	$2,410	$5,080	536	6	1%
Egyptian Goose	$3,025	$60	$3,085	4	-	0%
Cheetah	$2,560	$0	$2,560	42	-	0%
Ant Bear	$900	$1,651	$2,551	39	6	15%
Francolin	$1,166	$609	$1,775	22,449	109	0.5%

Species	2014	2015	Total	2015 Quota	Utilised	% Utilised
Dove	$1,321	$418	$1,739	34,485	63	0.2%
Monkey, Vervet	$885	$800	$1,685	3,677	15	0.4%
Ostrich	$1,200	$0	$1,200	14	-	0%
Mongoose	$508	$690	$1,198	279	3	1%
Sandgrouse	$456	$688	$1,144	8,088	78	1%
Oribi	$500	$500	$1,000	82	2	2%
Duiker, Red	$950	$0	$950	-	-	-
Caracal	$900	$0	$900	351	-	0%
Bushbaby	$850	$0	$850	-	-	-
Bontebok	$700	$0	$700	-	-	-
Waterfowl	$0	$400	$400	40	2	5%
Springhare	$60	$120	$180	-	-	-
Gemsbok	$105	$0	$105	6	-	0%
Hyrax	$75	$20	$95	371	1	0.3%
Duck	$29	$20	$49	10,779	13	0.1%
Aardwolf	$0	$0	$0	-	-	-
Blesbok	$0	$0	$0	40		0%
Rabbit	$0	$0	$0	252	-	0%
Hare	$0	$0	$0	138	3	2%
Lichtenstein's Hartebeest	$0	$0	$0	5	-	0%
Red Hartebeest	$0	$0	$0	7	-	0%
Grand Total	**$11,099,187**	**$8,288,049**	**$19,387,236**			

Surveys of lions *Panthera leo* in protected areas in Zimbabwe yield disturbing results: what is driving the population collapse?

Rosemary J. Groom, Paul J. Funston and Roseline Mandisodza

Abstract The African lion *Panthera leo* is an iconic species but it has faced dramatic range reductions and possibly as few as 30,000 individuals remain in the wild. In the absence of detailed ground-based surveys, lion populations may be estimated using regression models based on prey biomass availability but these often overestimate lion densities as a result of a variety of compounding factors. Anthropogenic factors can be key drivers of lion population dynamics and in areas with high human impact lion numbers may be significantly lower than those predicted by prey biomass models. This was investigated in two protected areas in Zimbabwe, where lion population densities were found to be significantly lower than would have been predicted by prey-availability models. High hunting quotas either within or around the protected areas are the most likely cause of the low lion numbers, with quotas in some areas being as high as seven lions per 1,000 km^2 in some years. Other factors, including persecution, poisoning and problem animal control, as well as disease and competition with spotted hyaenas *Crocuta crocuta*, are also discussed.

Keywords African lion, call-up survey, edge effects, *Panthera leo*, prey-biomass models, snaring, trophy hunting, Zimbabwe

Introduction

African lions *Panthera leo* and spotted hyaenas *Crocuta crocuta* are two of the most iconic of Africa's large carnivores. Whereas spotted hyaenas are widely distributed throughout Africa, lions are now believed to number only 32,000–35,000 individuals, with only ten areas qualifying as lion strongholds (Riggio et al., 2013). The low number of lions is already cause for concern but the reality may be even more serious given that most estimates are based on educated guesses, often related to prey availability (Chardonnet, 2002; Bauer & van der Merwe, 2004; IUCN SSC Cat Specialist Group, 2006).

As the potential density of large carnivores is scaled with biomass of prey (Carbone & Gittleman, 2002), carnivore density can be estimated indirectly using regression models based on available prey biomass (Gros et al., 1996; Hayward et al., 2007). However, this rarely relates to real densities in many natural systems because of a number of largely anthropogenic factors. Thus using indirect methods has the potential to overestimate the number of large carnivores in an area (Kiffner et al., 2009; Croes et al., 2011). Relying on such models in the face of the financial, logistical and time constraints of conducting direct population surveys may result in unreliable estimates of population size (Ferreira & Funston, 2010).

For lion populations a variety of limiting factors have been identified (Kiffner et al., 2009), including habitat fragmentation, epizootic diseases (Kissui & Packer, 2004) and, most importantly, increasing human–lion conflict and associated persecution of lions (Woodroffe & Frank, 2005). Deaths in wire snares, illegal hunting, use of lethal means for problem animals, and prey losses as a result of the bushmeat trade can also affect populations (Lindsey et al., 2011), causing decline or local extinction of lions, even within protected areas (Woodroffe & Ginsberg, 1998). Trophy hunting can also contribute to declining lion numbers in protected areas, as has been illustrated in Hwange National Park, Zimbabwe (Loveridge et al., 2007). Conversely, trophy hunting can create incentives for the retention of land for wildlife and thus benefit conservation of lions (Lindsey et al., 2012).

Here we examine the situation in two protected areas in Zimbabwe, Gonarezhou National Park and the Tuli Safari Area. We used call-up surveys to obtain direct estimates of lion populations and compared actual lion densities with potential density estimates. Call-up stations are a popular technique for surveying lions and hyaenas (Smuts et al., 1977; Ogutu & Dublin, 1998; Mills et al., 2001; Ferreira & Funston, 2010). The calibrated technique described by Ferreira & Funston (2010) was used to estimate lion populations in both protected areas. We also present data on trophy hunting for lions for both areas and discuss to what extent hunting may have affected lion populations.

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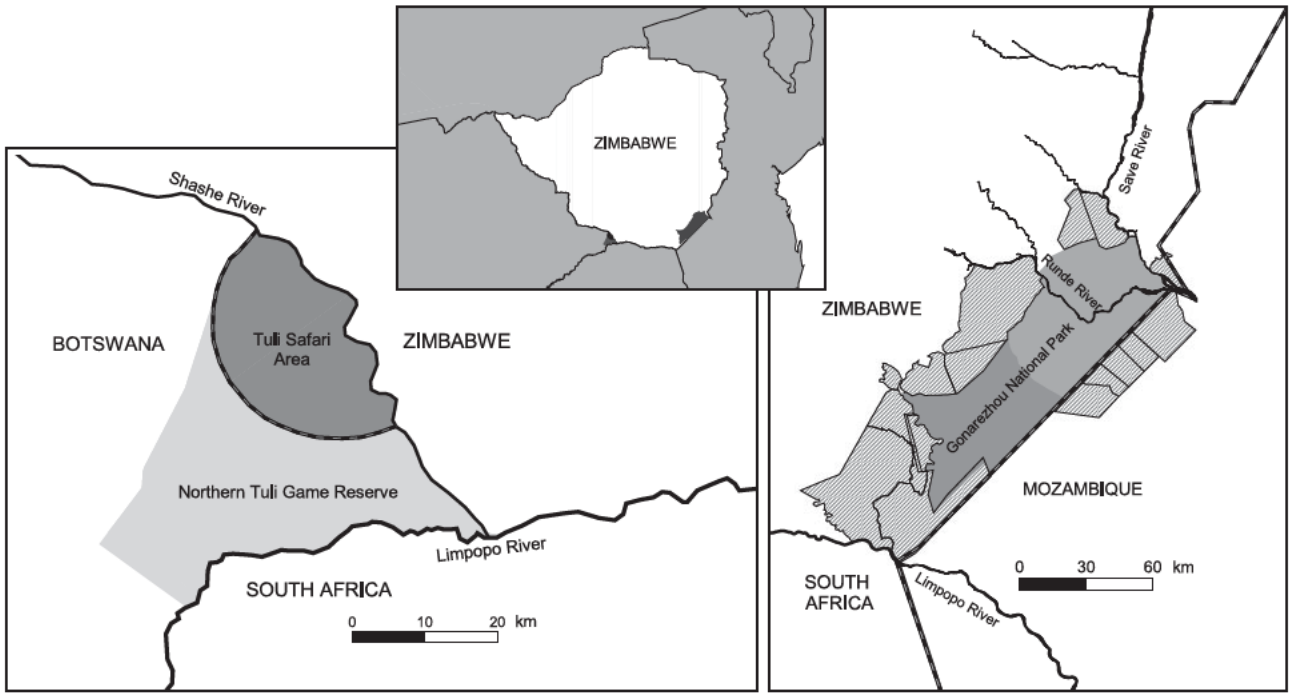

FIG. 1 Tuli Safari Area and Northern Tuli Game Reserve (left), and Gonarezhou National Park (right) showing surrounding hunting concessions (hatched areas). The black areas on the inset indicate the location of the two areas in Zimbabwe.

Study areas

Gonarezhou National Park (hereafter Gonarezhou) in south-east Zimbabwe comprises 4,963 km² and was gazetted as a national park in 1975. It borders Mozambique along its eastern edge and Kruger National Park in South Africa lies <50 km to the south-west. The biomass density of key herbivore species in Gonarezhou is only slightly lower than that in the similarly vegetated north-western part of Kruger (Ferreira & Funston, 2010: Fig. 1). Consumptive wildlife utilization is not allowed in the Park but is allowed in the surrounding hunting concessions (Fig. 1).

The 416 km² Tuli Safari Area (hereafter Tuli) is situated in the relatively low-lying savannahs of south-western Zimbabwe along the Shashe River. It borders the Northern Tuli Game Reserve in Botswana to the south (Fig. 1). Since 1958 Tuli has been a controlled hunting area, designated as a Safari Area in 1975 under the governance of the Zimbabwe Parks and Wildlife Management Authority. Consumptive use of wildlife is allowed in the Tuli Safari Area through trophy hunting regulated by the Management Authority.

Methods

Call-up survey

Call-up surveys were used to estimate lion and spotted hyaena populations in Tuli and Gonarezhou. Both surveys were conducted during the dark phase of the lunar cycle, in the winter months, during 11–14 July 2009 in Tuli and 3–18 August 2010 in Gonarezhou. We followed the methods used in Kruger by Ferreira & Funston (2010), using a minimum density of eight call-up stations per 1,000 km² to ensure sufficient sampling intensity. Thirty-nine completed stations sampled an area of 2,262 km² (45%) in Gonarezhou and eight stations sampled 100% of the area in Tuli. To ensure independence, stations were placed along roads, a minimum of 8 km apart in Tuli and 10 km apart in Gonarezhou (see Ferreira & Funston, 2010).

At each station the sound of an African buffalo *Syncerus caffer* calf in distress was broadcast continuously for 1 hour, using a 12 volt, 60 watt amplifier connected to two 4-ohm horn speakers, each with a 40 watt driver unit. The speakers were connected in series and placed c. 2.5 m above the ground (in Gonarezhou on the roof of the vehicle and in Tuli on a steel tripod), facing 180° from each other. The vocalizations were broadcast at full volume, with speakers rotated 180° every 15 minutes to get an all-round sound distribution. No bait was provided. Two observers sat in the back of the vehicle and one in the front seat. When any animal was heard approaching, a torch and/or a red-filtered spotlight were used to determine the number of individuals, group composition (age and sex) and time of arrival at the station. A minimum of two and a maximum of four stations were completed each night, starting just after dark and finishing no later than 2.00.

Ungulate surveys

Ungulate surveys were conducted using aerial counts, following the well-established procedures for aerial surveys of large African herbivores (Norton-Griffiths, 1978). No counts were available for Tuli and therefore we used estimates from a survey of the adjacent and contiguous Northern Tuli Game Reserve, Botswana (Fig. 1). This survey was flown in September 2008 and was a total count of the 720 km² Game Reserve using a fixed-wing aircraft (Selier, 2008). It was considered reasonable to extrapolate these results to the Tuli Safari Area because of its immediate proximity, similar vegetation and lack of any physical barrier between the two areas. The reliability of this extrapolation is considered further in the discussion, below. In Gonarezhou the aerial survey was a sample count, with a 20% sampling intensity, conducted in September 2009 using a fixed-wing aircraft. Full details are available in Dunham et al. (2010). Estimates were adjusted for undercounting according to Bothma et al. (1990).

Data on hunting of lions

There are 12 hunting concessions directly adjacent to Gonarezhou in Zimbabwe and five more on the Mozambican side (Fig. 1). In Zimbabwe nine of the concessions are state land: eight communal areas where the predominant activity is subsistence agriculture and where wildlife is utilized under the Communal Areas Management Plan for Indigenous Resources (CAMPFIRE), and one safari area (National Parks Estate). The remaining three concessions are classified as alienated land and include one private conservancy and two cooperative areas. Tuli itself is also Parks Estate, where hunting is permitted. Quota data for hunting of lions in Zimbabwe were provided by the Zimbabwe Parks and Wildlife Management Authority. Additional information was gathered from Rural District Council representatives and hunters.

Data analysis

Data from both surveys were analysed as per Ferreira & Funston (2010), taking into account survey effort, variability of response likelihoods, and probability of sampling the same individual more than once. Briefly, a fitted inverse sigmoid model on response data from Kruger predicts that lions respond up to 4.3 ± SE 0.9 km away from call-up stations, thus each station samples 57.7 km². Response probabilities suggest that the number of lions observed at a call-up station needs correction by a factor of 1.51 and 3.66 for groups with and without cubs, respectively (Ferreira & Funston, 2010).

Estimates of abundance of key ungulate species were calculated from the aerial surveys. Following Hayward et al. (2007) we converted these abundance estimates to biomass per km², using 75% of adult female body mass estimates from Stuart & Stuart (2000). Use of 75% of adult female body mass (following Schaller, 1972) is to account for subadults and young in the population. We considered African buffalo, eland *Taurotragus oryx*, giraffe *Giraffa camelopardalis*, wildebeest *Connochaetes taurinus*, zebra *Equus burchelli*, kudu *Tragelaphus strepsiceros* and impala *Aepyceros melampus* to be preferred lion prey species, following Radloff & du Toit (2004), Hayward & Kerley (2005) and Mbizah (2009) and based on our field observations. We then used the following equations to convert prey biomass into an estimate of lion density at carrying capacity

$$y = 10^{(\ 2.158+0.377x)}$$ Hayward et al. (2007)

where y is lion density (km ^{2}) and x is $\log_{10}$(prey biomass in kg km ^{2})

$$y = 0.010x^{0.878}$$ Loveridge & Canney (2009)

where y is lion density (per 100 km²) and x is prey biomass.

Resulting density estimates were multiplied by area to estimate the number of lions in each protected area that could theoretically be supported by the available prey biomass. For comparison, similar calculations were made for spotted hyaenas, following Hayward et al. (2007).

Results

Direct estimates of carnivore populations from surveys

In Gonarezhou lions were seen at only two (5%) of the 39 calling stations; one group of two females and one of eight individuals (total n = 10). This equates to a total population estimate of 33 lions (95% CI 28–39), which is consistent with the results of a spoor survey conducted in Gonarezhou in June 2010, which estimated 34 lions south of the Runde River, extrapolated to 44 in the whole Park (Groom, 2010). In Tuli, no lions responded physically or vocally to the calling stations, and no lion tracks were observed on the roads during 4 days of searching.

For spotted hyaenas the call-up survey in Gonarezhou estimated 400 individuals (95% CI 312–487), with 491 estimated from the spoor survey (Groom, 2010). In Tuli the call-up survey estimated 45 spotted hyaenas (95% CI 35–59).

Indirect lion population estimates from prey biomass availability

Using the calculations of Hayward et al. (2007), biomass density of preferred lion prey in Gonarezhou was calculated

TABLE 1 Summary of estimates of lion *Panthera leo* and spotted hyaena *Crocuta crocuta* populations for Gonarezhou National Park and the Tuli Safari Area (Fig. 1), using various methods.

	Survey estimates		Predictions from prey biomass		Comparison
	Spoor survey[1]	Call up survey	Hayward et al. (2007)	Loveridge & Canney (2009)	Using densities from north west Kruger[2]
Gonarezhou National Park					
Lions	44	33	357	115	248
Spotted hyaenas	491	400	354		
Tuli Safari Area					
Lions		0	40	21	31
Spotted hyaenas		45	66		

[1]Extrapolated from Groom (2010); spoor survey conducted May 2010 in Gonarezhou National Park
[2]Assuming a population density equivalent to that of a habitat with comparable prey biomass in Kruger National Park (Ferreira & Funston, 2010)

to be 494 kg km $^{-2}$, which could support 357 lions (7.2 per 100 km^2). Using the model of Loveridge & Canney (2009) this biomass could support 2.3 lions per 100 km^2 (115 lions). In the ecologically similar north-west section of Kruger National Park, where lion prey biomass is 643 kg km $^{-2}$, lion density was 5.0 per 100 km^2 (Ferreira & Funston, 2010). A similar prey density in Gonarezhou would result in 248 lions in the Park (Table 1).

In Tuli biomass density of preferred lion prey was estimated to be 1,217 kg km $^{-2}$ (through extrapolation from neighbouring Northern Tuli Game Reserve), suggesting the area could support a density of 10.1 lions per 100 km^2 (a total of 42 lions), using the Hayward et al. (2007) model. The Loveridge & Canney (2009) model estimates 21 lions in Tuli, and should the density of lions in Tuli be similar to those areas with similar prey biomass in Kruger (as per Ferreira & Funston, 2010) we would expect 31 lions (Table 1).

Our findings suggest that in Gonarezhou the lion population was at 16% of the mean predicted ecological carrying capacity (range 11–33%). As no lions were seen or heard in Tuli the estimated lion population was 0% of predicted ecological carrying capacity. For spotted hyaenas the Hayward et al. (2007) model predicts 354 individuals in Gonarezhou and 66 in Tuli, relatively similar figures to those estimated by the surveys (Table 1).

Trophy hunt quotas for lions

Hunting quotas in the early 2000s were high in both areas although there has been a significant decrease in quota allocation in recent years (Table 2). In Tuli, from 2005 to 2010, 11 lions were on quota, but only six were actually shot. Success rate in 2008 and 2009 was 0%, after which no lions were on quota. Historical figures for successful hunts for lions around Gonarezhou are not available but, since 2007, despite 29 lions on quota, only two were actually utilized (one as a problem animal control issue) and none have been taken since 2009.

The hunting concessions in Mozambique adjacent to Gonarezhou total 980 km^2. We do not have access to all long-term hunting quota figures but in 2009 there were at least seven male lions on quota in the reserves immediately bordering the eastern boundary of Gonarezhou (H. van der Westhuizen, pers. comm.).

Discussion

In both Gonarezhou and Tuli direct lion density estimates were considerably lower than the theoretical estimates, a finding not repeated for spotted hyaenas. Similar findings are presented by Croes et al. (2011) for northern Cameroon. Before discussing this it is important to evaluate potential biases, some of which could be inherent in the survey design. However, given their similar climatic and vegetation characteristics we see no reasons why the method used in Kruger (Ferreira & Funston, 2010) should not be applicable to the Zimbabwe study sites. The fact that lions were actively hunted in Tuli could also bias the lion response to call-up there. However, lions were not hunted in Tuli using sound recordings or from a vehicle, thus limiting the potential for negative association. Moreover, the complete lack of lion spoor in Tuli, and infrequent reports by rangers of a total of no more than four lions suggest that these results are credible. In Gonarezhou our call-up results correlated closely with spoor survey results (Groom, 2010) and other, anecdotal, evidence. Thus we are reasonably confident that our estimates of lion and spotted hyaena abundance are accurate.

It could be argued that the extrapolation of ungulate estimates from the Northern Tuli Game Reserve may have overestimated ungulate biomass in the Tuli Safari Area. This could be a result of trophy hunting and possibly higher poaching levels in Tuli. However, spotted hyaena numbers were close to the predicted density, and although they forage widely and predate livestock, it is unlikely that the recorded numbers could be sustained without sufficient natural prey.

TABLE 2 Lion quota figures, including both male and female lions, for the twelve hunting concessions in Zimbabwe adjacent to Gonarezhou National Park, and in Tuli Safari Area (where only male lions were on quota) for 2001 to 2011 (data from Roseline Chikerema Mandisodza, Zimbabwe Parks and Wildlife Management Authority sport hunting quotas, 2000 2011 records).

Name of property	Area type*	01	02	03	04	05	06	07	08	09	10	11	Total
Gonarezhou National Park (males)													
Malipati Safari Area	SA	1	1	1	1	1	1	1	1	1	0	0	9
Sengwe Area 1	CF	1	1	1	1	1	1	1	1	1	0	0	9
Sengwe Area 2	CF					0	0	0	1	1	0	0	2
Malipati Communal	CF							0	0	0	0	0	0
Naivasha	CF	3	3	2	2	0	0	0	1	1	0	0	12
Chibwedziva	CF	1	1	1	1	0	0	0	1	1	1	1	8
Chizvirizvi	CF	0	0	0	0	0	0	0	0	0	0	0	0
Chitsa	CF	2	2	2	2	0	0	0	0	1	1	1	11
Mahenya/Mutandahwe	CF	1	1	1	1	1	1	1	1	1	0	0	9
Gonakudzingwa Area 1	CO				0	0	0	0	0	1	0	0	1
Gonakudzingwa Area 2	CO						1	1	0	1	0	0	3
Malilangwe Reserve	PR	0	0	0	0	2	2	2	1	1	1	1	10
Total		9	9	8	8	5	6	6	7	10	3	3	74
Gonarezhou National Park (females)													
Naivasha	CF	1	1	1	1	1	0	0	0	0	0	0	5
Chibwedziva	CF	1	1	1	1	0	0	0	0	0	0	0	4
Total		2	2	2	2	1	0	0	0	0	0	0	9
Tuli Safari Area	SA	1	1	1	2	2	3	3	2	1	0	0	16

*SA, safari area; CF, CAMPFIRE area; CO, cooperative; PR, private conservancy

Hunting records for Tuli for 2005–2010 indicate a consistently high trophy quota and hunt success rate for key lion prey species. Thus we are confident that the ungulate abundance estimates were relatively accurate.

Another consideration is that potential predator densities based solely on prey biomass data are not always realistic, especially in areas with highly skewed prey distributions. For example, in Gonarezhou permanent water is restricted to the major river systems and a few perennial pans, which are where the majority of ungulates are concentrated in winter (see maps in Dunham et al., 2010). Thus, while there may be sufficient numbers of prey it is possible that their seasonal distribution may restrict the potential number of lion territories (Packer et al., 2005). However, even in more arid systems lions occupy territories that are seemingly little influenced by water distribution (Funston, 2011).

Thus, even if our lion estimates were biased by any of these factors, the differences between the predicted and estimated lion numbers are so extreme that we are confident that lions are currently well below their potential densities in both areas, having experienced a population collapse at some time in the past. This, combined with spotted hyaena densities approximating potential densities, suggests that prey biomass was not the driver of low lion abundance in these areas. This is further supported by the fact that estimates of densities of other carnivore species in Gonarezhou (R. Groom, unpubl. data) were similar to predicted densities; e.g. for leopards *Panthera pardus* (159 leopards from the spoor survey, using the equation of Funston et al. (2010), compared with 121 predicted from the Hayward et al. (2007) model) and for African wild dogs *Lycaon pictus* (c. 80 wild dogs from direct monitoring compared with 72 predicted by the model).

After reviewing the literature for other potential drivers of low lion abundance we conclude that these could include intra-guild competition with spotted hyaenas, diseases or anthropogenic influences. Both areas had a relatively high density of spotted hyaenas (8.1–10.8 per 100 km^2). However, there is no firm evidence suggesting that hyaenas affect lion populations (Hayward & Kerley, 2008), although they may compete with them for carcasses (Cooper, 1991).

Disease can severely affect lion populations (Kissui & Packer, 2004; Cleaveland et al., 2005) but there was no evidence of any disease in the lions in either reserve and there were no reports of sick, thin or weak lions and no unexplained carcasses. Although bovine tuberculosis has been noted in lions in nearby Kruger (De Vos et al., 2001; Michel et al., 2006; Keet et al., 2010), it is mainly restricted to southern Kruger (Rodwell et al., 2000) and at present there is no evidence of it affecting either African buffalo (Cross et al., 2009) or lion populations (Ferreira & Funston, 2010) there.

Thus we do not ascribe the suppression of lion numbers to disease and conclude that the population collapse was most likely driven by anthropogenic influences.

We surmised that these could include unsustainably high trophy hunting quotas within Tuli and in the concessions around Gonarezhou, illegal killing of lions (including shooting, poisoning and snaring) both in and outside these areas, and high levels of lethal problem animal control.

In assessing the impact of trophy hunting we consider that although Gonarezhou is a protected area with no legal utilization of lions, hunting of lions is allowed in all concessions areas adjacent to the Park. The majority of these are CAMPFIRE areas and most of the lions hunted originate from the Park (RJG, pers. obs.). Quotas are generally proposed by the landowners or CAMPFIRE or council representatives and approved by the Parks and Wildlife Management Authority, which has typically based the allocation at least partly on estimates of the number of lions in the Park. Prior to our recent population surveys these were considerably overestimated. Between 2001 and 2011 a total of 74 male and nine female lions were on quota in the Zimbabwe hunting concessions adjacent to Gonarezhou. However, there have been no females on quota since 2006, and only six males since 2009, after recognition of the low lion numbers in the Park and decreasing trophy size. No lions have been hunted in these concessions since 2009. In the 980 km^2 of hunting area adjacent to Gonarezhou in Mozambique the 2009 quota of seven male lions was 14 times higher than the general recommendation of 0.5 lions per 1,000 km^2 (Packer et al., 2011).

Similarly high quotas were set for the much smaller Tuli Safari Area, with a total of 16 male lions on quota between 2000 and 2009, with three on quota in each of 2006 and 2007. This is a high number for an area of only 416 km^2 and would no doubt have had a major impact on the lion population, despite no females being hunted. A moratorium on hunting of lions in Tuli was imposed in 2010 and 2011 because of this.

Significant edge effects in Gonarezhou may have been induced by hunters drawing lions out of the Park with carcass baits placed near the Park boundaries, as has been reported elsewhere (Loveridge et al., 2007). The primary problem with this is the concomitant territorial vacuum that draws lions from further inside protected areas, which increases their vulnerability to hunting and increases infanticide rates in boundary prides (Loveridge et al., 2007). The extent of these effects depends on the size and shape of the protected area and the home range dynamics of its lions. Gonarezhou, although relatively large, is long and thin, greatly increasing its boundary length to surface area ratio and thus its vulnerability to edge effects (Woodroffe & Ginsberg, 1998). Furthermore, given the relatively low prey density in the Park, lion home ranges are likely to be large. Even in Hwange National Park Loveridge et al. (2009) found that lion home ranges there typically covered several hundred km^2. It is thus likely that in Gonarezhou almost all lion prides would have home ranges that include boundary areas of the Park, exposing them to the risks outlined above. Although not the only factor, excessive trophy hunting combined with significant edge effects suggests that hunting has probably had a strong negative effect on lion abundance in both reserves.

These effects are also potentially exacerbated by both illegal killing and problem animal control. Within and outside both reserves lions were illegally killed for skins, caught in snares and also probably affected by the poisoning events recorded for other species (H. van der Westhuizen, pers. comm.; Snyman, 2011). Lions are often accidentally caught in wire snares set for other species (Lindsey et al., 2011) and are especially vulnerable because they are attracted to carcasses in snare-lines. In Hwange National Park 11.8% of recorded lion mortality was because of snaring (Loveridge et al., 2007). Generally, however, these sources of mortality are difficult to measure accurately as evidence of illegal killing is often concealed (Loveridge et al., 2007) but anecdotal evidence suggests they may be considerable.

Another important cause of lion mortality in Gonarezhou was the destruction of lions considered to be problem animals. Problem animal control incidences are poorly recorded and the responsibility is often handed over to hunting operators, with apparently little record-keeping (RJG, pers. obs.). However, we acquired records of at least 18 lions being shot as problem animals between 1993 and 2009 around the southern half of Gonarezhou. In many cases the sex of the lion killed was not recorded but at least five of them were females and one was a cub. This is likely to affect the population negatively, as regular removal of even small numbers of reproductive females can expose a population to decline (Van Vuuren et al., 2005). Moreover, as reproductive success is closely related to pride size, and prides of three or more adult females are significantly more successful at rearing cubs than smaller prides (Packer et al., 1988), removal of adult females may result in lower cub survival. Since 2009 there has been virtually no lethal problem animal control for lions around Gonarezhou, although lions are still reported to be killing livestock and there is evidence that communities poison them. Exact figures are unknown but presumed to be higher than recorded.

There is a growing recognition that efforts must be made to reduce conflict between carnivores and local communities. These include education and outreach efforts, training in predator-friendly livestock management practices, and increasing community benefits from wildlife resources. Additionally, effective law enforcement is critical, and appropriate penalties for illegal killing of carnivores need to be enforced. Effective anti-poaching efforts to reduce deaths in snares, reduction of unnecessary lethal problem animal control, and enhanced cooperation with relevant authorities in neighbouring countries for effective cross-border law enforcement are also crucial.

There are also several interventions that could be considered to reduce the edge effects of hunting, including banning the use of baits on park boundaries, monitoring trophy ages, with appropriate penalties for harvesting underage animals (Whitman et al., 2004), establishing buffer zones where lion hunting is excluded along park boundaries (Loveridge et al., 2007), and ensuring quotas are realistic and based on robust population estimates and/or limiting quotas based on the area of the hunting concession (Packer et al., 2011). If the guideline of 0.5 lions per 1,000 km² (Packer et al., 2011) were enforced this would preclude lion hunting in Tuli and probably reduce the hunting around Gonarezhou to sustainable levels, as long as this guideline was followed in Mozambique as well as in Zimbabwe.

Our results suggest that where carnivore populations are subject to anthropogenic influences, densities derived from prey biomass equations tend to be overestimated and should be treated with caution, even for protected areas. The low lion populations in both of the studied protected areas in Zimbabwe are largely attributable to the net effect of various anthropogenic influences, primarily previously excessive trophy hunting and indiscriminate problem animal control, with additional influences of poaching and persecution. Given the widespread and strikingly similar problems in many other areas (Ogutu et al., 2005; Woodroffe & Frank, 2005; Kiffner et al., 2009; Packer et al., 2009; Tumenta et al., 2010) and for other species (Balme et al., 2010), it is critical that effective strategies are designed and implemented to reduce these negative impacts. Trophy hunting for lions is a valuable management and conservation tool but needs much stricter regulation, especially in and around relatively small and/or isolated protected areas.

Acknowledgements

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Biographical sketches

Rosemary Groom works in southern Africa on large carnivore conservation, undertaking research and action to preserve habitat and species at regional scales. She currently works in Zimbabwe on transboundary African wild dog and lion conservation issues. Paul Funston focuses much of his research effort on the behavioural

ecology and conservation biology of African lions. Lion populations threatened by anthropogenic factors motivate his travels and research activities throughout Africa, and he is involved in a long term study on the effects of bovine tuberculosis on lions in the Kruger National Park. Roseline Chikerema Mandisodza has been involved in and contributed to the ZPWMA lion, cheetah and wild dog management plans and recently in the drafting of the national captive bred lion policy.

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Barry, Anna <anna_barry@fws.gov>

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4 messages

Moore, Kathleen <kathleen_moore@fws.gov> Thu, Dec 22, 2016 at 2:50 PM
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Anna,

Not sure if it will be useful but came across doing some searches today.

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Ahhhhhh

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From NRA, SCI, etc.

International Hunting Priorities and Recommended Actions
Executive Summary (July 2017)

The following suggested solutions, in order of priority, address problems that the international hunting community is facing.

1. **To remove barriers to the importation of legally-hunted African lions that enhance the survival of the species, we ask the Service to:**
   (A) Complete positive enhancement findings for the importation of lions harvested in the wild for all countries where hunting can be shown to benefit (enhance) the survival of the species; (B) Grant permit applications for the importation of lions from all countries for which the Service has evidence that the hunting benefitted (enhanced) the survival of the species in the wild; (C) Remove the import permit requirement for African lions; (D) Encourage South Africa's hunting community to continue their efforts to develop and demonstrate the connection between the hunting of captive-bred lions and the conservation of the species.
2. **To remove barriers to the importation of legally-hunted African elephants from Zimbabwe, we ask the Service to:**
   (A) Find that the importation of legally-hunted African elephants from Zimbabwe enhances the survival of the species; (B) Determine that the importation of elephants legally hunted in Zimbabwe since May 11, 2014 enhanced the survival of the species and to reinstate the finding that was in effect prior to the actions that the Service took in 2014.
3. **To remove barriers to the importation of legally-hunted African elephants from Tanzania, we ask the Service to**:
   (A) Find that the importation of legally-hunted African elephants from Tanzania enhances the survival of the species: (B) Reinstate its pre-April 4, 2014 finding that the importation of elephants legally hunted in Tanzania enhances the survival of the species; (C) Applying the proper standard, determine that the importation of elephants is not and has not been detrimental to the species.
4. **To re-evaluate the standard for enhancement of survival and return to one that examines whether the hunting benefits species conservation, we ask the Service to:**
   Reject the previous Administration's adoption of an unrealistic standard for enhancement of survival findings.
5. **To remove the permit requirement for African elephants, we ask the Service to:**
   Withdraw the regulation that imposes the permit requirement for the importation of every individual legally-hunted African elephant.
6. **To decide not to uplist African leopards, we ask the Service to:**
   Collect and use the best available science to support the decision.
7. **To provide relief from FOIA-related attacks on importers and exporters, we ask the Service to:**
   Consistently deny Freedom of Information Act Requests for information about the identity of importers and exporters of wildlife.

From NCA, SCI, etc.

International Hunting Priorities and Recommended Actions

July 2017

The following suggested solutions address problems that the international hunting community is facing. These requested actions are necessary to remedy harms resulting from several actions taken by the previous Administration that have undermined community-based, sustainable use conservation for multiple species in several range countries. The previous Administration imposed import barriers without adequately consulting with the range states, leading to uninformed decisions. The barriers to importation undercut the conservation programs of the range states by eliminating demonstrable benefits to those programs. The U.S. Fish and Wildlife Service (Service) arrogantly imposed the barriers based on the view that the U.S. knows how to conserve and manage foreign species better than the range states do. Neither the ESA nor any other laws specifically require the additional burdens imposed by the previous Administration. The Service needs to return to its proper role in the international regulation of trade in hunted wildlife and to support and encourage rather than undermine the efforts of the range countries whose wildlife is the subject of those conservation efforts.

This list by no means exhausts the potential solutions to problems facing the international hunting community that we would like to discuss. We hope that this is the first of many conversations about ways that the Service can utilize its existing authority to support and encourage community-based, sustainable use conservation of foreign species.

In order of priority, the following requests to the Service identify the problems, the intended goals, and the actions that the Service can take to achieve those goals.

1. **Removal of barriers to the importation of legally-hunted African lions that enhance the survival of the species:**

   A. We ask the Service to make or complete positive enhancement findings for the importation of lions harvested in the wild for all countries where hunting can be shown to benefit (enhance) the survival of the species. Such findings would allow importation of lions hunted starting from the date the positive enhancement finding is made. Since January 2016, the Service has not authorized the importation of African lions (other than wild ones from South Africa, where only a few wild lions are hunted each year). This failure has resulted in a de facto African lion importation ban.

   B. We ask the Service to grant permit applications for the importation of lions from all countries for which the Service has evidence that the hunting benefitted (enhanced) the survival of the species in the wild. This would allow importation of lions hunted between December 2015 and the date the new enhancement finding is made (requested above).

C. We ask the Service to remove the import permit requirement for African lions. (The ESA does not require permits for species, such as the African lion, that are listed as threatened and are on CITES Appendix II. Without the December 2015 regulation, which contains the permit requirement, hunters could import legally-hunted African lions without an import permit.) To do so, Service would need to conduct formal rulemaking to withdraw the regulations adopted by the Service in December 2015 that require permits for the importation of African lions.

D. We ask the Service to encourage South Africa's hunting community to continue their efforts to develop and demonstrate the connection between the hunting of captive-bred lions and the conservation of the species.

2. **Removal of barriers to the importation of legally-hunted African elephants from Zimbabwe:**

A. We ask the Service to find that the importation of legally-hunted African elephants from Zimbabwe enhances the survival of the species. This would enable individuals who harvest elephants after the date the enhancement finding is made to import their elephants into the United States. This finding would be based on the extensive information that Zimbabwe and others (e.g. the Zimbabwe Wildlife Management Authority, CAMPFIRE, Professional Hunting associations, Professional Hunters and others) have already presented to the Service since April 2014 demonstrating the relatively strong population numbers and beneficial role that hunting plays in elephant conservation in Zimbabwe.

B. We ask the Service to determine that the importation of elephants legally hunted in Zimbabwe since May 11, 2014 enhanced the survival of the species and to reinstate the finding that was in effect prior to the actions that the Service took in 2014. This would allow individuals who hunted elephants in Zimbabwe since the imposition of the importation ban to import their elephants.

3. **Removal of barriers to the importation of legally-hunted African elephants from Tanzania**:

A. We ask the Service to find that the importation of legally-hunted African elephants from Tanzania enhances the survival of the species. This, and the non-detriment finding in point C below, would enable individuals who hunt elephants, starting from the date the enhancement finding is made, to import their elephants into the United States. This finding would be based on the information that Tanzania and others have already presented to the Service since April 2014 demonstrating the beneficial role that hunting plays in elephant conservation in Tanzania.

B. We ask the Service to reinstate its pre-April 4, 2014 finding that the importation of elephants legally hunted in Tanzania enhances the survival of the species. This action would allow individuals who hunted elephants in Tanzania since the imposition of the importation ban to import their elephants.

C. We ask the Service to apply the correct standard for making non-detriment findings and make a revised determination that the importation of elephants is not detrimental to the species and that the importation of elephants has not been detrimental to the species since April 4, 2014.

4. Reevaluation of the standard for enhancement of survival:

We ask the Service to reevaluate and reject the previous Administration's adoption of an unrealistic standard for enhancement of survival findings. The Service must make these findings before allowing the importation of many foreign species. In 2014, the Service issued a negative enhancement finding for Zimbabwe's elephants based on its determination that the benefits from hunting were insufficient "*to overcome the problems currently facing Zimbabwe elephant populations.*" Instead of basing its finding on whether hunting simply benefitted/enhanced the survival of the species, the Service evaluated enhancement on whether the benefits from hunting outweighed or remedied all detriments to the species from other sources. This standard places an unfair and potentially insurmountable burden on the range countries and hunting community. We suggest that the Service return to a more appropriate evaluation such as the enhancement standard utilized by the Service prior to 2014 that "[t]o enhance the survival of the species, the importation must be associated with activities that provide a direct benefit to the species being hunted."

5. Removal of the permit requirement for African elephants:

We ask the Service to withdraw the regulation that imposes the permit requirement for the importation of every individual legally-hunted African elephant. The permit requirement is not mandated by the Endangered Species Act or the African Elephant Conservation Act. The permit requirement exists only because of the regulations that the Service adopted in July 2016. To withdraw the regulation, the Service would need to comply with the same rulemaking requirements necessary for adopting the regulations. Notice and comment rulemaking procedures would give the hunting community, the management authorities of the range countries and others the opportunity to explain why individual permits are unnecessary, and would provide a forum for them to explain how the Zimbabwe and Tanzania elephant importation bans have undermined African elephant conservation.

6. Best available science supports a decision not to uplist African leopards:

We ask the Service to rely on and continue to collect the best available scientific data on the current conservation status of African leopards. This information is necessary to help the Service make a determination on the listing status of the species. We are convinced that the science will support a decision to reject an uplisting of African leopards from threatened to endangered. If the Service currently lacks sufficient information to make its determination on the status of African leopards, we ask that the Service request additional information from the range countries and the hunting community.

7. **Relief from FOIA-related attacks on importers and exporters:**

We ask the Service to consistently deny Freedom of Information Act Requests for information about the identity of importers and exporters of wildlife. The Service has recently received numerous requests for personal information about individuals who have imported and exported animals and has taken a less than consistent approach about whether to release the identities and other identifying information to the requestors. We ask the Service to firmly and consistently reject requests for personal, identifying information that could potentially be used by the requesters to attack members of the hunting community.

Fwd: Paper in review cited in Beyond Cecil docucment

1 message

Vannorman, Tim <tim_vannorman@fws.gov> Tue, Jan 3, 2017 at 9:38 AM
To: FWHQ DMA-BOP <fwhq_dma_bop@fws.gov>

All,

Some information on lions throughout Africa that Kathy has uncovered.

Tim

---------- Forwarded message ----------
From: **Moore, Kathleen** <kathleen_moore@fws.gov>
Date: Tue, Jan 3, 2017 at 8:51 AM
Subject: Re: Paper in review cited in Beyond Cecil docucment
To: Peter Lindsey <plindsey@panthera.org>
Cc: Michelle Gadd <michelle_gadd@fws.gov>, Tim Vannorman <tim_vannorman@fws.gov>

Thanks very much. Our office looks forward to seeing the document when you get word.

Can you also forward the affiliations of co-authors? Since that won't change it would be good to become familiar with those that i don't recognize.

Best,
Kathleen

On Mon, Jan 2, 2017 at 7:07 AM, Peter Lindsey <plindsey@panthera.org> wrote:

> Hi Kathleen,
>
> Here is the abstract of the paper.. As soon as it is accepted, I will send you the full version with all of the figures.
>
> **The performance of African protected areas for lions and their prey, determinants of success and key conservation threats**
>
> Lindsey, P.A. [1, 2†], Petracca, L. [1,3†], Funston, P.J. [1], Bauer, H. [4], Dickman, A. [4], Everatt, K. [5], Flyman, M. [6], Henschel, P. [1], Hinks, A. [4], Kasiki, S. [7], Loveridge, A.[4], Macdonald, D.W.[4], Mandisodza, R. [8], Mgoola, W. [9] Miller, S[10, 11]., Nazerali, S.[12], Siege, L. [13], Uiseb, K. [14], Hunter, L. [1]
>
> **Abstract**
>
> -
>
> Using surveys of experts associated with 186 sites across 24 countries, we assessed the effectiveness of African protected areas (PAs) at conserving lions and their prey, identified factors that influence conservation effectiveness, and identified patterns in the severity of various threats. Less than one third of sampled PAs conserve lions at ≥50% of their estimated carrying capacity (K), and less than half conserve lion prey species at ≥50% of K. Given adequate management, PAs could theoretically support up to 4x the total extant population of wild African lions (~83,000), providing a measurable benchmark for future conservation efforts. The performance of PAs shows marked geographic variation, and in several countries there is a need for a significant elevation in conservation effort. Bushmeat poaching was identified as the most serious threat to both lions and to wildlife in general. The severity of threats to wildlife in PAs and the performance of prey

populations were best predicted by geographic-socioeconomic variables related to the size of PAs, whether people were settled within PAs, human/livestock densities in neighbouring areas and national economic indicators. However, conservation outcomes for lions were best explained by management variables. PAs tended to be more effective for conserving lions and/or their prey where management budgets were higher, where photographic tourism was the primary land use, and, for prey, where fencing was present. Lions and prey fared less well relative to their estimated potential carrying capacities in poorer countries, where people were settled within PAs and where PAs were used for neither photographic tourism nor trophy hunting.

Regards,

Peter

From: "Moore, Kathleen" <kathleen_moore@fws.gov>
Date: Wednesday, 28 December 2016 at 13:04
To: Peter Lindsey <plindsey@panthera.org>
Cc: Michelle Gadd <michelle_gadd@fws.gov>, Tim Vannorman <tim_vannorman@fws.gov>
Subject: Re: Paper in review cited in Beyond Cecil docucment

Thank you Dr. Lindsey. Do you anticipate an acceptance date now that you have taken into account the peer review?

If you do not anticipate any more substantial changes to the document, it would be great to see it. I hesitate to quote anything just yet though until I get word from you that it has been accepted.

Thanks much,
Kathleen

On Fri, Dec 23, 2016 at 3:15 AM, Peter Lindsey <plindsey@panthera.org> wrote:

> Hi Kathleen
>
> That paper is about to be re-submitted to the journal, the changes that were requested by the reviewers having been made.
>
> It will thus hopefully be published soon. I will send it to you when it comes out
>
> In the meantime, I would be happy to provide you the nutshell elements relating to hunting in the meantime, if you would like?
>
> Best regards
>
> Peter

From: Moore, Kathleen [mailto:kathleen_moore@fws.gov]
Sent: Thursday, December 22, 2016 9:49 PM
To: Peter Lindsey <plindsey@panthera.org>
Cc: Michelle Gadd <michelle_gadd@fws.gov>; Tim Vannorman <tim_vannorman@fws.gov>
Subject: Paper in review cited in Beyond Cecil docucment

Hi Dr. Lindsay,

Hope this message finds you well. I was not able to make your acquaintance last you were in the DC area but I am part of Mr. Van Norman's team here in the Division of Management Authority..

As you are well aware, the U.S. Fish and Wildlife Service is tasked with reviewing the potential import from U.S. hunters who visit various African countries to harvest lions for the purpose of obtaining a personal sport hunted trophy. In reviewing various documents I came across the document mentioned above that cites an in review paper by you. Has this paper been accepted to a journal as yet? If so, could we please obtain a copy?

Thanks very much.

Best regards,

Kathleen

--

Kathleen Moore

Senior Biologist

USFWS/Division of Management Authority

Branch of Permits, MS: IA

5275 Leesburg Pike

Falls Church, VA 22041-3803

1-800-358-2104 (Phone)

Check out the new CITES species database at **www.speciesplus.net** to find out more information about how species are listed and protected under the Convention.

--
Kathleen Moore
USFWS/Division of Management Authority
Branch of Permits, MS: IA

5275 Leesburg Pike
Falls Church, VA 22041-3803
1-800-358-2104 (Phone)

Check out the new CITES species database at **www.speciesplus.net** to find out more information about how species are listed and protected under the Convention.

--

Kathleen Moore
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1-800-358-2104 (Phone)

Check out the new CITES species database at **www.speciesplus.net** to find out more information about how species are listed and protected under the Convention.

--

Timothy J. Van Norman, Chief
Branch of Permits
Division of Management Authority
U.S. Fish and Wildlife Service
(703) 358-2350

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Fwd: Report on Lion Conservation with Particular Respect to the Issue of Trophy Hunting

1 message

Vannorman, Tim <tim_vannorman@fws.gov> Tue, Jan 3, 2017 at 1:46 PM
To: FWHQ DMA-BOP <fwhq_dma_bop@fws.gov>

Additional info on lion hunting.

Tim

---------- Forwarded message ----------
From: **Gnam, Rosemarie** <rosemarie_gnam@fws.gov>
Date: Tue, Dec 27, 2016 at 11:27 AM
Subject: Fwd: Report on Lion Conservation with Particular Respect to the Issue of Trophy Hunting
To: Craig Hoover <Craig_Hoover@fws.gov>, "Vannorman, Tim" <tim_vannorman@fws.gov>
Cc: "Arroyo, Bryan" <bryan_arroyo@fws.gov>, Gloria Bell <Gloria_Bell@fws.gov>

FYI
---------- Forwarded message ----------
From: **Susan Lieberman** <slieberman@wcs.org>
Date: Fri, Dec 23, 2016 at 12:00 PM
Subject: Report on Lion Conservation with Particular Respect to the Issue of Trophy Hunting
To: Rosemarie Gnam <Rosemarie_Gnam@fws.gov>

Report on Lion Conservation with Particular Respect to the Issue of Trophy Hunting

https://www.wildcru.org/wp-content/uploads/2016/12/Report_on_lion_conservation.pdf

This report (to UK DEFRA) was published the end of November. You probably already have it, but I am sending it if not. It is very comprehensive. Please feel free to forward, of course.

All the best,
Sue

Susan Lieberman, Ph.D.
Vice President, International Policy
Wildlife Conservation Society
2300 Southern Boulevard, Bronx, New York 10460 USA and
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--
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Report on Lion Conservation with Particular Respect to the Issue of Trophy Hunting

A report prepared by Professor David W. Macdonald CBE, FRSE, DSc*

Director of WildCRU, Department of Zoology, University of Oxford

at the request of Rory Stewart OBE

Under Secretary of State for the Environment

28 November 2016



WILDCRU
Wildlife Conservation Research Unit

UNIVERSITY OF OXFORD

* david.macdonald@zoo.ox.ac.uk

Contributors

This report was prepared with the assistance of members of the Wildlife Conservation Research Unit, Department of Zoology, University of Oxford, of which the core team was Dr Amy Dickman, Dr Andrew Loveridge, Mr Kim Jacobsen, Dr Paul Johnson, Dr Christopher O'Kane and Dr Byron du Preez, supported by Dr Kristina Kesch and Ms Laura Perry.

It benefitted from critical review by:

Dr Guillaume Chapron
Dr Peter Lindsey
Professor Craig Packer

It also benefitted from helpful input from:

Dr Hans Bauer
Professor Claudio Sillero
Dr Christiaan Winterbach
Professor John Vucetich

Under the aegis of DEFRA the report was helpfully informed by evidence and opinions offered during consultations with the following organisations:

Born Free
LionAid
Safari Club International Foundation (SCIF)
The British Association for Shooting and Conservation (BASC)
The European Federation of Associations for Hunting and Conservation (FACE)
The International Union for Conservation of Nature (IUCN)
The Wildlife Conservation Society (WCS)
The World Wide Fund for Nature (WWF)

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Abbreviations Used in the Text

ALWG	African Lion Working Group
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on the Conservation of Migratory Species of Wild Animals
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DEFRA	Department for Environment, Food and Rural Affairs
FSC	Forest Stewardship Council
ISO	International Organisation for Standardisation
IUCN	International Union for Conservation of Nature
PAC	Problem Animal Control
SCI	Safari Club International
SCIF	Safari Club International Foundation
TAWIRI	Tanzania Wildlife Research Institute
UNPD	United Nations Population Division
USFWS	US Fish and Wildlife Service
WWF	World Wide Fund for Nature
ZPWMA	Zimbabwe Parks and Wildlife Management Authority

Preface

This is a scientific report about one aspect of the conservation of wildlife and, specifically, of lions in Africa. That aspect is the trophy hunting of wild lions, and the remit is to evaluate evidence that trophy hunting has, or could, impact on the distribution and abundance of lions for better or worse in terms of their conservation. Other considerations beyond this, most obviously ethics (Macdonald et al. 2016b), are relevant to society's decisions on whether hunting lions for trophies is an acceptable activity. These other considerations are very important, and potentially decisive, but they are not the remit of this report. Indeed, those who have contributed to this report have done so strictly from a position of professional neutrality that is neither pro- nor anti-hunting, although they are united in being pro good evidence and anti bad management of lion populations.

The question of whether trophy hunting of lions harms or benefits lion conservation has become important and topical because lion numbers are declining fast and because the allegedly illegal hunting in Zimbabwe in 2015 of a lion nicknamed Cecil has focused unprecedented international attention on the issue (Macdonald et al. 2016a). It has also revealed that, at least in many of the countries into which lion trophies are currently imported, large sections of society regard hunting lions for sport as an ethically inappropriate activity for the twenty-first century (Macdonald et al. 2016a). Others take the opposite view, most notably often amongst people who actually have to live with lions in their range countries (Nzou 2015). Crucially relevant to the consequences of this disagreement is the proposition that rather than being a threat, hunting lions contributes significantly to their conservation, primarily through the maintenance of wild habitat, and that its cessation would worsen the species' already deteriorating status (Lindsey et al. 2012b; Di Minin et al. 2016). These ethical and pragmatic views may be irreconcilable, but before deciding what to do about it, individuals and nations need to know the facts, and indeed the gaps in

knowledge. Providing these facts, and identifying important gaps, is one function of this report, and it is particularly important insofar as policies applied impulsively could have perverse consequences if the intention to improve lion conservation resulted in worsening it. In that case, even those implacably opposed to lion hunting on ethical grounds might favour a *journey* rather than a *jump*. For example, if society judged trophy hunting lions unacceptable, but also concluded that it benefited lion conservation, then this dilemma might be approached via a journey to find ways of replacing the benefits of hunting before jumping to end them.

It was against this background that the then Minister for the Environment, Rory Stewart, invited this review of existing lion trophy hunting practice with the aim of:

1. providing recommendations for criteria for best practice in the industry to inform assessments of whether trophy hunting is well managed and sustainable;
2. providing recommendations for what the UK, working with the our partners in the EU and also internationally, could do to assist implementation of best practice; and
3. framing these recommendations within the wider context, and overall goal, of supporting lion conservation.

As will become clear, the topic is vast, its ramifications endless, and the knowledge gaps numerous. Plugging those gaps could take a substantial inter-disciplinary research programme, and compiling even what is known now might usefully take a team of scholars a year. In reality, only a few months have been available, and so amongst the things this report is not, is entirely comprehensive or complete. Nonetheless, it aspires to set the scene and offer recommendations that are evidence-based, precautionary and workable.

Having stated that this report is concerned with trophy hunting in terms only of its impact on lion, and other wildlife, conservation, it is worth being clear on the meaning of conservation as used in this report. It is a highly inter-disciplinary blend of natural and social sciences that together provide the evidence from which

to understand, and thereby to provide the basis for conserving, species and their diversity. That evidence is necessary, but not sufficient, to make decisions on policy, because like other political matters good decisions rest upon wise judgement beyond the facts. Conservation is often characterised as being focused on populations, but insofar as the behaviour of populations emerges from the behaviour of the individuals that comprise them, conservation is also concerned with the fates and well-being of individuals. Conservation is sometimes characterised as being disinterested in animal welfare, but that is an error: for example, welfare is one of the factors that would be considered in evaluating different conservation policies. Furthermore, there was a time when conservation was thought to prioritise wildlife over people, but this too is a simplification to the point of error. Modern wildlife conservation strives to find mutual advantage between the well-being of wildlife and the people who live, often with difficulty and in poverty, alongside it.

In this report, the 'lion estate' refers to the area of land occupied by wild lions (more technically, their geographical range) and relevant to the species' conservation in the wild. Due to ecological factors (principally linked to variation in rainfall, vegetation and prey abundance) lion abundance varies across their geographical range (East 1984). But over and above that natural intra-specific variation in population density (e.g. between <1 and 40 lions 100 km^{-2}; Packer et al. 2013a), their numbers are frequently below carrying capacity due to human factors. For example, lions are often poisoned in reprisal for stock-raiding, or killed by snares set by poachers for bushmeat, or they may be hunted unsustainably for trophies. This report is concerned with lion conservation in terms of impacts on the extent of the lion estate and the abundance of lions occupying it. Any human action that diminishes the extent of that estate is considered here as inimical to lion conservation; any action that maintains or increases the lion estate is a benefit to lion conservation. In terms of the abundance of lions, while in the face of their widespread decline increasing the numbers of lions is generally considered a benefit to conservation, maximising their numbers is not necessarily the goal of conservation. This is because, in the context of natural communities, a greater abundance of lions can lead, through competition, to smaller numbers of other wild carnivores (e.g. leopards, cheetahs, African wild dogs) or, through predation, to fewer of their prey. Notwithstanding these nuances, the

primary aim of this report is to evaluate how trophy hunting impacts lion conservation, where the goal is to maintain or increase the lion estate and the eventual abundance of lions thereon.

The original Ministerial request to prepare this report had the intention of informing the British government delegation to the 17th meeting of the Conference of the Parties to CITES (CoP17), at which a proposal by Niger and eight other countries to up-list lions to Appendix I was anticipated to have implications that could have added further restrictions to the trophy hunting of wild lions, and thus had consequences, some of them perhaps unintended, for lion conservation. As Bauer and Breittenmoser (2016) report, the proposal was not adopted and so trophy hunting of wild lions was not directly affected. However, the mood of the meeting, and perhaps also of a wider global community, was that if trophy hunting had on this occasion avoided strictures it was nonetheless the moment for that industry to take decisive steps to ensure forcefully not only that it caused no detriment to lion conservation but actively enhanced it. Thus an additional and timely role emerges for this report: to address the question of how, for so long as it continues, trophy hunting can be managed to maximise its contribution to lion conservation.

David W. Macdonald

WildCRU, Oxford

28th November 2016

Executive Summary and Recommendations

Value and Status: Lions are charismatic, widely valued and have the potential to act as conservation 'ambassadors' for biodiversity. As a species, they are not doing well: lions have disappeared from 92% of their historic range and their numbers have declined drastically to approximately just 20,000 individuals.

Grasping the moment to create the movement: Given this rapid decline of one of the world's most iconic species, action to conserve lions is urgently needed. Considering this urgency, and from the perspective of conservation, it is unacceptable to tolerate factors worsening the lion's status where options exist for mitigating them. With the world's attention galvanised by the killing of 'Cecil' the lion, there is an opportunity to convert that *Cecil Moment* into the *Cecil Movement* for global conservation. From the perspective of conservation, there is a global responsibility to grasp that opportunity.

Threats to lions: The primary threats to lions (which vary regionally), are habitat loss and degradation, loss of prey base and conflict with people over livestock. These threats are likely to intensify with climate change and rapidly increasing human population, predicted to double in Africa by the year 2050. Trophy hunting of lions can be a threat to some populations.

Extent of lion trophy hunting: Trophy hunting of lions was legal in 18 African countries in 2014, is currently practised at a significant level in at least 12 countries, and is an extensive form of land use therein. 'Canned' hunting of captive animals is legal in some countries but these are not considered wild lions and so are considered only in passing in this report.

Ethical considerations: The ethics of trophy hunting are much debated. This report focuses on trophy hunting's consequences for lion conservation, while recognising that ethics, particularly relating to animal and human welfare, will influence policy decisions.

Numbers of lions hunted for trophies: Most trophy-hunted lions are bred in captivity. The number of wild lions trophy-hunted is hard to establish with precision due to inconsistencies in the data. Between 2006 and 2015, CITES recorded 4,474 'wild'-sourced lion trophies (which include parts of lions so may not reflect numbers of individuals) as imported world-wide, with only 2,429 reported as exported. Between 1991 and 2013, CITES records 80 wild lion trophies (not individual lions) exported to the UK; the UK importation records show 4 trophies.

Effects of trophy hunting on lion populations: Trophy hunting, particularly of females and pride males, can be a significant (and in some cases even primary) threat to lion populations at a local level, especially when additive to other effects. The damaging effects of unsustainable trophy hunting can extend beyond hunting areas into adjacent protected areas. However, there is little evidence that trophy hunting has substantial negative effects at a national or regional level. Where trophy hunting is well-regulated, transparent and devolves sufficient authority to the land managers, it has the potential to contribute to lion conservation, but in many countries, poor governance and weak regulation can lead to unsustainable trophy hunting.

Impact of trophy hunting on lion populations: There is little evidence that trophy hunting has substantial negative effects at a national or regional level. Where trophy hunting is well-regulated, transparent and devolves sufficient authority to the land managers, it has the potential to contribute to lion conservation, but in many countries, poor governance and weak regulation can lead to unsustainable trophy hunting.

Trophy hunting as a contributor to lion conservation: The most fundamental benefit of trophy hunting to lion conservation is that it provides a financial incentive to maintain lion habitat that might otherwise be converted to non-wildlife land uses. It has been estimated that trophy hunting areas cover 1.4 million km^2 – 22% more land than National Parks – in Africa. How much of that area could viably be converted to phototourism is unknown, but this certainly could not be accomplished everywhere.

Revenue generated from trophy hunting: The revenue generated by trophy hunting is debated, with estimates of >US$200 million in gross revenue annually across sub-Saharan Africa. Lion hunting probably accounts for 5-17% of that income, depending on the country. Overall, the trophy hunting industry is not heavily

dependent on lions for its financial viability, but if lion hunting was ruled out, trophy hunting could, according to the only peer-reviewed published estimate (Lindsey et al. 2012), become unviable across approximately 60,000 km^2.

Approaches to reducing the risk of over-harvesting: Two main proposals have been made for reducing the risk of unsustainable trophy hunting – the first is area-based, with removal level ideally capped at 0.5 lions 1,000 km^{-2} (unless there is evidence it can withstand a higher level), and the second is age-based, where it is recommended that only males of 7 years or above are taken. In areas where other threats are present then combining the age- and area-based methods would be the safest policy (if other risk factors are not increasing, this should have a $<$10% risk of population extirpation within 25 years).

Trophy hunting in perspective: Over and above the issue of trophy hunting, international attention should be focused on generating new financial mechanisms to secure lion populations across their range. In this context lions are a metaphor, and an ambassador, for wider biodiversity conservation. Given that there are probably 60 remaining wild lion populations, a priority, and a call to arms, is to secure the six remaining ones of those which have substantial lion numbers and to safeguard all 60 remaining wild lion populations.

Recommended criteria for importing trophies to the UK: The criteria for whether a lion trophy could be imported into the UK should be that the hunting (a) was unlikely to cause detriment to the lion population from which it was taken, and (b) contributes to lion conservation. Therefore, we recommend that the following essential criteria should be applied to the consideration of lion trophy imports to the UK:

i. That the UK should import trophies only from areas that are sufficiently large to offer conservation benefit to lions (we suggest 500 km^2 or more), and where the lion population is demonstrably well-managed.

ii. Good management requires either adequate monitoring, which allows scientific quota-setting and shows a stable or increasing population, or age-based harvesting. Age-based harvesting could include either the precautionary approach (0.5 male lions of $\geqslant$7 years per 1,000 km^2, with rest periods, unless there are good data showing it can withstand a higher level), or adaptive age-based quotas.

iii. Areas that fail to qualify under the foregoing criteria could possibly receive a 'grace period' of up to 3 years under very strict criteria and annual review in order to allow

them to reach the required standards. During any such period, hunting should be heavily limited, e.g. to a maximum of 0.5 lions 1,000 km^{-2} aged $\geqslant$7 years. Failure to meet the required conditions after the grace period would result in a moratorium on UK imports from the area until they are in place.

iv. In areas where lion populations are declining unsustainably under any of the permitted harvesting systems, hunting should be stopped or, if there is a significant risk of losing that habitat from the wildlife estate, the area should be examined on a case-by-case basis and any lion hunting kept only at a very minimal level until the situation can be improved.

v. These criteria should ideally be applied at the level of the hunting area not the country, and exports should be managed by an independent committee of stakeholders in each country. That committee should audit hunting practices, set and monitor quotas, encourage certification of hunters, ensure adequate training of professional hunters, ensure transparency and compliance, and verify the age of hunted lions based on hunt reports, photos and tooth X-rays. The costs of operating these national committees would normally be met by stakeholders such as the hunting industry, relevant NGOs, international and local governments.

In addition, the likelihood of trophy hunting contributing to lion conservation would be increased if regulations were designed to maximise the revenue procured that was, at least partly, available to conservation. Therefore, this report recommends that the following desirable elements should be in place:

i. Short leases, and the short-termism and incentive for over-harvesting that they encourage, should not be issued to hunting blocks. A suitable minimum would be ten years, with option for extension by the current tenant (assuming conservation requirements have been met).

ii. Hunting blocks should be allocated according to an open auction system.

iii. Trophy hunting fees should only be applied following successful hunts, thereby reducing the incentive to kill inappropriate individuals.

Because trophy hunting involves killing a wild animal that, if not killed cleanly, has the potential to suffer, and because human safety is also at risk with the use of firearms, this report recommends reviewing the evidence and codes of practice that would ensure:

- that professional hunters are strictly accredited as evidenced by membership of internationally recognised associations that put standards first and foremost (including those

of marksmanship and animal welfare), and will conduct investigations into reports of misconduct and expel guilty members (national governments should support such expulsions by refusing disciplined PHs permission to hunt). Membership with such an association would be necessary to market hunts (e.g. at the large international conventions where an estimated >75% of the hunts are booked).

Finally, broader scale analysis of imports and exports of lion trophies is an essential element of monitoring the industry and its impact on conservation. The CITES database is a potentially incomparable resource for doing so. However, ambiguities over the muddling of entire lions and parts of lions, and some lack of clarity between exports and re-exports, currently confound the data, and lamentably diminish the value of the database. Therefore, this report also recommends that:

- CITES procedures are adjusted so that it is possible to assign various body parts to a single trophy lion (thereby avoiding the double-counting of, say, the pelt and skull of a single animal), and to track successive re-exports of that individual.

These recommendations, based on an impartial review of the scientific evidence, represent feasible steps for minimising risk of adverse effects of trophy hunting on lion populations, while ensuring that where trophy hunting occurs it contributes significantly to the benefit of lion conservation. This is important, but the UK government, and its partners and collaborators in this grand vision, will also need to invest heavily in tackling even greater issues beyond trophy hunting to secure the long-term future of this globally iconic species.

Wider implications for the governance of lion trophy hunting to ensure it is not detrimental to lion conservation and has the potential to enhance it: Although this report was commissioned by the then Under Secretary of State to inform decisions on the conditions that might apply to the import of lion trophies to the UK, the recommendations set out in that context in the foregoing section apply equally to the wider question of how the lion trophy hunting industry might be regulated to ensure that it is not detrimental to lion conservation and is best placed to enhance it.

1. Reasons for examining the issue of trophy hunting with respect to lion conservation

1.1 Reasons for being concerned about lion conservation

1.1.1 What value do lions have?

The African lion is one of the world's most iconic species, and has played a rich role in the symbolism and culture of the United Kingdom. At a wider scale, at least a large part of the global public assign great existence value to lions (Dickman et al. 2011), and there is vast international interest in lion welfare and conservation (Macdonald et al. 2016a). Lions and other big cats are viewed as particularly charismatic species amongst people likely to engage with conservation campaigns, making them powerful ambassadors for conservation (Macdonald et al. 2015a).

As apex predators, lions also have great ecological value, and the removal of top carnivores from ecosystems can have long-lasting negative ecological impacts (Ripple et al. 2014). In addition to their cultural and ecological significance, lions undoubtedly have very high economic value, and are one of the top draws for both photographic tourists and trophy hunters to the countries where they remain, generating large amounts of revenue (McNeely 2000; Lindsey et al. 2012b). Lions are a regular part of the trophy hunting industry in at least 10 African countries and more information on the specific economic revenue of lion trophy hunting is provided in Section 2.2.2.

1.1.2 To what extent have lions declined, in terms of numbers and geographic range?

The urgency and importance of lion conservation arises from the fact that lions have experienced a dramatic decline in both numbers and geographic range over recent decades. The latest IUCN estimates suggest a population of 23,000 – 39,000 African lions (probably closer to the lower estimate), representing a decline of at least 43% between 1993 and 2014 (approximately three lion generations) (Bauer et al. 2016). Most alarmingly, lions are now considered to have been extirpated from at least 92% of their historic range[1] (Bauer et al. 2016).

[1] *Lions occur in 24 African countries (Bauer et al. 2016). Since 1977, 20 of these countries have exported lion trophies (CITES: http://trade.cites.org/en/cites_trade/ [accessed 2016-07-12])*

According to the 2016 Red List Assessment, in Africa, lions are now extinct in 15 countries (including Western Sahara, which is technically a disputed territory), are possibly extinct in another seven and now occur in only 24 countries (Bauer et al. 2016). Lion decline may be even more severe than currently estimated by the IUCN, due to the assessment being based on data from relatively well-known populations. This is a common practice, but well-monitored populations are also those which are likely to have relatively high levels of attention, investment and protection, so a possible bias is that they are likely to be less threatened than many other subpopulations (Durant et al. submitted).

1.1.3 What is the current threat status of lions?

The lion is classed as 'Vulnerable' by the IUCN (Bauer et al. 2016) based on its declining population size, so is thought to be facing a high risk of extinction in the wild. However, across the majority of its range, the lion meets the IUCN criteria for 'Endangered' status, with an inferred rate of decline of over 50% across three lion generations, but the positive trends from southern Africa reduce that average decline at a range-wide level (Bauer et al. 2015). Only two African countries (Namibia and Zimbabwe) had substantially increased lion populations between 1993 and 2014, and it is of note (given the purpose of this report) that both those countries are ones which trophy-hunt lions. Similarly, while lions in most parts of Mozambique are declining, in Niassa Game Reserve where hunting was tightly regulated, lion populations increased locally between 1993 and 2014. However, trophy hunting is clearly not a guarantee of increasing lion populations, as other key trophy hunting countries such as Tanzania showed declines (Bauer et al. 2016), with previous data from Packer et al. (2009) showing highest declines in countries with highest trophy hunting rates.

1.1.4 What are the major current threats to lions?

The 2016 IUCN Red Listing for the lion states that "*Among the causes of decline, the most important are indiscriminate killing in defence of human life and livestock, habitat loss, and prey base depletion. Prey base depletion is partly linked to habitat loss, but more importantly to poaching and bushmeat trade (Becker et al. 2013). An emerging threat is trade in bones and other body parts for traditional medicine, both within Africa and in Asia (IUCN 2006a, b; Riggio et al. 2013). Furthermore, although trophy hunting contributes positively to Lion conservation, improvements in management practices have been recommended (Hunter et al. 2013; Lindsey et al. 2013; Edwards et al. 2014), as when poorly regulated, it also contributes to population declines (Packer et al. 2009; Croes et al. 2011;*

Packer et al. 2011; Rosenblatt et al. 2014). While attention is currently focused on Lion hunting reforms to ensure sustainability, the leading causes of population decline are more difficult to address and are likely to continue" (Bauer et al. 2016).

The CITES/CMS meeting of all lion range states in May 2016 summarised that: "*...the main threats (listed in no particular order) for lions in Africa are: (1) Unfavourable policies, practices and political factors (in some countries); (2) Ineffective lion population management; (3) Habitat degradation and reduction of prey base; (4) Human-lion conflict, (5) Adverse socio-economic factors; (6) Institutional weakness; and (7) Increasing trade in lion bones.*" The two 2006 IUCN regional reports for lions noted that the major factors affecting lion viability were availability of wild prey, indiscriminate killing of lions, size and extent of the lion population, and loss, degradation and fragmentation of lion habitat, with increasing human populations and poverty acting as key underlying root causes of decline, as well as institutional weakness and poor management (IUCN 2006a, b). A 2016 report by Panthera, WildAid and WildCRU named human-lion conflict and bushmeat poaching as critical threats to lions, while human encroachment was a high threat and trophy hunting and lion poaching were deemed medium threats (Panthera et al. 2016). In short, experts agree that the primary threats to lions (which vary to some extent by region; see Section 2.1.4) are habitat loss and degradation, loss of prey base and conflict with people over livestock depredation.

1.1.5 Future considerations for lion conservation

There are significant global challenges facing lions and other biodiversity, particularly the impacts of human population growth and climate change. Human populations are set to swell over the 21st century, as is their demand for resources including land. Africa, with a current population size of ∼1.2 billion (UNPD 2015), has the fastest population growth rate in the world, with projections estimating a population tripling across 27 African states by 2100, leading to a continental estimate of ∼4 billion. Eight lion range states[2] (as well as Mali, where lions are possibly extinct, and Burundi, where they are extinct) are estimated to have a five-fold increase in human population by 2100 (UNPD 2015). At current rates of population growth, by the end of the century the population of Tanzania will be two-thirds that of the United States of America (USA) but in an area ten times smaller. Worse still, Nigeria, also with a surface area roughly one-tenth that of the USA, is projected

[2] *Angola, Democratic Republic of the Congo, Malawi, Niger, Somalia, Uganda, Tanzania and Zambia*

to have a population that will be double that of the USA (European Commission 2015). The impact of this human population growth on the lion estate depends on many variables, but even supposing favourable economic development and land-use transitions were to occur (which seems unlikely in many places), it is expected that pressure on lion habitat and prey will increase substantially. Livestock numbers are expected to grow concomitantly, leading to intensified human-lion conflict. Changes in human populations may also be associated with changes in patterns of tourism, which might affect both photographic and hunting revenues for lion range states.

Regarding climate change, under moderate emissions scenarios, global mean temperature is expected to reach 2° above pre-industrial levels by 2050. More likely, and given the reticence or incompetence with which governments have faced climate change, these temperature scenarios will be exceeded. A more likely prediction is 2.5–3° warming by 2050[3]. Climate changes are likely to have pervasive effects such as reduced and more erratic rainfall (Fields 2005; Toulmin 2009). Although lions have broad habitat tolerance within the savannah biome, the predicted drying trend is likely to affect lions through declines and changes in prey species communities. The implications of changing climate for lions are not limited to direct effects: it could also feasibly alter the potential human land-uses. There is uncertainty about how increasing aridity may affect land conversion and the implications for the lion estate. However, there is likely to be increasing pressure on water-rich regions from growing human populations, increasing demand for land and increasing pressure on currently protected areas.

1.1.6 Summary of reasons for being concerned about lion conservation

Lions have great value at national and international scales, including significant existence, ecological and economic value. Furthermore, lions hold both symbolic meaning and widespread affection in the UK, making their conservation important for the British populace. Rural populations in many African countries often take a different view of animals that can and do kill their stock and even members of their families, and to them, lion killing can be not only ethical but often desirable (Hazzah et al. 2009; Dickman 2015). Furthermore, governments in lion range countries, often affected by poverty and all the attendant pressures, will have different priorities from West-

[3] *IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp.*

ern audiences. Over only a few decades, the lion estate has shrunk strikingly, as have numbers of lions occupying parts of it, so to those who value it, the conservation of this iconic species is now more urgent than ever. With perhaps not many more than 20,000 free-ranging lions remaining, and in the light of increasing pressure on lion populations, there is a pressing requirement for effective conservation, and anything that might imperil it necessitates careful scrutiny. There have been vociferous arguments that trophy hunting is one of the factors that imperils lions, while others state equally vigorously that restricting trophy hunting would be a larger danger factor for lion conservation. Therefore, it is urgent that this issue is examined impartially, in order to develop suggestions for policy that would minimise negative impacts for lion conservation.

1.2 Background to lion trophy hunting

1.2.1 What is lion trophy hunting?

According to the IUCN, "*Trophy hunting generally involves the payment of a fee by a foreign or local hunter for a hunting experience, usually guided, for one or more individuals of a particular species with specific desired characteristics (such as large size or antlers). The trophy is usually retained by the hunter and taken home*" (IUCN 2016). Trophy hunting is also known as 'safari hunting' and is often referred to as a type of 'sport' or 'recreational' hunting (and justifications are clearly distinct from those when hunting is primarily for pest control or subsistence; Loveridge et al. 2007b). Regarding lions, the trophy is normally the animal's skull and skin (and clavicle, hyoid bone and claws). The mane is the prominent feature of the skin, with longer, thicker and darker hairs signifying a better quality of trophy, although ultimately Safari Club International (SCI) define trophy quality by skull size (Safari Club International 2005). Trophies are usually mounted for display and associated kudos and nostalgia.

Although an important part of the pursuit, trophies themselves are not usually the sole motivation for hunting. Motivations may include engagement in outdoor pursuits, an enthusiasm for collection, social status and owning 'bigger' trophies (as evidenced by the emphasis on trophy size in SCI Awards and record book). Surveys of over 600 international trophy hunters who had hunted in South Africa between 1999 and 2003 revealed that spiritual or emotional motives (particularly the enjoyment of being in nature), were the most commonly mentioned reasons for hunting, followed by 'emotional' aspects such as enjoying the challenge of the hunt, although col-

lection of the trophy was an important theme for many people (Radder 2005).

In Africa, government or wildlife management agencies make hunting concessions available, usually on leasehold, and normally issue trophy hunting licences that are available to the hunting client through hunting outfitters, also known as safari operators[4], for a fee. The overall cost to the hunting client covers the direct costs of the hunt (e.g. trophy fees, per diem rates [which differ between species and are significantly larger for dangerous species], concession fees, accommodation, subsistence, staff and travel costs). It also usually covers a levy that goes to the Government, part of which may be used by the Government to provide funds for wildlife areas and local communities (see Section 2.2.2.3). The motivation of the lion range states for permitting trophy hunting is, as for other forms of tourism, to generate revenue and jobs; this has the consequence of financing a wildlife economy on land where in some cases alternative forms of land-use are less profitable or practical.

The hunting operations are usually run by outfitters (although sub-leasing and external marketing complicates the system and the task of regulating it); outfitters are responsible for all hunting requirements in-country, such as obtaining the correct licences, permits, liaising with landowners, and organising all other logistics. Outfitters also provide access to a professional hunter (which may be the outfitter themselves), whose responsibility it is to accompany the client and ensure that the hunt is conducted to the required standard. Professional hunters are variously accredited by national hunting bodies or wildlife management authorities. The exact mechanisms of lion trophy hunting vary by country, but once the lion has been killed, the outfitter or professional hunter is responsible for the field preparation and care of the trophy, and ensuring that all the relevant permits are in place for the client to export the trophy to its final destination.

1.2.2 Legality of lion trophy hunting

The global outcry over the trophy hunting[5] of Cecil the lion in July 2015 (Macdonald et al. 2016a) revealed widespread surprise amongst the public, particularly in more developed countries, that trophy hunting remains a legal practice

[4] *Hunting outfitters or safari operators have the legal rights to hunt on a defined piece of land (either private land, government concession, or community land) for which they may be issued a hunting quota for particular species. Professional hunters are contracted by the safari operators to guide paying tourist hunters in their pursuit of quarry; doubling up as instructors, first aiders, bodyguards etc.*

[5] *All legal charges relating to the hunting of Cecil were dropped in November 2016. A Zimbabwe court ruled that they were too vague for a proper defence to be mounted (http://www.bbc.co.uk/news/world-africa-37948866). Most trophy hunting is legally practiced.*

(and an expansive land use) in many African countries. Trophy hunting (of certain wildlife species, not just lions) is currently practiced at a significant level in approximately 12 African countries (historically at least 33 African countries permitted trophy hunting; CITES data: http://trade.cites.org/en/cites_trade/ [accessed 2016-07-12]). A summary of which African countries historically hunted and currently hunt lions, according to CITES data, is shown in Table 1.

As of December 2015, trophy hunting was banned in six African lion range countries that are still thought to have lions – Angola, Botswana, Kenya, Malawi, Niger and Nigeria (U.S. Fish and Wildlife Service 2015). While some of these bans are long-standing (e.g. Kenya banned all trophy hunting in 1977), some are recent bans – for example Botswana enforced a ban on all trophy hunting in public areas from the start of 2014 (following a moratorium on lion hunting between 2001 and 2004, and successive restrictions thereafter). Trophy hunting is also banned in Congo, Gabon and Mauritania, where the lion is regionally extinct, in Ghana where they are possibly extinct, and in Rwanda where a small number of lions were reintroduced in 2015[6] (U.S. Fish and Wildlife Service 2015; Bauer et al. 2016).

The US Fish and Wildlife Service found that as of May 2014, 18 African countries in Africa legally permitted lion hunting: Benin, Burkina Faso, Central African Republic, Democratic Republic of the Congo, Ethiopia, Côte d'Ivoire, Mali, Mozambique, Namibia, Senegal, Somalia, South Africa, Sudan, Tanzania, Togo, Uganda, Zambia and Zimbabwe (U.S. Fish and Wildlife Service 2015). However, lions are thought to be extinct in three of those countries (Côte d'Ivoire, Mali and Togo), and in Ethiopia and Uganda, trophy hunting is restricted to problem or dangerous animals (U.S. Fish and Wildlife Service 2015), with some similar restrictions in places in Namibia. However, they also found that as of 2013, lion trophy hunting was only documented to occur in eight countries, namely Benin, Burkina Faso, Central African Republic, Mozambique, Namibia, Senegal, Somalia, South Africa, Tanzania and Zimbabwe – Zambia imposed a moratorium on the trophy hunting of big cats in 2013, but lifted it for the 2015/16 hunting season for leopards, and announced the lifting of the ban on lions for the following year (U.S. Fish and Wildlife Service 2015). Swaziland has no legal protection for lions (similar to Guinea Bissau, where lions are possibly extinct, and Burundi and Lesotho where they are regionally extinct) (U.S. Fish and Wildlife Service 2015; Bauer et al. 2016). There have

[6] *Rwanda is amongst the 7 countries we cite on a list of those from which lions have probably become recently extinct according to the IUCN Redlist. This situation may be retrieved by the 2015 reintroduction.*

also been some restrictions on lion hunting within countries – for example, Zimbabwe imposed a regional moratorium on lion hunting between 2004 and 2008 (Loveridge et al. 2010).

As with any other form of wildlife management, permitted trophy hunting activities are legislated by the relevant national government and wildlife authorities, and the specifics of that legislation (as well as how well it is enforced) vary considerably. In some countries (most notably South Africa) lions can be shot within very small enclosures, a practice known as 'canned', 'captive' or 'put-and-take' hunting. As long as the landowner complies with the relevant national and provincial legislation regarding minimum standards for fencing and enclosure sizes, it is legal to breed lions and hunt them within those small fenced areas (although trophies from these captive lions from South Africa can no longer be imported into the US as a result of the October 2016 evaluation by the USFWS). Most lion hunting in South Africa is from captive animals: Lindsey et al. (2012a) reported that South African hunting operators estimated that only 0.9% – 1.1% of lions hunted in 2009 and 2010 were wild. The CITES Scientific Authority for South Africa have given a slightly higher estimate, with wild lions accounting for 5% of total successful lion hunts, but the vast majority of hunting in South Africa is clearly from captive animals (Williams et al. 2015). There is widespread opposition to the practice of canned or captive hunting on ethical and animal welfare grounds (IUCN 2016) and it has been condemned by the IUCN, which states: "*Canned hunting...raises very different issues from trophy hunting of free-ranging animals, and is condemned by existing IUCN policy*" (IUCN Recommendation 3.093, 'Application of the IUCN Sustainable Use Policy to sustainable consumptive use of wildlife and recreational hunting in southern Africa', 2004; IUCN 2016).

Table 1: *Summary of the historic extent of trophy hunting practice across Africa, including information on the recent export of trophies from that country. The current lion conservation status for each country is summarised as per Bauer et al. (2015). The relative scales as a proportion of 1 for both general trophy hunting and lion hunting are provided for the decade 2006 and 2015. Data were extracted from the CITES database* (http://trade.cites.org/en/cites_trade/ [accessed 2016-07-12]) *for the years 1975 to 2015 and for the purpose of* 'H – Hunting trophy'*. The data were then subset by* 'W' *(wild) source and term* 'trophies'*. As there may be a lag in exporting trophies and updating the records, the* 'Recently exported' *columns consider data from 2014 to 2015.*

Country	Historically hunt *Trophies*	Recent export *Trophies*	Relative scale *Trophies*	Lion status	Historically hunt *Lions*	Recent export *Lions*	Relative scale *Lions*
Algeria	no	no	-	Extinct	no	no	-
Angola	no	no	-	EXTANT	no	no	-
Benin	YES	YES	0.002	EXTANT	YES	YES	0.004
* Botswana	YES	YES	0.044	EXTANT	YES	no	0.025
Burkina Faso	YES	YES	0.007	EXTANT	YES	YES	0.050
Burundi	no	no	-	Extinct	no	no	-
Cameroon	YES	YES	0.028	EXTANT	YES	YES	0.026
Cape Verde	no	no	-	absent	no	no	-
Central African Republic	YES	YES	0.010	EXTANT	YES	no	0.007
Chad	YES	no	0.001	EXTANT	YES	no	0.001
Comoros	no	no	-	absent	no	no	-
Congo	YES	YES	0.000	Extinct	no	no	-
Congo	YES	no	0.000	EXTANT	YES	no	0.000
Cote D'ivoire	YES	no	0.000	*Unsure*	no	no	-
Djibouti	no	no	-	Extinct	no	no	-
Egypt	no	no	-	Extinct	no	no	-
Equatorial Guinea	no	no	-	absent	no	no	-
Eritrea	no	no	-	Extinct	no	no	-
Ethiopia	YES	YES	0.004	EXTANT	YES	YES	0.001
Gabon	YES	no	0.000	Extinct	YES	no	0.000
Gambia	no	no	-	Extinct	no	no	-
Ghana	YES	no	0.000	*Unsure*	no	no	-
Guinea	YES	no	0.000	*Unsure*	no	no	-
Guinea-bissau	no	no	-	*Unsure*	no	no	-
Kenya	no	no	-	EXTANT	no	no	-
Lesotho	YES	no	0.000	Extinct	no	no	-
Liberia	YES	no	0.000	absent	no	no	-
Libya	no	no	-	Extinct	no	no	-
Madagascar	YES	no	0.000	absent	no	no	-
Malawi	YES	no	0.000	EXTANT	no	no	-
Mali	YES	no	0.000	*Unsure*	no	no	-
Mauritania	no	no	-	Extinct	no	no	-
Mauritius	YES	YES	0.000	absent	no	no	-
Mayotte	no	no	-	absent	no	no	-
Morocco	YES	no	0.000	Extinct	no	no	-
Mozambique	YES	YES	0.035	EXTANT	YES	YES	0.040
Namibia	YES	YES	0.186	EXTANT	YES	YES	0.024
Niger	YES	YES	0.000	EXTANT	no	no	-
Nigeria	YES	no	0.000	EXTANT	no	no	-
Reunion	no	no	-	absent	no	no	-
Rwanda	no	no	-	*Unsure*	no	no	-
Sao Tome And Principe	no	no	-	absent	no	no	-
Senegal	YES	no	0.000	EXTANT	YES	no	0.000
Sierra Leone	no	no	-	Extinct	no	no	-
Somalia	no	no	-	EXTANT	no	no	-
South Africa	YES	YES	0.436	EXTANT	YES	YES	0.269
South Sudan	no	no	-	EXTANT	no	no	-
Sudan	YES	no	0.001	EXTANT	no	no	-
Swaziland	YES	no	0.000	EXTANT	no	no	-
Tanzania	YES	YES	0.118	EXTANT	YES	YES	0.424
Togo	YES	no	0.000	*Unsure*	YES	no	0.000
Tunisia	no	no	-	Extinct	no	no	-
Uganda	YES	YES	0.000	EXTANT	no	no	-
Western Sahara	no	no	-	Extinct	no	no	-
§ Zambia	YES	YES	0.060	EXTANT	YES	no	0.079
Zimbabwe	YES	YES	0.069	EXTANT	YES	YES	0.047

∗ *Botswana banned lion trophy hunting in 2008, and all trophy hunting in public arenas in 2014.*

§ *Zambia implemented a lion and leopard hunting moratorium in 2013, which was reversed in 2015 for leopards and 2016 for lions.*

Across Africa, there is also a bias towards hunting captive lions rather than wild ones[7]: CITES export records document more than twice as many captive lion trophies as wild ones, with a ratio of 2.35 to 1 (5,715 'captive' versus 2,429 'wild'), although the importers record a slightly different ratio, of 1.89 captive trophies for every wild one (4,474 'captive' versus 2,367 'wild').

In South Africa at least, captive lions are bred for the purpose of supplying the demand for lion trophies, with this industry regulated by the Department of Environmental Affairs (DEA) and the Department of Agriculture, Forestry and Fisheries (DAFF)[8]; however these lions are generally neither considered as wild or contributing to lion conservation[9].

The African Lion Working Group (ALWG) in 2016 stated that "*the sport hunting of lions that are captive bred and reared expressly for sport hunting, and/or sport hunting of lions that occur in fenced enclosures and are not self-sustaining, does not provide any demonstrated positive benefit to wild lion conservation efforts and, therefore, cannot be claimed to be conservation... The estimated 8,000 lions in South Africa currently being maintained and bred on game farms as part of this industry should not be included in any assessments of the current status of wild lions.*"

As this report is focused on wild lion conservation, canned or captive hunting does not fall within its remit, and will therefore not be considered further, except insofar as it might indirectly affect lion conservation.

1.2.3 Ethical acceptability of lion trophy hunting

There has been more than a century of concern over the ethics of hunting (e.g. fox hunting in the UK: Burns Inquiry 2002; Macdonald and Johnson 2015a), against which background the killing of Cecil the lion triggered widespread outrage over the perceived ethical unacceptability of trophy hunting (Macdonald et al. 2016a). The motivation for that outrage varied, but tended to centre around the unacceptability of killing an animal purely for sport, particularly when that animal is a threatened species.

However, views regarding trophy hunting (and indeed the killing of animals in general) vary markedly across

[7] *Similar systems of put-and-take hunting are familiar in the West, for example, in the UK the shooting of reared game birds or angling in stocked trout lakes*

[8] https://www.environment.gov.za/sites/default/files/docs/lionmanagementinSA_questions_answers2015

[9] http://www.repository.up.ac.za/dspace/bitstream/handle/2263/19272/Lindsey_Possible(2012).pdf

the world (Macdonald et al. 2016b). In many African communities, the killing of a lion is often something to be celebrated (Hazzah et al. 2009; Dickman 2015), and there is a commonly-held view that it was unethical for foreigners to care so much about the killing of one lion (or indeed lions in general), particularly when lions themselves kill people and endanger their livelihoods (Nzou 2015). It was also noted that much of the demand for banning trophy hunting in Africa came from the United States, which has one of the largest domestic trophy hunting markets in the world (Sharp and Wollscheid 2009). The ethical debates around trophy hunting are important and merit consideration (Macdonald et al. 2016b), but they are beyond the scope of this report, which is focused specifically on the role of trophy hunting with regard to conservation. Conservation action does not of course take place in an ethical vacuum – Vucetich and Nelson (2012) provide an accessible account of applied conservation ethics. An exploration of the specific issues raised by trophy hunting is provided in Appendix A. Some people find any form of lion hunting morally unjustifiable, regardless of the sustainability question, particularly if it is done in ways that involve animal suffering. This report focuses on conservation. But welfare and other ethical issues (which dominated the much of the public discourse following Cecil's death) are inextricably part of the process that shapes conservation policy.

1.2.4 Extent of lion trophy hunting and its markets

It is surprisingly hard to determine exactly how many lions are trophy hunted across Africa each year, because the CITES database (which records imports and exports of such trophies) records the number of trophies (i.e. individual parts moved) and not the number of animals killed. One trophy-hunted lion could result in multiple trophies, for example if the skin, skull and claws were counted separately. This is an issue which is clearly highlighted by CITES itself, which states that "*Because 'specimens' include parts and derivatives, the numbers of specimens do not reflect numbers of individual animals*" (CITES 2014). In addition, the records of exported trophies often do not match the number imported, partly because of delays in the system and partly because of inconsistencies in the ways different countries record their data. Despite this, many reports publish the number of trophies as if it was the number of lions hunted, which is misleading. Bearing in mind these caveats, the CITES database gives an overall idea of trends and comparative numbers, and a summary of the number of wild-sourced lion trophies

(using data from the CITES database, http://trade.cites.org/) is given in Table 2, with more information on the international extent of trade in lion trophies by country is given in Appendix B.

Table 2: *Summary of the total number of wild-sourced lion trophies (not necessarily the number of lions) recorded as exported or imported by CITES.*

Country	Reported exports *Lion trophies*	Reported imports *Lion trophies*	Total destinations *Lions*
Benin	25	18	6
Botswana	168	151	20
Burkina Faso	333	78	12
Cameroon	176	78	15
Central African Republic	48	49	12
Chad	10	6	2
Congo, Democratic Republic Of	0	1	1
Ethiopia	10	13	3
Gabon	2	0	1
Mozambique	268	197	19
Namibia	163	168	28
Senegal	3	0	2
South Africa	1801	3572	69
Tanzania, United Republic Of	2842	2305	49
Togo	1	0	1
Zambia	530	562	33
Zimbabwe	317	1117	34
Total	**6697**	**8315**	**-**

The UK was recorded as having 80 wild lion trophies exported to it (from 9 source countries) during the 22 years from 1991–2013, with the importation records showing 4 trophies[10]. Figure 1 provides an overview of the movements of lion trophy across the globe, and highlights the significance of the US and European markets for such trophies.

1.2.5 Reason for the UK Government examining this issue now

Wildlife conservation has been a concern in Britain for centuries, and remains a strong interest of the UK public (Sutherland 2008).

[10] *These numbers have to be interpreted bearing in mind the problems of inferring number of lions from number of trophies.*

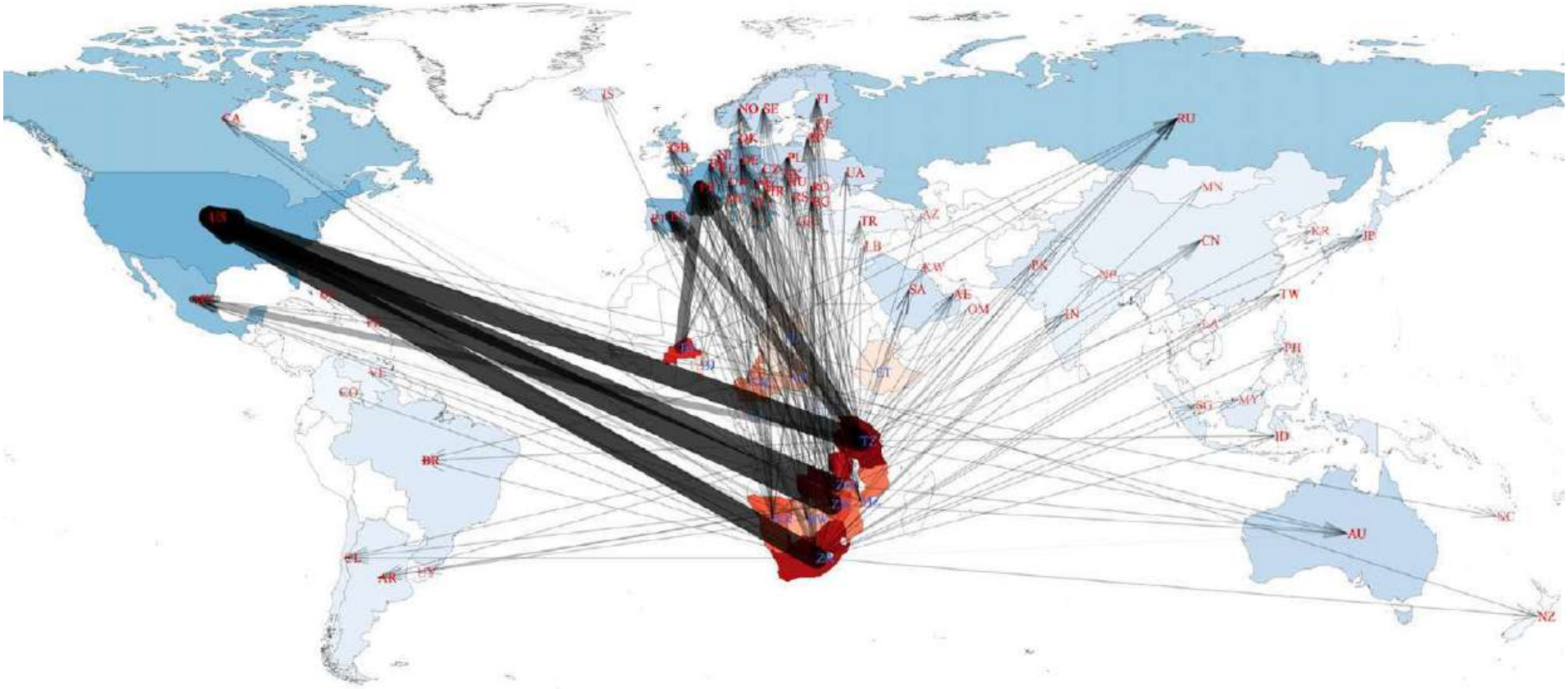

Figure 1: *Overview of international movements in lion trophies, showing source (red) and destination (blue) countries for lion trophies linked by directional arrows. Arrow width indicates the scale of trade from one country to another. Tone of colour per country indicates the relative scale of either export or import relative to all other exporters or importers respectively. ISO2 country codes of exporter and importer countries are indicated on the map. Lion hunting data was obtained from CITES and considered for the decade between 1996 and 2015. The data was subset to include only* 'lion' 'trophies' *from a* 'wild' *source and that were* 'hunted'. (CITES data: http://trade.cites.org/en/cites_trade/ [accessed 2016-07-12])

For the roots of modern conservation some might look to 1066 when King William I set aside forests, such as New Forest, Sherwood and Forest of Dean as royal hunting reserves (others trace the roots of conservation to concerns over UK forests in the 1660s). John Muir, a Scotsman, inspired the movement to preserve wilderness in the USA, including Yosemite National Park. In 1892, he founded the Sierra Club, one of the first organisations devoted to environmental conservation.

The roots of conservation in Europe and the USA are inextricably bound to hunting, initially by protecting wild animals for it and latterly more often protecting them from it. In 1903, British naturalists helped found another pioneering conservation society (the Society for the Preservation of the Wild Fauna of the Empire, which has evolved today into Fauna and Flora International) (Loveridge et al. 2007b). As a group they were known as 'The Penitent Butchers' because all were former sportsmen or trophy hunters who became concerned by the wide-scale decimation of wildlife through unregulated hunting particularly in Africa (Loveridge et al. 2007b). Their aim was to safeguard Africa's large mammals from over-hunting and habitat encroachment. The Society worked with Governments, land-owners and hunters to pass legislation which restricted hunting across large swathes of East and southern Africa, and which ultimately led to the creation of some of Africa's most iconic parks, such as the Serengeti National Park.

In short, hunting and conservation has long been a preoccupation within British society. There has long been a demand to examine and reform trophy hunting, but public awareness of the issue reached a peak in July 2015 over the killing of Cecil the lion (Macdonald et al. 2016a). Much of the reaction to Cecil's killing focused on pressing for bans on trophy hunting, or at least of the carriage and import of trophies to countries such as the USA and the UK. As of August 2016, 32 airlines, including British Airways, have instigated complete bans on carrying trophies. Seven more refuse to carry 'Big Five' trophies, and a further five have implemented specific embargoes, from a ban on CITES Appendix I species by Emirates to a much broader ban on dead/processed/research animals by Turkish Airlines. In total, 44 airlines now refuse to carry lion trophies[11], with pressure on other carriers to do the same[12].

As a measure of feeling (although it floundered), in January 2016 a group of members in the European Parliament

[11] http://www.hsi.org/news/news/2015/08/airlines-shipping-hunting-trophies
[12] http://www.ifaw.org/united-states/news/trophies-back-board-south-african-airways-cans-its-ban
[13] http://www.europarl.europa.eu/sides/getDoc

called for the signing of a declaration restricting trophy imports[13], while the UK Government is actively considering its position on the importation of lion trophies, including asking for this report to be produced to inform its thinking.

As of August 2016, several countries have already banned lion trophy imports, including the Netherlands, France, Australia and Costa Rica. Whilst the USA has refrained from an outright ban, lion trophies had been made illegal in Washington State and New Jersey[14], although in late August 2016, the New Jersey ban was deemed illegal by US authorities[15].

Moreover, in December 2015 the US Fish and Wildlife Service (USFWS) listed the lion in southern and eastern Africa, *Panthera leo melanochaita*, as threatened under the Endangered Species Act (the lion in west, central, northern Africa and India, *P. l. leo*, was listed as endangered). Although this threatened listing comes with an addendum permitting the import of sport-hunted trophies, the conditions under which a permit may be granted are rigorous, perhaps prohibitively so, requiring that exporting countries address concerns over "*evaluating population levels and trends; the biological needs of the species; quotas; management practices; legal protection; local community involvement; and use of hunting fees for conservation*" (Federal Wildlife Service, 2016[16]). This evaluation has now taken place for South Africa[17] (with the conclusion that only trophies from wild or wild-managed lions could be imported to the US); evaluations will follow for other relevant countries.

A proposal (CoP17 Prop 4) for consideration at the 2016 Conference of the Parties (CoP) to CITES was made by nine countries (Chad, Côte d'Ivoire, Gabon, Guinea, Mali, Mauritania, Niger, Nigeria and Togo) for all African populations of *Panthera leo* to be transferred from Appendix II to Appendix I. However, it should be noted that only three of those countries (Chad, Niger and Nigeria) are still thought by the IUCN to have any extant lions (Bauer et al. 2016), and the proposed listing was met with significant opposition by many of the key lion range countries, particularly the southern African lion hunting countries where lion populations are stable.

In fact, the first CITES/CMS (Convention on International Trade in Endangered Species of Wild Fauna and Flora / Convention on the Conservation of Migratory Species of Wild Animals) meeting of all lion range states, which

[14] http://www.nj.com/politics/index.ssf/2016/06/christie_signs_law_banning_trophy_animals_in_nj
[15] http://www.africahunting.com/threads/victory-for-new-jersey-hunters-in-the-anti-trophy-law.30930/
[16] https://www.fws.gov/endangered/what-we-do/pdf/Lion_FL_FAQs_Final.pdf
[17] http://www.huffingtonpost.com/entry/a-major-step-forward-for-lion-conservation-in-africa_us_5808f6ffe4b099c434319294

took place in 2016, highlighted the importance of trophy hunting under certain conditions, stating: "[*We*] *Highlight the benefits that trophy hunting, where it is based on scientifically established quotas, taking into account the social position, age and sex of an animal, have, in some countries, contributed to the conservation of lion populations and highlight the potentially hampering effects that import bans on trophies could have for currently stable lion populations*".

Regarding the 2016 proposal to list lions on CITES Appendix I, the CITES/CMS report states that "*Lion Range States have different views on the inclusion of all African populations of* Panthera leo *in Appendix I, with some arguing that the populations in West and Central Africa are fragmented and highly threatened; and others arguing that the species does not meet the listing criteria and is threatened by factors other than those CITES can address*".

The 2016 CITES CoP (CoP17) eventually decided not to list lions on Appendix I, but did state they would work towards lion conservation in a more active way, including helping to develop and support the implementation of joint lion conservation plans and strategies (CITES 2016). CoP17 did add an amendment which prohibited the export of bones, bone pieces, bone products, claws, skeletons, skulls and teeth from wild lions for commercial purposes, although it remained possible for these parts to be exported from captive-bred lions in South Africa (CITES 2016).

This decision, and the subsequent October 2016 evaluation by the USFWS which banned the import to USA of trophies from 'canned' lions, interact to raise two new questions of relevance to the conservation of wild lions. First, insofar as the majority of farmed lion trophies would hitherto have been imported to the USA, will this prohibition cause a proportion of the American hunters who might formerly have hunted farmed lions to turn to wild lions, thereby affecting the demand on the wild sector? Second, and considering the report by Williams et al. (2015) on the export from South Africa of farmed lion products aside from trophies, with the loss of their income from trophies destined for America, will the farmers flood the market with lion body parts with the possible result, through predatory pricing, of increasing the subsequent demand?

In terms of lion conservation, banning the importation of trophies to the UK would have little significant direct effect because the numbers of lions involved are so few (<4 lions yr^{-1} between 1991 and 2013 exported from Africa to Britain; CITES data; see Section 1.2.4). However, the cascading indirect effects of UK policy are difficult to predict and possibly wide-reaching. The UK may have impact beyond its borders through the influence of the evidence it is able to present (e.g. this report) and through ad-

vocating for greater alignment of North American and European positions.

Even if the UK doesn't change policy, the status quo will not be maintained, as international policy developments will bring about change. For example, it has been proposed that lions should be uplisted to CITES Appendix I, most recently in 2016 and previously by Kenya to the CoP in 2004 (although that was subsequently withdrawn) – such uplisting has not been passed but similar proposals could be submitted again in the future. It is very likely that any such listing would lead to increased regulation and/or limitation of trophy exports to all Parties, including the UK. Although strictly tangential to the issue of trophy hunting, the UK's influence on the classification of lions under CITES is likely to be influenced by lobbying motivated by opposition to hunting. Listing lions on CITES Appendix I would prevent commercial trade in wild specimens but hunting trophies are currently considered personal effects. It is not necessary to have specific Resolutions (cf black rhinos and leopards) to permit future trade.

Although the CITES uplisting has not passed to date, there has been a significant recent change in international policy regarding lions, when in 2015 the US listed them as Endangered in West and Central Africa and as Threatened in East and southern Africa on the annexes of the Endangered Species Act. As a consequence, imports of lion trophies into the large and lucrative American market are no longer allowed from West and Central Africa, and the industry in other regions is forced to demonstrate that trophy hunting is of net benefit to lion conservation. Many trophy hunting areas are now setting up monitoring systems to be able to demonstrate net positive effect in order to maintain access to the US market, and the US is currently considering whether those areas do provide enhancements for the species. The USFWS announced their first finding, for South Africa, in October 2016, stating that it would not permit the importation of trophies from captive-bred lions as they did not meet the criteria for conservation enhancement, but would permit the import of trophies from wild and wild-managed lions on a case-by-case basis[18]. Some possible consequences for wild lions of this prohibition on the import to the USA of farmed lion trophies are mentioned above.

In another policy development, many Parties to the Convention on Migratory Species are arguing that the lion should be listed under that Convention[19] – the implications would depend on which Appendix they were added to, but this

[18] http://www.huffingtonpost.com/entry/a-major-step-forward-for-lion-conservation-in-africa_us_5808f6ffe4b099c434319294

[19] https://cites.org/eng/news/sg/Lion_Range_State_Meeting_Joint_statement_by_CITES_CMS_300516

could facilitate management of transboundary lion populations. The UK plays an active role in these international developments, but that doesn't preclude further domestic policy development.

Given the intensity of global interest in this subject, and the wide range of views and stakeholders involved, the UK government has recognised the need for comprehensive and impartial advice on how possible trophy hunting might affect lion conservation, as well as how the UK Government can best support lion conservation in a wider context.

1.3 Summary of reasons for examining trophy hunting with regard to lion conservation

Lions are one of the world's most iconic species, and are under increasing threat. The degree to which trophy hunting plays either a negative or positive role in lion conservation is hotly debated and will be covered in more detail below, but it is clear that there is a long history of polarised views over trophy hunting. Recently – and particularly notably since the killing of Cecil the lion – a large section of the global public appears to have concluded that lion trophy hunting in particular, is unethical. However, this contrasts strikingly with the views of many people in the African countries where lions occur, and it is important to consider how any actions taken by the UK and its partners would affect those range countries with regard to wild lion conservation.

2. Threats and impacts associated with lion trophy hunting

2.1 The significance of trophy hunting as a threat to lions

2.1.1 Significance of trophy hunting as a threat to lions at a population scale

Trophy hunting can have marked impacts at a population scale, particularly when harvest rates are high (Loveridge et al. 2007a; Caro et al. 2009; Creel et al. 2016). Trophy hunting tends to be particularly negative when it is additive to other threats – and the magnitude of those other threats also depends strongly on how well the hunting area is managed. For example, lion populations are declining across the Benoue complex in Cameroon, thought to be due to a combination of high poaching pressure and excessively high lion trophy off-takes (Croes et al. 2011). However, there are strong underlying pressures in Cameroon – large mammal populations have declined steeply since the 1970s due to habitat destruction and poaching, and are particularly precarious due to the small size and fragmentation of protected areas, as well as poor management of those areas (Croes et al. 2011). Modelling by Creel et al. (2016) suggested that in the presence of additional (and stable) threats such as human encroachment, poaching and prey depletion, the addition of any hunting produced some degree of population decline and an increased probability of local extirpation, although conservative limits on hunting (see Section 3.2), resulted in situations with relatively stable dynamics and low probability of extirpation over a 25 year period.

In some populations, hunting alone explains lion declines – Packer et al. (2009) found that within Tanzania's Selous Game Reserve (the largest lion trophy hunting landscape in the world), the hunting blocks with the highest lion offtakes per 1,000 km^2 had the steepest declines in lion populations, unrelated to the impact of habitat loss. In western Zimbabwe lion populations rebounded by 50% when lion hunting was suspended, suggesting that previously high quotas were a cause of population decline (Loveridge et al. 2010; Loveridge et al. 2016). In Zambia, trophy hunting was the major factor behind declining lion populations (Rosenblatt et al. 2014). Poorly calculated and/or enforced quotas are thus perilous for lion populations (Caro et al. 2009; Packer 2015). The severity of impacts at a population level depends upon both the number and de-

mography of the animals removed, and this is covered in more detail below (see Section 3.2).

2.1.1.1 Negative population effects associated with the removal of females

Currently, only male lions are now hunted in most countries, but females were hunted in Zimbabwe until 2004 (Packer et al. 2006) and are still hunted in Namibia (Lindsey et al. 2013), as well as South Africa[20] (although many of those lionesses are in canned hunting operations). The number of females in a pride has a strong effect on per capita reproductive success, with the lowest cub production in prides with fewer females (Packer et al. 1988).

Larger prides have greater survival of all cub age-classes, benefitting from collective defence and possibly from synchronous breeding and communal nursing (Packer et al. 2001; Loveridge et al. 2010). Therefore, the removal of adult females is particularly damaging to populations of lions and other long-lived species.

2.1.1.2 Negative population effects associated with the removal of pride males

Loss of male lions from a pride facilitates pride takeover by other males, and infanticide of dependent cubs (Loveridge et al. 2007a; Loveridge et al. 2010). Rapid turnover of males also results in premature eviction and subsequent death of sub-adults (Elliot et al. 2014). The difference in male turnover between hunting/non-hunting periods was evident from cub survival rate, with only 66% of cubs surviving to 1 year of age during the trophy hunting period, which increased to 80% in the absence of hunting (Loveridge et al. 2010). Similarly, cubs in protected core areas experienced >40% greater survival than did cubs in edge prides, presumed as a result of reduced male turnover (Loveridge et al. 2010).

Moreover, the consequences for hunted populations are not limited to those individuals on hunting concessions: there can be knock-on effects even across core protected areas, as a result of the vacation of territories. In Hwange, removal of territorial males from the adjoining hunting zone resulted in a 'vacuum effect' where the availability of territory and lack of competition drew individuals from the safe area into hunting zones (Loveridge et al. 2010). Thus, removal of males within hunting areas adjacent to protected areas can have pervasive effects at a population scale when hunting offtake is high (Whitman et al. 2004; Loveridge et al. 2007a; Loveridge et al.

[20] https://www.discountafricanhunts.com/hunts/south-africa-spot-stalk-lioness-hunting-safari.html

2010). That excessive levels of trophy hunting can negatively impact lion populations is illustrated by Hwange National Park. Sport hunting of lions over the period 1999–2004 greatly reduced the number of males in the population, resulting in sex ratios heavily skewed towards females. However male densities and sex ratios recovered quickly once trophy hunting levels were reduced (Barthold et al. 2016a; 2016b; Loveridge et al. 2016a). Similarly, the number of male coalitions across the population was lower and the average coalition size smaller than in the absence of hunting (Loveridge et al. 2010). The number of adult females also increased when hunting was absent or light, probably as a response to increased adult and cub survival (Loveridge et al. 2016b). In the absence of hunting, there was an average reduction in male lion territory size of 421 km^2 in Hwange, which was probably due to a resultant increase in lion density from the lack of harvest offtake (Davidson et al. 2011).

Trophy hunting was the primary cause of death in Zambia's South Luangwa landscape between 2008 and 2012, with 46 males harvested (Rosenblatt et al. 2014). This was linked to a declining population, low recruitment, low survival of sub-adult and adult males, depletion of adult males and an ageing population of adult females (Rosenblatt et al. 2014). Similarly, Loveridge et al. 2016b show that trophy hunting areas form 'attractive sinks' for male lions, in that they represent areas with intact habitat and available prey and thus attractive to lions. The risk of mortality in these areas is however very high with few cues available to the lions to facilitate avoidance.

These strong negative impacts associated with the removal of pride males forms the biological basis for stipulating a minimum age limit where only older (and ideally post-reproductive) males can be hunted, as this should theoretically limit these 'cascading effects' of pride male removal. The principle behind restricting trophies to older males is that their tenure in the pride should have overseen the raising of at least one generation of cubs to adulthood. Following early models setting the minimum age at 5 years or older (Whitman et al. 2004), age limits set within countries have traditionally been set at $\geqslant$6 years. However, more recent modelling (Creel et al. 2016) has suggested that it would be prudent to raise this to $\geqslant$7 years (see Section 3.2 for more detail), while Packer et al. (2006) suggest that because the '6-year rule' was developed in Tanzania and male lions seem to mature later in southern Africa, it might be prudent to use a 7 year minimum in southern Africa. Nonetheless, it has been evident that in some populations, e.g. in Hwange National Park, almost all trophy males, even very old ones such as Cecil, were reproductively active in a pride when hunted. Old males evicted from prides in Hwange National Park rarely survive long enough to be hunted,

and even elderly males in prides seem to be reproductive, meaning that their deaths are followed by perturbation in the same way as those of younger pride males.

2.1.1.3 Threat to lion populations of trophy hunting relative to other threats

It is important to view trophy hunting within the context of all threats facing lion populations. Trophy hunting is usually only one of several threats facing lions, and the relative magnitude of those threats varies between sites. In South Luangwa, Zambia, trophy hunting was indeed the major threat at the population scale – although snaring was a significant concern, 87% of known snared lions were immobilised and successfully treated for their injuries, so this had little impact on lion dynamics (Rosenblatt et al. 2014). The snaring of prey is likely to contribute to the declining lion population as well, but the magnitude of this threat had not been quantified, and trophy hunting was the only obvious cause of the severe male depletion seen in the population (Rosenblatt et al. 2014).

In western Zimbabwe, trophy hunting was the primary source of recorded mortality for adult lions (mostly males), followed by snaring bycatch and retaliatory killing. Natural annual mortality rates were only 0.11 for males and 0.30 for females, compared with trophy hunting mortality rates of 0.65 and 0.30 for males and females respectively, which underlines the profound effect that anthropogenic factors can have on population dynamics (Loveridge et al. 2016b). In Tanzania's Selous Game Reserve, trophy hunting is thought to also pose one of the largest threats to lions (Creel and Creel 1997), but this is Africa's largest protected area, where other anthropogenic threats are likely to be relatively small.

In some other populations, trophy hunting is an additional (and often important) factor but not the major reason for any lion decline. In Tanzania's Ruaha landscape, another major trophy hunting landscape, there is an extremely high level of lion killing to protect livestock or to fulfil cultural roles (Dickman 2015), and it is likely that the impact of trophy hunting is dwarfed by these other threats. In that landscape, 37 lions were documented as killed through conflict with pastoralists in an area of less than 500 km^2 in one year – which equates to over 100 times the recommended maximum offtake if that was a hunting area (Dickman pers. comm.). That level of lion killing across just a few rural villages (which is likely to be an underestimate of the real level of killing), exceeds the number of lions imported as trophies into the US (the major importer) in 2013 from Botswana, Mozambique, Namibia, Zambia and Tanzania combined (U.S. Fish and Wildlife Service 2015). Similarly, in the Niassa National Reserve, 12 lions

were trophy hunted in 2014–15, while at least 42 lions were killed by local people. Across Africa, the number of lions killed illegally has been estimated as perhaps 5 times as many as those killed by trophy hunters, with the level of illegal killing being up to 10 times higher in some populations (Panthera et al. 2016).

We are not aware of any documented case of trophy hunting being the primary driver of lion population extirpation – Tanzania's Katavi National Park is one case where lions have apparently been extirpated, according to the latest IUCN listing (Bauer et al. 2016) and anthropogenic mortality is a likely driver of that decline, but that includes both unsustainable trophy hunting and traditional killing (Kiffner et al. 2009).

However, it should be noted that there is considerable debate about whether lions have truly been extirpated from Katavi – in communication with the EU CITES Scientific Authorities, Tanzanian authorities maintain that "*there are substantial numbers of lions remaining in Katavi ecosystem and a significant proportion of prime age males are still present, suggesting a balanced age pyramid and population structure (despite trophy hunting in the area)*" (Sigsworth pers. comm.).

2.1.2 Significance of trophy hunting as a threat to lions at a national scale

There are several guidelines for the percentage of a hunted lion population that can be sustainably harvested. Creel and Creel (1997) and Greene and Mangel (1998) suggest sustainable offtakes of 5% and 10% of adult males respectively. Caro et al. (2009) recommend harvests of 5% of total population, which if only males are hunted (as is the norm) would result in a higher proportion of males in the population being hunted than Creel and Creel (1997) or Greene and Mangel (1998) recommend. But few lion populations are adequately surveyed at the population level, so using a percentage harvest to determine sustainable offtakes is generally unworkable. If the above guidelines are accepted then at the current scale, trophy hunting offtake in most of the countries where it currently occurs is relatively conservative with no more that 2–4% of lions hunted annually (Loveridge et al. 2009)[21].

However, in the past, offtakes have often been considerably higher (e.g. in Zambia, offtakes occasionally reached 8–9% of the population per year, while in Zimbabwe historically offtakes reached 20–30% (Packer et al. 2006). Although, in a review for the Eastern and Southern

[21] *Given that there is a large degree of uncertainty surrounding lion population size and status across much of the species range these figures should be treated with some caution. The utility of defining sustainable offtakes as a percentage of a population is limited when population sizes is unknown.*

African regional lion plan, Packer and colleagues concluded that "*quota sizes have probably been too small in almost every country to contribute to any decline in lion numbers in the past 20–30 yrs...[with] one exceptional country, Zimbabwe, there is some evidence that trophy hunting can have a significant effect at a national scale, as over the past 25 years the steepest declines in lion harvests occurred in countries with the highest hunting intensities*" (Packer et al. 2009).

Next, we examine the potential significance of trophy hunting as a threat to lions in the six most significant countries for lion conservation (including Botswana as the ban is very recent, and excluding South Africa as the vast majority of its hunting involves captive lions).

2.1.2.1 Significance of trophy hunting as a threat to lions in Botswana

Our latest data suggest that Botswana holds approximately 2,800 free-ranging lions[22] in an estimated lion range of 237,000 km^2 (Dickman in prep.). The latest Red List assessments compiled data from three populations in Botswana (none of which were hunting areas), and found they had undergone an overall decline of 26% between 1993 and 2014, although this was heavily biased by the 46% decline in the Okavango, while Kwando/Chobe had an increase of 84% and Magkadikgadi had an increase of 121% (Bauer et al. 2016). Di Minin et al. (2016) estimated that 37.2% of the country was in terrestrial protected areas, while 23.0% was in hunting areas, although Botswana has banned all lion trophy hunting since 2008 and all trophy hunting in public areas since 2014. Botswana does not have a national action plan for the lion, but did adopt a 6-year minimum for trophy males in March 2005. Botswana has imposed various temporary bans on trophy hunting – after the ban of 2001–2004 there was an expectation of high quality trophy lions, which pushed the price per lion hunt from US$25,000–US$30,000 pre-ban, to US$85,000–US$115,000, and meant that the country was able to generate more income with half the quota (Winterbach pers. comm.). Before the most recent cessation of lion trophy hunting the country had an annual quota of 30 lions, of which 13–18 trophies were exported (Winterbach et al. in prep.). Due to this low offtake, lion trophy hunting in the recent past may have been sustainable in Botswana.

2.1.2.2 Significance of trophy hunting as a threat to lions in Mozambique

[22] *Defined, for this and all countries in this section, as lions which are either completely free-ranging, in areas of at least 500 km^2 if the population is partially fenced, or in areas of at least 1,000 km^2 if the population is partially fenced.*

Our latest data suggest that Mozambique holds approximately 1,500 free-ranging lions in an estimated lion range of 247,000 km^2 (Dickman in prep.). Di Minin et al. (2016) estimates that 17.6% of the country is in protected areas, while 10.5% is covered by hunting areas. Lions have declined substantially across Mozambique (with some areas, such as the Niassa National Reserve, apparently showing population increases; Bauer et al. 2016), and the key causes for the reduction in lion distribution and are thought to be declining prey numbers and conflict with livestock-rearing pastoralists (Fusari et al. 2010). The IUCN Red List obtained population trend data from only one population (Niassa National Reserve, where hunting occurs), which showed a 246% increase between 1993 and 2014 (Bauer et al. 2016). Although Niassa might not be representative of the whole country, as it has had relatively high conservation investment, it does hold perhaps two-thirds of Mozambique's lions (Dickman et al. in prep.), so this trend is significant for the country's overall population.

The lion trophy hunting quotas in Mozambique have been criticised as being too high, as well as being issued without any scientific basis (Fusari et al. 2010). The annual quota was 50 animals in 2007, 111 in 2008 and 60 in 2009 (Fusari et al. 2010), but the actual offtake appears to be significantly lower than that. Many wildlife areas have been depleted in Mozambique, due to factors including government culling of wildlife (including lions) during the 1960s and 1970s, and extensive poaching for meat during and after the civil war (Fusari et al. 2010). Due to this wildlife depletion, most hunting areas currently generate negative returns on investment, with hunting operators investing in unprofitable concessions on the assumption that wildlife populations will recover. Age-based export regulations have now been developed and enforced in Niassa National Reserve, with a 6-year minimum implemented in September 2006, limiting the negative impacts of trophy hunting (and leading the EU to conclude a positive opinion for lion trophies from Niassa only rather than the whole of Mozambique; Sigsworth pers. comm.). The small number of lions trophy hunted per year in Mozambique relative to its population size suggests that trophy hunting unlikely to have a significant negative impact at a national scale, with bushmeat pressure, growing human populations and pastoralist-lion conflict more significant threats.

2.1.2.3 Significance of trophy hunting as a threat to lions in Namibia

The 2008 draft Namibian national lion conservation strategy suggested that, based on data collected within the two previous years, Namibia had fewer than 1,000 lions, including between 615 and

799 free-ranging lions (as termed in the report) and an additional 100 to 125 animals on private land (MET 2008). Our latest data suggest that Namibia holds approximately 750 free-ranging lions in an estimated lion range of 170,000 km^2 (Dickman in prep.).

The draft national lion conservation strategy states that lions are subject to extreme human pressure, with nearly 900 lions destroyed over the past 20 years, mainly due to conflict with livestock keepers (MET 2008). Di Minin et al. (2016) estimated that 43.2% of Namibia was covered by protected areas, with 11.4% covered by game ranches. As well as state protected areas and private game ranches, by the end of 2014, Namibia had 82 communal conservancies (including 36 in Kunene region, mentioned below), which covered over 17% of the country and encompassed 184,000 people, around 8% of the national population and around one in four rural Namibians (NACSO 2011, 2015). Sustainable use of wildlife (including trophy hunting), with devolved power and benefits to local communities, are a cornerstone of the conservancies – about half the conservancies benefit solely from hunting, and the revenues from trophy hunting totalled US$1.6 million in 2013 (NACSO 2015). This community-based conservation model is thought to be one of the key factors behind Namibia's expanding population of free-roaming lions (NACSO 2011, 2015). The latest Red List assessment of Namibian lion populations, based on three areas (one of which had hunting) showed an overall increase of 41% between 1993 and 2014. However, this was strongly influenced by the huge increase in lions in Kunene (the area where trophy hunting occurred), which had an increase of 3,933%, going from an estimated 6 lions in 1993 to 242 lions in 2014 (Bauer et al. 2016).

At least as of 2008, Namibia had no annual national-level lion quota. Trophy hunting permits are allocated to kill problem lions (males only) on conservancy land. 38 lions were hunted this way between 1998 and 2008, with an average offtake of less than 4 a year. In addition, trophy hunting is permitted on free-roaming lion populations in hunting concessions, which may be conservancies or protected areas (excluding Etosha National Park) (MET 2008). Most lions shot as trophies in Namibia are from hunting concessions, mostly in the Kunene and Caprivi regions (MET 2008).

The draft national lion conservation strategy revealed that some illegal trophy hunting was occurring along the southern boundary of Etosha National Park, making the allocation of quotas and maintenance of trust with landowners very difficult (MET 2008). The draft national lion conservation strategy set out some key activities for improving trophy hunting in Namibia, specifically that efforts should be made to:

- Develop and implement an approved

quota setting methodology rigorously and consistently across all hunting areas

- Review and analyse annual quotas and offtakes to ensure these are adaptive and responsive to population changes, trophy quality and levels of PAC over time
- Allocate quotas at a scale reflective of lion ecological and biological functionality which invariably acts across different and/or smaller land units or uses
- Develop and implement standardised hunt return forms and trophy hunting databases and review annually thereafter
- Ensure centralised database and cost-effective system for data collection from hunting areas and subsequent collation, entry, analysis, reporting and feedback to key stakeholders in the wildlife industry (MET, NAPHA, NAU, NNFU, Conservancies, conservation NGOs and researchers etc. as appropriate)
- Provide training to MET, Conservancy and NAPHA personnel and other relevant field staff in the approved quota setting methodology
- Review trophy fees to maximise benefit and generate additional revenue

Overall, trophy hunting does not seem to pose a threat to lions in Namibia, and is in fact (particularly in the conservancy areas) thought to be one of the reasons why Namibia's lion population has increased over recent years (NACSO 2011, 2015). However, Namibia is an unusual case in having relatively good governance and very low human population density, so it is unlikely that the successes seen here could easily be replicated across many other African countries. More generally, governance and infra-structural capacity, of which corruption is a factor, are relevant to the delivery of felid conservation as documented by (Dickman et al. 2015), and governance has been highlighted as a key issue with regard to the sustainability or otherwise of trophy hunting operations (Packer 2015).

2.1.2.4 Significance of trophy hunting as a threat to lions in Tanzania

Our latest data suggest that Tanzania holds approximately 9,900 free-ranging lions in an estimated lion range of 380,000 km^2 (Dickman in prep.). Tanzania has around 32.2% of its land covered by protected areas, and 26.4% in game reserves (Di Minin et al. 2016). Tanzania contains about half of the continent's remaining lion population (Riggio et al. 2013), but the IUCN found significant declines, based on an analysis of five populations, one of which had trophy hunting (Bauer et al. 2016). There was

an overall decline of 66% in the lion populations between 1993 and 2014 – only one population (the Serengeti) increased, while the population with trophy hunting (Katavi) was apparently extirpated during that period, according to the IUCN data (Bauer et al. 2016; although this is disputed – see Section 2.1.1.3).

Tanzania has long hosted the largest lion trophy hunting industry, with 100–300 lions hunted per annum (Packer et al. 2010). The Selous Game Reserve is the largest uninhabited protected area in Africa (55,000 km^2) and is a premier destination for lion trophy hunters. Lions are considered to be declining in a significant proportion of Tanzanian hunting areas, with trophy hunting considered to be the primary driver of this decline outside (and inside some) protected areas (Packer et al. 2011). Lion harvests declined by 50% across Tanzania between 1996 and 2008, and hunting areas with the highest initial harvests suffered the steepest declines; the intensity of trophy hunting was the only significant factor in a statistical analysis of lion harvest trends (Packer et al. 2009).

Tanzania introduced a 6-year age minimum for lion trophies in 2012 (based on the recommendations of Whitman et al. 2004); lion offtakes have further declined in the past few years, with only 40 lions exported in 2014; it is not clear if this recent drop has resulted from hunting clients restricting their offtakes to lions aged 6yrs or older or from a continuation of the trend reported by Packer et al. (2009). Leader-Williams et al. (2009) and Packer (2015) note that Tanzania has a poor record of hunting governance, and the recent scandal over Green Mile Safaris (whose clients posted evidence of multiple trophy hunting and animal welfare infractions online, but who nevertheless were apparently permitted to continue hunting in Tanzania[23]) is one clear example of very poor management of the country's trophy hunting industry. Similarly, a recent report from East Africa has raised concerns that corrupt officials in Tanzania and Kenya in particular, have been compromised through bribes to allow the killings of wildlife and the illegal export of trophies[24].

While there is evidence that trophy hunting has had negative impacts on Tanzania's lion populations (Packer et al. 2011), other threats are more significant. Tanzania's National Action Plan for lions and leopards concluded that prey availability, land use and land cover change, anthropogenic killing, inadequate management and disease may

[23] http://www.huffingtonpost.com/entry/abusive-safari-company-tanzania_us_57769240e4b04164640fbba8
[24] http://allafrica.com/stories/201608291000.html

pose threats to those species, with retaliatory killing, land use change and problems arising from inadequate management the most important factors (TAWIRI 2007).

2.1.2.5 Significance of trophy hunting as a threat to lions in Zambia

Our latest data suggest that Zambia holds approximately 1,200 free-ranging lions in an estimated lion range of 135,000 km^2 (Dickman in prep.). The IUCN examined only one population in Zambia (Luangwa) for the IUCN Red Listing – this population was hunted for trophies and had declined by 28% between 1993 and 2014 (Bauer et al. 2016).

Di Minin et al. (2016) estimated that 37.8% of Zambia was covered by terrestrial protected areas, with 21.3% in hunting ranches. However, it is notable that despite this extensive coverage of hunting areas, which is second only to Tanzania and Botswana (before the ban), Zambia generates very little revenue from trophy hunting (see Table 3 for comparison of estimates). This concurs with the findings of Lindsey et al. (2012b), who stated that most Zambian trophy hunting concessions appear to be running at a loss, probably as a result of the depletion of prey populations due to human settlement and the bushmeat trade in Game Management Areas (Lewis and Alpert 1997; Simasiku et al. 2008). Quotas of lions have been excessive, are established arbitrarily and there is a lack of monitoring of wildlife populations or of trophies. Per annum, 39 lions are hunted, while 13–18 trophies are exported (Lindsey et al. 2007). This level of hunting is approximately 3.4% of the estimated population, so is a relatively high level compared to many other countries.

Zambia's national authorities appeared to consider trophy hunting as a significant threat to lions (hence the ban on big cat trophy hunting implemented in 2013) but later reversed the decision (with some adjustments to quotas and regulations), mainly because of concerns over a lack of revenue[25].

The Zambian lion management strategy highlights poor management of the trophy hunting process, and states that there is inconsistency in the collection of data at temporal scale and in terms of measurable variables making it difficult to assess trophy quality trends in the country. The management plan states that it is focusing on the "*promotion of age-based harvesting of lions and setting of hunting quotas based on empiri-*

[25] http://www.bbc.co.uk/news/world-africa-32815508

cal biological data in addition to the ongoing collection of trophy measurements" (Zambia Wildlife Authority 2009). The national lion management strategy also highlights the following issues relevant to improving trophy hunting within the country:

- Standardization of lion survey methods and conducting baseline survey of lion numbers
- Setting of sustainable lion off take quotas
- Monitoring and evaluation of the lion population in the context of existing conservation and tourism programmes
- Preparation and implementation of field age determination techniques
- Development of area-specific lion management strategies especially for Game Management Areas (GMAs)

However, that strategy was developed in 2009 and it is unclear how much progress, if any, has been made since then towards improving the management of lion trophy hunting in Zambia. Therefore, it is still possible that poorly-managed trophy hunting could be a threat to Zambia's lion populations.

2.1.2.6 Significance of trophy hunting as a threat to lions in Zimbabwe

Our latest data suggest that Zimbabwe holds approximately 1,500 free-ranging lions in an estimated lion range of 57,000 km^2 (Dickman in prep.). The IUCN Red Listing used data from five populations in Zimbabwe, four of which had trophy hunting. All populations showed a significant increase (the lowest level was in Hwange, but even that was 86%) so overall, there was a very impressive 1,252% increase in lion numbers across those areas between 1993 and 2014, mainly due to increases in relatively small populations (Bauer et al. 2016). The largest increase was in Gonarezhou, the non-hunted population, which had a 7,900% increase (from 1 lion to 80), and this was closely followed by Savé Valley Conservancy, with a 6,967% increase (3 lions to 212) (Bauer et al. 2016).

Di Minin et al. (2016) estimated that 27.2% of the country was covered by terrestrial protected areas, with game ranches covering 16.6%. From the 1970s lion trophy hunting harvests in Zimbabwe were some of the highest in relation to population size in Africa, with annual offtakes of between 90 and 141 lions between 1992 and 2002 (Loveridge et al. 2009; Packer et al. 2009), but quotas were reduced to 75 individuals in 2015 (ZPWMA 2015) and lion numbers are now increasing in several populations (Bauer et al. 2016). Since the elephant trophy import ban in the US, there is

anecdotal evidence that lion have become relatively more important to the national hunting industry economically.

Zimbabwe introduced a 5-year age limit on hunted lions in January 2006, and has used an adaptive age-based quota system with evidence of success. This calculates a fluid quota per area based on the previous season's performance in terms of hunting only older males. The Zimbabwean adaptive system has been associated with a rising age of hunted lions, a desirable outcome illustrating the role of quotas and age-based restrictions in influencing population demographics (ZPWMA 2015). The goal of the Zimbabwean system of inbuilt feedbacks is to discourage outfitters from hunting lions that are too young, thereby minimising negative impacts on the lion population whilst maximising the sustainable yield, and therefore the economic incentive to conserve lions. With these lowered quotas and age-based systems, there is little evidence that trophy hunting is negatively affecting Zimbabwe's lion population at a national scale.

2.1.3 Factors mediating the threat posed by trophy hunting

Despite the threats posed by trophy hunting to individual populations, trophy hunting has never (to our knowledge) been implicated as a significant factor in the extirpation of lions from a country. While Chardonnet's (2002) estimate that 32 African countries supported wild lions may have been optimistic, by 2015 seven of them no longer did so (Bauer et al. 2016); however, none of these countries had exported a lion trophy over that period [CITES trade database: http://trade.cites.org/en/cites_trade/ (Accessed 11 July 2016)].

It seems as if where trophy hunting is well-regulated, transparent and has a significant amount of power devolved to the landowners (for example in Namibia; Naidoo et al. 2016a), it has the potential to deliver significant conservation benefits in terms of protecting habitat and allowing lion populations to persist (NACSO 2011, 2015; Naidoo et al. 2016a). However, in many countries, poor governance[26] and weak enforcement of hunting regulations increases the threat posed by trophy hunting; indeed, Packer (2015) argues that corruption within the hunting industry

[26] *Lion hunting countries rank poorly in governance scores from Transparency International (www.transparency.org)*

and wider frameworks is the reason why lion hunting often fails to deliver the benefits to lion conservation that might be expected in principle, and Dickman et al. (2015) consider corruption as a limiting factor in delivering felid conservation in some countries.

According to the IUCN in 2009, good governance was absent from almost the entire trophy hunting sector in many countries, with those currently in control of the system not prepared to share power and undertake adjustments that would mean relinquishing control; a position that IUCN (2009) concludes serves individual interests, but not those of conservation, local communities or good governance (UICN/PACO 2009). However, even poor national governance does not always preclude relatively well-managed trophy hunting: Zimbabwe has recently implemented an age-based adaptive quota strategy (see Section 2.1.2.6), which has resulted in the reduction of hunting under-age animals (ZPWMA 2015).

Similarly, despite weak governance across much of Mozambique, age-based adaptive management of trophy hunting (and work to address other threats to lions) has been implemented effectively in the Niassa National Reserve, and lion populations are increasing there despite hunting (Bauer et al. 2016).

2.1.4 Significance of trophy hunting as a threat to lions at a regional scale

The IUCN 2006 regional conservation Strategies for lions (in West and Central Africa, and in Eastern and Southern Africa), considered possible threats to lions, and ranked them using a points-based system (IUCN 2006a, b).

The top five threats (i. *prey depletion*, ii. *conflict with humans*, iii. *small population size*, iv. *livestock encroachment* and v. *habitat loss*) were the same in each region, albeit in slightly different orders (see Figures 2a and 2b).

Trophy hunting was not ranked by experts as one of the top three threats to any lion populations across West and Central Africa (IUCN 2006a). Trophy hunting emerged as a higher threat across Eastern and Southern Africa than in West and Central Africa, but was not ranked as a high level threat.

2.1.5 Summary of the significance of trophy hunting as a threat to lions

Poor quota management and unregulated hunting of lions, in particular that of dominant males and pride females, can result in significant negative impacts at a population scale (e.g. Loveridge et al.

2007a; Packer et al. 2009; Croes et al. 2011; Packer et al. 2011; Becker et al. 2013). These negative impacts could be ameliorated (either in whole or in part, depending on the population) by restricting offtake to males of ⩾7 years, which should have reproduced, and in some areas by combining this with an area-based hunting quota. However, when assessed at either a national or a regional level, the negative impacts on lions from trophy hunting are deemed by experts to be substantially smaller than other threats, particularly those of human-lion conflict and loss of prey (IUCN 2006a, b).

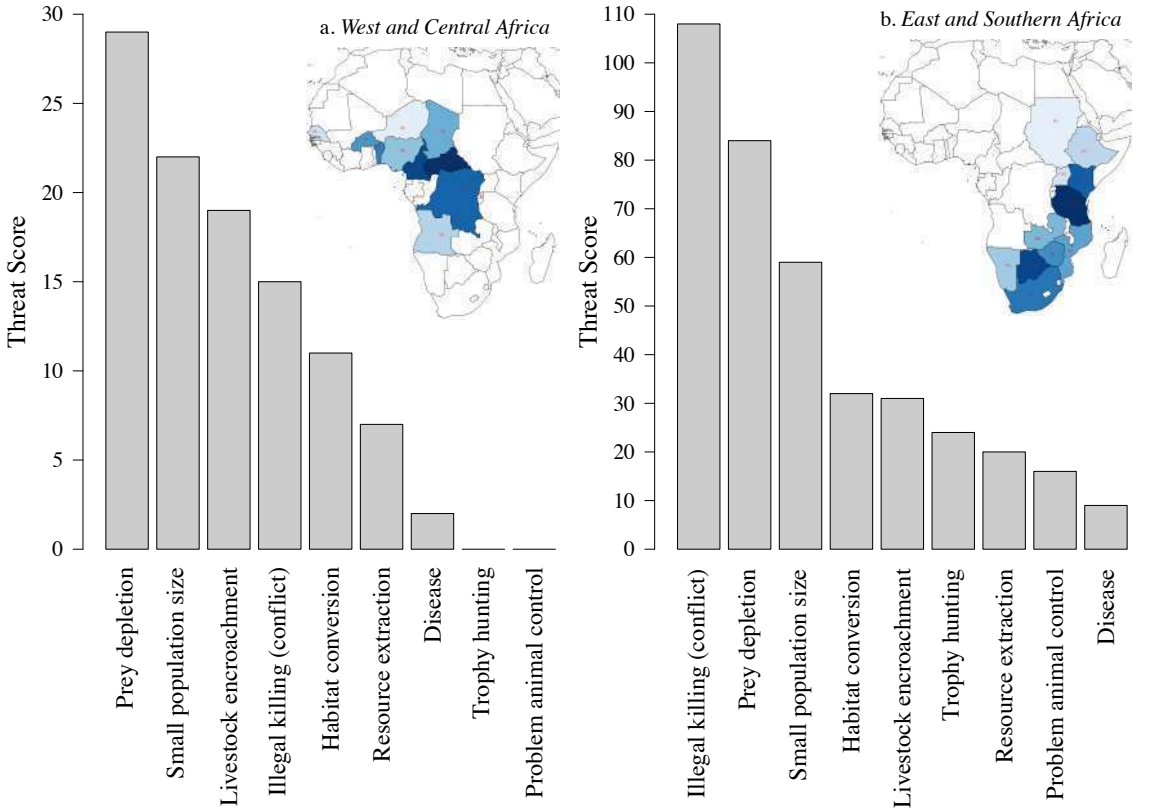

Figure 2: *Threat ranking for lions in (a) West and Central Africa, and (b) East and Southern Africa, as assessed by experts at the 2006 IUCN Lion Conservation Strategy meetings (note that the y-axes are different scales as the magnitude of threats was considered higher in East and Southern Africa). The maps show the countries assessed in the strategies, with the colour showing the relative lion population in the range country, with darker colour showing a larger population.*

2.2 Impacts associated with lion trophy hunting [27]

2.2.1 Ecological impacts

2.2.1.1 Habitat protection

The protection of wildlife habitat is the primary benefit associated with trophy hunting, as it reduces the major threat of habitat loss – conversion to other forms of land use such as agriculture is often irreversible. In 2007, Lindsey et al. estimated that a total area of at least 1,394,000 km^2 was conserved for trophy hunting in sub-Saharan Africa, which exceeded the area of national parks in those countries by 22%. In 2013, it was estimated that lions were hunted across at least 558,000 km^2, which comprised 27–32% of the lion range in countries where trophy hunting of lions was permitted (Lindsey et al. 2013), and at least 16% of the total lion distribution in Africa (Riggio et al. 2013). Given the dates of those studies, the extent of this hunting range will now have declined slightly since Botswana imposed its lion trophy hunting ban in 2014.

Many of the areas that are (or recently were) hunting zones are not currently suitable for photographic tourism (e.g. even in Botswana, which is one of Africa's premier destinations for photographic tourists, over three-quarters of hunting land in the Northern Conservation Zone had low potential for phototourism; Winterbach et al. 2015), so hunting enables this land to be maintained under a wildlife-based land use. This maintenance of habitat (even if lions themselves are negatively affected at some level) is by far the most significant benefit provided by trophy hunting of lions, particularly given the fact that habitat loss and degradation is such a significant threat to lions at all scales (IUCN 2006a, b; Fusari et al. 2010; Henschel et al. 2010; Henschel et al. 2014). Particularly in West and Central Africa, trophy hunting maintains lion habitat in areas where photographic tourism and philanthropy are absent – and those land uses are much less developed than in other regions. This is evident from the fact that lions have been extirpated from most protected areas in the region (Henschel et al. 2014) whereas the last two remaining substantial populations (>250 lions) are both within large complexes of National Parks interconnected and buffered by hunting zones that appear to be at least partially effective at reducing livestock encroachment, with hunting not

[27] *Throughout, we try to provide as much specific data as possible with regard to lion trophy hunting, but in some cases information is only available for trophy hunting in general.*

appearing to significantly affect the last remaining lion stronghold in West Africa, the W-Arly-Pendjari (WAP) ecosystem (Bouché et al. 2016).

Although lions are one of the main draws of trophy hunting areas and increase their financial viability, these areas are also very important for many other species, including some highly threatened ones. For example, in the case of the critically endangered black rhino (*Diceros bicornis*), only 10 'IUCN Key 1' populations remain (i.e. populations that are crucial to the survival of the species), and three of those occur on private hunting conservancies in Zimbabwe where lions are also key hunted species (N. Anderson, International Rhino Foundation, pers. comm.).

However, not all the ecological impacts of trophy hunting are positive. In areas managed predominantly for lions, high densities have negative impacts on the populations of smaller competitors, such as cheetahs (*Acinonyx jubatus*) and African wild dogs (*Lycaon pictus*). Where provided with adequate resources and protection (even where they are hunted), lion populations can achieve very rapid growth rates (e.g. Groom and Watermeyer 2015; Miller et al. 2015; du Preez et al. 2016a). High lion densities (particularly within fenced reserves, including non-consumptive photographic areas) can lead to significant ecological and social problems such as severe reductions in prey populations and intra-specific lion killing (Ferreira and Funston 2010; du Preez et al. 2015). The associated management issues (overpopulation and overpredation) may necessitate lethal control of the lions (Miller et al. 2015), or intensive management strategies such as contraception or translocation.

2.2.1.2 Reduction of other threats to lions and other wildlife

At least within well-managed trophy hunting areas, it is common to have significant anti-poaching patrols, which would reduce threats of human encroachment, such as the loss of lion prey through bushmeat hunting. For example, in Cameroon, where bushmeat poaching is a major conservation issue, observations between 2005 and 2010 suggested that anti-poaching efforts were higher in the hunting zones than National Parks, due to economic incentives to reduce poaching in hunting areas, and a lack of government funding to conduct similar anti-poaching efforts in Parks (Croes et al. 2011). Even in poorly-managed areas, funds from hunting can still play a major role in funding anti-poaching operations. For example, in Tanzania's Selous Game Reserve (which is allegedly beset by high levels of corruption), the 'Selous Retention Scheme' has recently been re-established, where 50% of hunting revenues from the Reserve are re-invested into conservation and anti-poaching (IUCN 2016). The Re-

serve's chief warden from 1994–2008 and 2012–2015 has raised serious concerns about the impacts of trophy import bans on the capacity of the reserve to successfully conduct anti-poaching efforts (IUCN 2016). However, anti-poaching efforts run by hunting operators vary considerably between countries and operators, and they tend to be seasonal rather than year-round.

2.2.2 Impacts of economic benefits generated from trophy hunting

There are several reasons for considering the economic contributions of trophy hunting, not least because of its possible role in the economic development of African nations and as a source of income to local people (though the significance of trophy hunting revenue is debated for both those factors). However, within the remit of this report, we focus on the connection between the economic impact of trophy hunting and conservation outcomes.

2.2.2.1 Level of trophy hunting revenue generated

There are a range of estimates of the degree of economic revenue generated by trophy hunting, but there is a lack of rigorous, independent data on the economics of trophy hunting. A report commissioned by Safari Club international, an organisation that is explicitly in favour of hunting, concluded that across eastern and southern Africa (Botswana, Ethiopia, Mozambique, Namibia, South Africa, Tanzania, Zambia and Zimbabwe) hunters spend US$326.5 million annually when accounting for all in-country expenditure, including not only the cost of the hunt and associated fees but also other costs such as transportation, food and souvenirs (Southwickes Associates 2015). They found the value-added contribution to GDP (using multipliers derived from World Travel and Tourism Council) to be US$426 million (Southwickes Associates 2015). They also found that trophy hunting supports 53,400 jobs, when including supporting sectors. However, in 2009 the IUCN criticised the low proportion of jobs created by the hunting industry in comparison to the proportional area of land it occupies – it cited figures of 15,000 salaried jobs across Africa, compared to a human population of 150 million in the eight main trophy hunting countries, where trophy hunting takes up 16% of their land (UICN/PACO 2009). However, this must be considered in the context of naturally low human density in wildlife areas, and the general incompatibility of (or inverse relationship between) large human populations and maintenance of wildlife populations.

There is variation in estimates given in the peer-reviewed literature regarding the level of trophy hunting revenue,

and those estimates usually do not provide value-added estimates or account for revenue to supporting sectors etc. Lindsey et al. (2007) estimated that trophy hunting generated gross revenues of at least US$201 million per year in sub-Saharan Africa, although this estimate has been criticised in a report prepared for The African Lion Coalition, which is composed of animal welfare groups, for relying on unreliable sources of data (Economists at Large 2013). Booth (2010) estimated gross revenues of at least US$190 million for South Africa, Namibia, Botswana (the paper was published prior to Botswana's trophy hunting ban that entered into effect in 2014), Zambia, Mozambique, Zimbabwe and Tanzania. Di Minin et al. (2016) estimated total annual hunting revenue to be approximately US$217.2 million in those same countries (see Table 3 for a summary of estimates of the revenue generated by trophy hunting per country). However, the report prepared for the African Lion Coalition argues that that the contribution of trophy hunting to national economies is insignificant because it constitutes only a small percentage of Gross Domestic Product (GDP) (Economists at Large 2013). The IUCN estimated trophy hunting revenue to contribute 0.19% of GDP in Botswana, 0.03% in Mozambique, 0.45% in Namibia, 0.04% in South Africa, 0.22% in Tanzania, 0.05% in Zambia and 0.29% in Zimbabwe (UICN/PACO 2009). Though small on a national scale, income from trophy hunting can be a significant source of income for the government bodies responsible for managing wildlife. For example, the Wildlife Division in Tanzania makes 60% of its income from trophy hunting licence fees (Estes 2015). The IUCN stated that a definite positive aspect of trophy hunting is that conservation results are financed completely by the hunters, without drawing from donors or requiring government commitment (UICN/PACO 2009).

Most of the figures discussed above concern trophy hunting as a whole, and only part of these are generated by trophy hunting of lions specifically. Lindsey et al. (2012b) estimated that lions generate 5–17% of gross trophy hunting income on national levels among Mozambique, Namibia, Tanzania, Zambia and Zimbabwe, but lions were not the species that generated the largest proportion of trophy hunting income in any of these countries.

2.2.2.2 The economic contribution of lion hunting and its impact on land-use

From a conservation perspective, the overriding concern is how the economic profitability of trophy hunting of lions affects land-use.

Table 3: *Estimates of revenue generated by trophy hunting per country.*

Country	Revenue year^{-1} (US$ m)	Source
Botswana	20	*Lindsey et al. 2007*
	40	*Di Minin et al. 2016*
	12.5	*Northumbrian 2001*
	40	*Booth 2010*
Burkina Faso	0.6	*Lindsey et al. 2007*
Cameroon	2	*Lindsey et al. 2007*
CAR	1.4	*Lindsey et al. 2007*
Ethiopia	1.3	*Lindsey et al. 2007*
Mozambique	5	*Di Minin et al. 2016*
Namibia	28.5	*Lindsey et al. 2007*
	28.5	*Di Minin et al. 2016*
	9.6	*Booth 2010*
South Africa	100	*Lindsey et al. 2007*
	68	*Di Minin et al. 2016*
	68.3	*Booth 2010*
Tanzania	27.6	*Lindsey et al. 2007*
	56.3	*Di Minin et al. 2016*
	6-7 *	*Mésochina et al. 2010*
Zambia	5	*Lindsey et al. 2007*
	3.6	*Di Minin et al. 2016*
Zimbabwe	16	*Lindsey et al. 2007*
	15.8	*Di Minin et al. 2016*
	18.5	*Booth 2002*

∗ *Figure for revenue from lion hunting only*

If a ban on the import of lion trophies (or other policies) impacted the profitability of trophy hunting operations to the extent that it becomes less profitable than alternative land-uses due to reduced demand, then it is likely that there will be a transition to more profitable land-uses. The type of the land-use that replaces trophy hunting is important to predict the effect on the conservation of lions and wildlife in general. Transition to agriculture or livestock grazing is a serious threat to the survival of the lion populations (Loveridge et al. 2007b) and is the likely alternative to trophy hunting across much of Africa, because it is profitable for land-owners, or in the case of government-owned land, because there is strong political pressure to turn these areas over to livestock production

(Loveridge et al. 2007b).

To consider the effect of curtailment of hunting of lions on land-use, information on the specific contribution of lions to the viability of trophy hunting operations is required. There is a paucity of information on this, but Lindsey et al. (2012b) estimated the significance of lions for the financial viability of trophy hunting in Mozambique, Namibia, Tanzania, Zambia and Zimbabwe. They found that the trophy hunting industry is not dependent on lions to remain viable in most areas, and that other species are more important in financial terms. However, they conclude that if lion hunting was precluded, trophy hunting could still become unviable across at least 59,538 km^2, which constitutes 11.5% of the area lions are hunted in the countries included in the analysis. Lion hunting was found to be important for financial viability of trophy hunting in Mozambique, Tanzania and Zambia, but of minor importance in Namibia and Zimbabwe. Lindsey et al. (2012b) further noted that had Benin, Burkina Faso and the Central African Republic been included in the analysis, the estimated size of the area where trophy hunting will be lost is likely to increase significantly as these countries have low numbers and diversity of other key trophy species. Crucially, trophy hunting becomes unfavourable as a land-use option not only if a trophy hunting business becomes unprofitable, but also if it becomes less profitable than the alternative land-use from the perspective of the owners/custodians of a piece of land, so the extent of habitat loss could be greater than 59,538 km^2. In some areas, the net returns from livestock is similar to those from trophy hunting (Lindsey et al. 2012b)so there might be a transition to livestock production even with only relatively small decreases in profitability of trophy hunting. Estimates of the profitability of trophy hunting per hectare differ. IUCN (2009) reported US$1.1 ha^{-1}, Lindsey et al. (2012b) estimated net earnings to be between US$0.24 to US$1.64 ha^{-1} year^{-1} depending on the country, and du Preez et al. (2016b) calculated that hunting in Zimbabwe's lowveld was worth approximately US$16.4 per hectare per year for all species and US$5.57 for lion hunting alone. Net returns from livestock in semi-arid African rangelands (US$0.1–US$0.3 per hectare per year in areas with 400–800 ml of annual rainfall (Cumming 2004) are similar to those from trophy hunting in some areas, so these areas are at risk of conversion (Lindsey et al. 2012b).

In the most attractive and accessible areas, land-use could shift from trophy hunting to non-consumptive wildlife use, e.g. photo-tourism, such that habitat is maintained without lions being killed. This could be the ideal outcome from conservation and welfare perspectives, as lion populations would be secured without the damaging ethical, ecological and welfare impacts of trophy hunting. Indeed, Barnes (2001) concluded that pho-

tographic tourism has greater benefits than consumptive use over about one-third of the wildlife estate in Botswana, finding that "*consumptive wildlife uses are relatively unimportant in terms of economic contribution*", whilst consumptive wildlife use is the only possibility across the "*less well-endowed two-thirds of the wildlife estate*".

However, only a subset of the areas that are currently used for trophy hunting are likely to be suitable for photographic tourism (Lindsey et al. 2006). For example, they might contain limited numbers of charismatic species, lack photogenic scenery, or be located in areas with high risk of tropical disease, poor infrastructure or political instability (IUCN 2016). Trophy hunters are less discouraged by these conditions than most tourists: during the first year of land-seizures in Zimbabwe, the tourism sector was reduced by 75% while profits from trophy hunting only dropped 12% (Booth 2002). Also, it is unknown whether there exists enough unsatisfied demand for photographic tourism to supply clients if current trophy hunting areas are converted to photographic tourism, or whether this would simply divert visitors from current protected areas. Across Africa, a large number of protected areas with high levels of biodiversity receive very few visitors (Balmford et al. 2015). This is not consistent with there being significant unsatisfied demand for photographic tourism opportunities, which suggests that the creation of new photographic tourism areas might divert visitors from existing protected areas, some of which are already operating at a loss.

Even where photographic tourism is financially viable, there is evidence for interdependence between this form of tourism and trophy hunting. In Namibia, trophy hunting was shown to be important for the establishment of conservancies because it generates benefits sooner than photographic tourism after establishment of a conservancy, so it can allow conservancies to remain financially viable while its photographic tourism is developing (Naidoo et al. 2016a). Furthermore, simulations show that a significant number of community-led Namibian conservancies would not be able to meet their operational costs if there was a ban on trophy hunting, which would remove both the incentive to maintain these protected areas and the financial means to manage them (Naidoo et al. 2016a).

However, where the land-owners value wildlife beyond their economic value they might be willing to tolerate low returns from their land in order to maintain wildlife habitat, if they have sufficient wealth to do so. In these cases, reductions in profitability of lion trophy hunting may not affect the conservation of lion habitat. It is uncertain to what extent land-owners perceive intrinsic value of wildlife, and considering that the host countries of lion hunting are developing

nations, the ability to absorb financial losses or reduced returns is likely to be low.

Although there is anecdotal evidence from such countries as Botswana and Zambia after recent trophy hunting bans (see text box below), there is no published literature on the specific impacts of the ban in terms of protecting lions, and very little information on actual land use changes. At present, we are limited to inference: Williams et al. (2016) documented substantial decreases in the density of lion, leopard, cheetah, African wild dog, spotted hyaena (*Crocuta crocuta*) and brown hyaena (*Hyaena brunnea*) as land was converted from hunting conservancies to agriculture, following land reform in Zimbabwe. Direct evidence demonstrates that local people are often unsupportive of a ban, and that significant loss of revenue to hunting zones occurs when lions can no longer be utilised (Hann 2015). Hann (2015) highlights the huge knowledge gaps regarding hunting and its association with wildlife declines. The IUCN notes that "*Revenues from trophy hunting are also important for conserving threatened species that are not hunted. Populations of Black Rhino and White Rhino and of the African Wild Dog on the Savé and Bubye Conservancies in Zimbabwe are not hunted, but proceeds from trophy hunting support their conservation*" (IUCN 2016).

2.2.2.3 Trophy hunting and economic incentives for lion conservation

Another way that the economic impact of lion trophy hunting is connected to conservation outcomes is through the revenue generated by trophy hunting that goes towards implementing conservation efforts and incentivises tolerance for lions and the maintenance of habitat for wildlife – reductions in the income generated from lion hunting could reduce these incentives among governments, local communities and private land-owners.

Governments require funds for wildlife management and income to justify the maintenance of land as game reserves/wildlife management areas in the face of increasing human populations and demand for land. Some of the funds generated by trophy hunting accrue to governments. For example, in Tanzania, direct and indirect tax flows to the government is approximately 44% of the estimated gross income of the trophy hunting industry (Booth 2010), and, based on data from 2008, 22% of the gross revenue generated by hunting is allocated to the Wildlife Division (Di Minin 2016). However, much of the income generated by the industry never enters the country, accruing instead to external parties (Booth 2010). In Namibia, 21% of the income generated is captured by the government through fees and taxes (Humavindu and Barnes 2003). Lewis

and Alpert (1997) report that in Zambia: ADMADE (Administrative Design from Game Management Areas) receives around 67% of all revenue generated by sport hunting activities in Zambia's Game Management Areas. Over half (53%) of ADMADE revenue is allocated directly to local wildlife management and the remainder to community development. However, is usually unclear how much of the revenue captured by governments across lion range countries is channelled into conservation efforts, especially in the context of high levels of corruption.

From the viewpoint of lion conservation, generating benefits for local communities from trophy hunting of lions is important because it incentivises local communities to tolerate lions despite the threat they can pose to livestock and human lives (Loveridge et al. 2007b) and the opportunity costs that they can often impose by restricting resource use. These benefits can be in the form of financial/material contributions to community development, employment or income for local producers and service providers. Before Botswana's ban on trophy hunting, 75% of the gross income generated by hunting tourism remained in the country, and of this 49% remained at the district level. This equated to approximately US$5 head^{-1} when translated to an income per capita at the national level but when attributed to the main hunting districts, the per capita income was US$48.5 head^{-1}. In Tanzania, 3.1% of estimated gross expenditure by hunting companies is spent on community development and fees paid to the community and 11.9% on wages and welfare (Booth 2010). In Namibia, agreements between conservancies and operators specify the portion of income the conservancy receives, typically 8–12% of total lodge revenue and 30–75% of trophy price (Naidoo et al. 2016a). Humavindu and Barnes (2003) found that in Namibia, 24% of the income accrues to poor segments of society in the form of wages and rentals/royalties, while Samuelsson and Stage (2007) estimated that 40% went to local communities and low income wage earners.

If trophy hunting became unviable, thousands of Zimbabwean households that benefit from the CAMPFIRE programme would lose a combined US$1.7 million per annum, and the programme's revenue has already been significantly reduced following the US ban on elephant trophy imports from Zimbabwe (C. Jonga, quoted in IUCN 2016)[28]. However, despite some successes and good examples of benefit-sharing, local communities rarely benefit from trophy hunting activities (Lindsey et al. 2006) and trophy hunting frequently occurs without meaningful community involvement or consultation, which in many countries is further complicated by corruption, lack of transparency and weak rule of law (IUCN 2009).

[28] http://www.newzimbabwe.com/news-21699-US+embargo+hits+Campfire+revenues/news.aspx

Case study: Botswana after the hunting ban in 2014

Since trophy hunting was banned in Botswana in 2014, there has been minimal uptake of hunting blocks for photographic tourism (Winterbach pers. comm.). Winterbach et al. (2015) conclude that only 22% (17,142 km^2) of the Northern Conservation Zone has intermediate to high potential for phototourism, while 78% has low phototourism potential (61,769 km^2). Ten concessions (out of 32) in the Northern Conservation Zone did not include high potential phototourism areas and only one of those ten was conducting photographic safaris (although the economic viability of this concession was reliant on access to the nearby Moremi Game Reserve). Although these ten concessions have been offered to public tender four times since the hunting ban in 2014, as of June 2016 still only one was operating phototourism, the other nine being without concessionaires or not operational. In terms of habitat connectivity between protected areas, those ten concessions are critical for ecosystem health and form a vital link between Moremi Game Reserve, Nxai/Makgadigadi Pans National Park, Chobe National Park in Botswana and Hwange National Park in Zimbabwe and surrounding concessions. While hosting what is possibly the geographically largest intact lion population in Africa, this is also a key wet season range for buffalo and elephant and hosts two long-range migration routes of zebra. Some blocks that are part of the Western corridor in southern Botswana have already been changed to agricultural use (livestock farming), disrupting the link between the Central Kalahari Game Reserve and the Kgalagadi Transfrontier Park and probably fragmenting the lion population of the Southern Conservation Zone. Although the Government of Botswana has a good conservation track record and there is no immediate threat to these areas, pressure from Botswana's livestock industry for access to areas with limited tourism potential is only likely to increase (Winterbach et al. 2015). Initial reports from some communities in Botswana suggest significantly reduced conservation incentives (including meat, jobs and pensions) and hardening negative attitudes toward wildlife since the ban was implemented (Naidoo et al. 2016b).

Furthermore, lions generate only part of the total trophy hunting revenue considered in the above figures. However, if there was no income generated by lions, communities could potentially wish to eradicate them from trophy hunting areas because they pose a threat to livestock in surrounding areas, and private land-owners might want to remove lions from their trophy hunting concessions because they predate other valuable trophy species (Funston et al. 2013).

2.3 Summary of the impacts associated with trophy hunting

Trophy hunting can have marked negative impacts on the ecology of lions at a population scale, and can also have negative impacts on other species when an area is managed primarily for lions. However, these impacts are generally small in comparison to other threats at a national and regional scale, and perhaps counter-intuitively, trophy hunting could in some areas be reducing some of the primary threats to lions, namely habitat loss and loss of prey. For example, across Africa, approximately ∼1.4 million km^2 has been estimated to be conserved for trophy hunting purposes. It is likely that without trophy hunting, parts of this vast area of land would become economically unviable if maintained as ecologically intact wildlife areas, and could well be converted to agricultural use with strong negative impacts on lions and other wildlife. Governments require incentives to justify the maintenance of wildlife habitat, local communities and private landowners require incentives to maintain wildlife habitat instead of converting the land to other uses, such as agriculture, and to tolerate the presence of lions, which can pose a threat to livestock and human life. Some revenue from trophy hunting accrues to governments and to local communities, but information is lacking for most areas and in many places benefit-sharing with communities is inadequate. Furthermore, only a small portion of total trophy hunting income is attributable to lions. However, without the income from lion hunting, trophy hunting is estimated to become unviable across 59,538 km^2 in five sub-Saharan countries alone, and a transition to alternative land-uses is likely. Photographic tourism is an alternative land-use that would allow lion populations to remain, but is likely only to be viable in a subset of current trophy hunting areas. The likely outcome for many areas would be conversion to agriculture or livestock grazing, which would seriously threaten the survival of the lion populations in those areas.

3. Current and recommended lion trophy hunting practices

Many of the detrimental effects on lion conservation associated with trophy hunting are to do with failure to establish and enforce regulatory systems based on now well-established scientific principles, and within those regulatory systems, failure to follow a good code of conduct. The UK can only affect a few of these issues directly, for example potentially through specific import regulations, but it would be good to put pressure on the hunting industry to ensure that best practices are met, with strict regulations both imposed and effectively implemented.

3.1 Lease length, allocation and fixed quotas

Short leases on hunting concessions are not conducive to conservation goals (Damm 2005). The argument is that when short leases are issued with no guarantee of a long-term stake, then there is no incentive to invest in conservation, and the maximum quota is always taken so as to maximise return on the cost of lease, even if this means that wildlife are over-exploited as a result. With greater security in the future of a concession comes greater incentive to invest in the resource, and thus conservation goals are more likely to be achieved.

As an illustration, multiple use concessions in Botswana were awarded on 15-year leases. Evaluation of tender documents included a Technical Management Plan, financial plan and financial bid, which all contributed to a total point score, which determine the winner of the tender. This provided the opportunity to have wildlife monitoring, corporate social responsibility, environmentally responsible camp management etc., and the management plan became part of the lease agreement. Biannual site visits by Department of Tourism, Department of Environmental Affairs and Department of Wildlife and National Parks were conducted to ensure compliance, and operational licences could be revoked if people were not adhering to the lease agreement. This carefully regulated system contrasts with the shortcomings of patronage, and associated over-harvesting, documented by (Packer 2015) as a major impediment to hunting delivering conservation benefits to lions.

Hunting blocks should also be allocated according to an open auction system (Dickson et al. 2009) that recognizes

the extent of past investments in each block while encouraging access by well-capitalized businesses or individuals and allows options for long-term leases in the case of well-managed tenure. In some countries (e.g. Tanzania), the outfitter has to pay a mandatory fee for the lions they are allocated to hunt, even if they are not shot. Packer et al. (2006) noted that that 'fixed' quotas do not provide any incentive for hunting operators to reject lions that are too young, leading to reduced trophy quality and unsustainable harvesting. In 2013, Lindsey et al. reported that Mozambique, Benin, Burkina Faso and Cameroon had no fixed quotas, with hunters only paying for the animals they shot, but other countries did have some mandatory fees regardless of the actual offtake (Lindsey et al. 2013). This fee (regardless of actual offtake) was apparently set at 30% of the quota in Zimbabwe, 40% in Tanzania, 50% in the Central African Republic, 60% in Zambia and 100% in Namibia, where concession rights are based on the sale of the quota rather than lease of the land (Lindsey et al. 2013). Best practice would be to have no fixed quotas, with hunters only paying trophy fees for the animals that are actually shot.

3.2 Restrictions on lions able to be hunted

The negative consequences of removing females from a population have been detailed above (see Section 2.1.1.1), so best practice would be to import only male lions.

To ensure that the benefit to lion conservation from trophy hunting (through habitat protection) outweighs the costs that may be imposed, it is important to estimate how many lions can be hunted from a particular management unit without imperilling the population, and in order to import any lions, national regulators should have some confidence that the country concerned is making their calculations based on good science. Calculations of 'safe' harvests would be difficult for most species because of the practical challenges of counting animal numbers and working out their population dynamics, but in the case of lions it is made much more difficult because their social system is such that the death of a pride male can trigger a perturbation effect with cascading consequences reducing recruitment (Loveridge et al. 2007a). To avoid the hazard of overharvest, two broad approaches have been proposed by experts on lion populations, one area-based and the other age-based. Both these approaches involve hunting only adult males and there is now an emerging case for, in some circumstances, combining them (Creel et al. 2016).

The area-based approach recommends capping the number of hunted male lions at a sufficiently low number that there is minimal risk that this offtake causes a decline in the population. In most populations, the offtake has been recommended as no more than 0.5 lions 1,000 km^{-2} (Packer et al. 2011), although there might be local variation – high-density populations such as the Selous could probably sustain an offtake of 1 lion 1,000 km^{-2} (Packer et al. 2011), as could well-managed and increasing populations such as those in Bubye Valley Conservancy (ZPWMA 2015), while in particularly low-density populations, the cap may have to be adjusted downwards. Lindsey et al. (2012b) present data showing that the introduction of a recommended quota of lion offtakes of 0.5 lions 1,000 km^{-2} would allow lion hunting to be sustainable, while retaining conservation incentives from trophy hunting. They conclude such a policy would result in only 7,005 km^2 of existing hunting estate potentially become financially unviable (representing ∼1% of the 516,738 km^2 where lions are currently hunted in the main lion hunting countries), and argue sustainability would be enhanced further if age-based regulations were also implemented.

The age-based approach recommends harvesting only older males that have had the opportunity to reproduce successfully and whose deaths will therefore have fewer repercussions for recruitment of cubs into the population. The assumption behind this approach is that the harvest of those males can be sustainable irrespective of population size or numbers taken, and has no deleterious effect on population genetic diversity (Whitman et al. 2007).

However, these general rules involve complications. The original computer models by Whitman et al. (2004 & 2007) indicated that so long as only males older than $\geqslant$5 years were hunted, the numbers taken had little impact on the viability of the remaining lion population. However, as Whitman et al. (2004) cautioned, this model was based on data from a well-protected and growing lion population with an increasing prey base: conditions that may not apply to the majority of lion populations in hunting areas. Furthermore, a practical difficulty is aging the candidate trophy lions accurately under challenging field conditions, although new guidelines (and an associated training website) published by Miller et al. (2016) help with this, as well as the field guide produced by Whitman and Packer (2007). Revisiting Whitman et al.'s (2007) pioneering work, Creel et al. (2016) offer more precautionary guidelines to minimise the risk of a hunted population being extirpated, and advocated the hunting of only males aged 7 years or more (along with other measures such as recovery periods from hunting and area-based quotas). Indeed, these recent models conclude that even this strengthened age-based criterion does not necessarily en-

sure that the hunted population will not decline if other threats such as bushmeat poaching are present. However, the models show that the contribution of trophy hunting to population decline, within the suite of all the threats facing lions, will be minimised if only males of 7 years or older are removed. This is at least partly because setting the age limit higher reduces the impact of misjudging age in the field by a year or so (Creel et al. 2016). Individual lion age characteristics may vary regionally (Kays and Patterson 2002; West and Packer 2002; Patterson 2007; West and Packer 2013), and lion aging techniques differ pre- and post-mortem, with pre-mortem aging being less accurate and precise (Miller et al. 2016), and thus enforcing minimum age requirements in the field is often difficult. However, Miller et al. (2016) have shown that a suite of lion age traits, in combination with training workshops, may be used to improve significantly field assessment of lion age, and could thus be used to improve sustainability of harvest by reducing levels of underage offtake. Post mortem monitoring of age is possible (Winterbach et al. in review) but not without problems (White et al. 2016).

Therefore, and as a failsafe regulation under conditions (which often prevail) where threats such as human encroachment, poaching and prey depletion are present (but not increasing) Creel et al. (2016) suggested that a combined age- and area-based method be used. They determined that an age limit of $\geqslant$7 years AND a maximum offtake of $\sim$0.5 lion 1,000 km^{-2} AND interspersing fallow periods of recovery, in combination reduced the risk of population extirpation within 25 years to less than 10% (Creel et al. 2016). Although some people may view any risk of population extirpation as unacceptable, this level of risk is low compared to the risk implied by recent declines in lion populations (43% decline in 21 years), and should be weighed against the benefit of protecting lion habitat, the degradation of which has been a primary cause of rapid lion decline at a continental scale (Bauer et al. 2016). However, Creel et al. (2016) recognise that for some responsible operators this stringency could reduce current offtakes tenfold; they suggest a compensatory rise in trophy fees to maintain the same levels of economic return from the land (Creel et al. 2016), which would only be feasible in certain areas or markets. How the demand for lion trophies would be affected by the price is a significant gap in current knowledge.

We suggest that in order to be eligible to export trophies, countries should be able to demonstrate that they are effectively implementing a quota system based on this best available science, with hunting restricted to older males, possibly with an additional area-based component. More information on how this might feed into conditions for any imports is provided in Section 4.3.2.

4. Options to improve the conservation impact of trophy hunting

Regarding the importation of lions into the UK, an option for the UK Government is to maintain the status quo, which is conditional import, with those from some countries banned and others subject to assessment against strict criteria. Options are thus to make the judgment that trophy hunting has no part in conservation, which might lead to a ban on all imports, or whether to enhance existing criteria to give greater confidence of conservation benefit (and by working with other countries have a greater impact). When considering the impacts of banning trophy imports, we acknowledge that if the decisions made by the UK Government are only adopted by them, then the impacts will be negligible, but we are assuming that the approach decided on by the UK Government could influence the development of policies more widely.

4.1 Possible impacts of maintaining the status quo

Maintaining the status quo would probably anger elements of the UK public, who have been vociferous in their demand for the Government to take action to restrict the importation of trophies from lions (as well as from other species[29]), and would put the UK at odds with the US and two EU countries, Netherlands and France (as well as Australia and Costa Rica) with regard to their positions on trophy hunting. It would also miss the opportunity to incentivise for the trophy hunting industry to improve its performance, as is clearly needed, in delivering benefits to conservation and reducing its negative impacts on threatened lion populations. This is therefore probably the least desirable option for the UK Government.

4.2 Possible impacts of a total import ban

Another option would be for the UK to impose a total ban on all lion trophy imports, and this would please a vocal section of the British public. If such a ban was done in partnership with other countries then it would reduce the eco-

[29] http://www.express.co.uk/news/nature/600874/CECIL-S-LAW-Brian-May-demands-law-to-stop-hunters-importing-trophies-back-to-UK

nomic viability of trophy hunting, which might encourage land-owners to switch to non-consumptive forms of wildlife use. This would be more ethically acceptable to large numbers of people, although the degree to which this would or could happen is uncertain. The degree to which trophy hunting can be substituted by photographic tourism is debatable (see Section 2.2.2.2), and in many areas such a substitution seems unlikely, particularly in countries that are less appealing to photographic tourists such as Cameroon and the Central African Republic, and even large sections of well-visited countries such as Tanzania or Botswana.

The major risk of a total import ban would be the removal of economic incentives to maintain the land in lion hunting areas under a wildlife-based land use, and this could have significant detrimental impacts on lions. In 2012, Lindsey et al. judged that in Mozambique, Namibia, Tanzania, Zambia and Zimbabwe, trophy hunting was not dependent on lions for viability, with other species being financially more important. They also judged that trophy hunting could nonetheless become unviable across at least 59,538 km^2 in these 5 countries, representing 11.5% of the 516,738 km^2 where lions are currently hunted in these countries. Even where a safari area remained viable despite the loss of lion hunting this could affect the overall profitability of trophy hunting and thus reduce its competitiveness relative to alternative land uses that diminished the lion estate.

To predict the impact of a ban on the import of lion trophies it is also necessary to consider what further policies it is likely to give rise to. It is possible that a ban on lion hunting will precipitate pressure for restrictions on leopard hunting as well, and other charismatic threatened species, such as the elephant. There are already calls for such bans[30], and as these species are some of the most sought-after for hunters, their collective removal would certainly reduce the economic viability of trophy hunting areas quite significantly. This is particularly true regarding potential restrictions on leopard and elephant hunting; the leopard appeared as one of the top three most-hunted species in Tanzania, Botswana, Namibia, Zambia and Zimbabwe, while the elephant was amongst the top three in Tanzania, Botswana, Mozambique and Zimbabwe (Di Minin et al. 2016). Unless an alternative wildlife-based land use was implemented at the same time as hunting was stopped, or the land was managed under conservation philanthropy, there is a significant risk that a considerable area of current hunting land could be converted to non-wildlife based land uses, with the con-

[30] https://www.theguardian.com/environment/2016/jul/25/leopards-animal-welfare-groups-endangered-us

comitant increases in lion habitat loss associated with that.

Popular disdain for lion trophy hunting appears widespread in North America and Europe, but this mood is not universal. If adopted more widely, one speculation is that a ban on imports to North America and Europe could increase uptake of trophies by hunters from other countries instead, for example the Middle East and Asia, with possible unintended consequences for conservation and animal welfare. Similar shifts in the market have been seen with other import bans, such as with Asian giant tortoises (*Manouria emys*), where an import ban was well implemented by the EU and was associated with a two-year decrease in global imports before new markets were found – however, four years after the import ban, global imports approached twice the volume of the year of ban (Hann 2015). There is also a risk that if countries feel that external views are being continually imposed on them (for example through trade restrictions) then they may decide to opt out of agreements such as CITES, which would be extremely damaging for the future validity and operation of such international agreements. There were some calls in the African media for African nations to withdraw from CITES in the run-up to CoP 17 and "*reject the power of rich elites in Europe or America to dictate how they manage their affairs*"[31], although no countries actually did so.

4.3 Possible impacts of stricter controls on the import of lion trophies to the UK

4.3.1 Reasons for considering stricter controls

It is clear that poorly managed trophy hunting of lions can have serious negative impacts at a population scale (see Section 2.1.1), and potentially some impacts at a national or regional scale (IUCN 2006b). Where they occur, allowing these negative consequences to continue is unacceptable from the viewpoint of lion conservation, particularly considering the species' deteriorating status (Bauer et al. 2016). However, it is also clear that trophy hunting is currently the reason for a large percentage of the lion estate being maintained as land for wildlife – it has been estimated that four times as much of that estate is in hunting areas than Parks (Packer 2015). A central dilemma is that imposing total import bans on lion trophies would, in the absence of alternative in-

[31] http://www.dailymaverick.co.za/opinionista/2016-08-23-african-nations-should-withdraw-from-cites/

centives to conserve lions, risk perverse consequences that may worsen the conservation of lions (as well as everything covered under their conservation umbrella). Principally, this might occur by reducing the economic incentives for wildlife-based land uses, which increases the likelihood of land conversion out of the lion estate and exacerbates the main threats to lions (namely the degradation of habitat, poaching of prey and conflict with people; IUCN 2006a, b).

With the intention of creating the strongest possible incentive for the trophy hunting industry to take responsibility for improving its practices and regulations in ways that maximise the benefits to lion conservation, one solution to this dilemma would be to impose stricter conditions linked to conservation gain for the issuance of any lion trophy import permits to the UK. There are, of course, already strict conditions in CITES as implemented by the EU CITES Scientific Authorities through the Scientific Review Group (SRG). CITES conditions require that the trophy lion had been hunted according to regulations that avoided a significant detrimental impact on the lion population from which it came, so evidence of this, and encouragement to enhance conservation, could be strengthened. These dual goals, recommended to the UK government, align with those of the US Fish and Wildlife Service, which deem that, amongst other conditions, the import of any lion trophy to the USA should be contingent upon the management of lions benefiting the species in the wild (US Fish and Wildlife Service 2015). Under this scenario, the UK acts directly by permitting the importation of lion trophies only if stringent conditions that benefit lion conservation are met, and acts indirectly by convincing other nations to adopt those same conditions.

The main positive conservation enhancement associated with trophy hunting is securing habitat for both lions and other wildlife; that benefit is likely to be significant to lion conservation only in larger areas. Therefore, this report recommends setting a minimum size for areas from which trophy imports can even be considered; as a practical threshold, we suggest 500 km^2 to ensure that it is delivering conservation enhancements[32].

4.3.2 Possible options for stricter conditions

Current CITES requirements are that trophies can be approved for import where, at a minimum, it is demonstrated that hunting has no detrimental impact on the sustainability of the lion popula-

[32] *500 km^2 is not a firm cut-off for all scenarios, but is a necessarily somewhat arbitrary judgment on the smallest area usually likely to enable lions to be self-sustaining and ecologically functional, and deliver meaningful conservation benefits for lions (and other wildlife) at the landscape scale.*

tion; however, insofar as trophy hunting has been associated with over-harvesting, and declines in lion numbers, it is clear either that these requirements are not always properly applied, or the evidence to meet them has been inadequate. A second requirement could be added, namely that trophy hunting delivers conservation enhancement. A fundamental element of that enhancement is the maintenance of ecologically functional areas of lion habitat.

Although not necessarily prerequisites for trophy importation, UK government should also encourage additional benefits to conservation, e.g. anti-poaching patrols and/or wider co-benefits such as contributions to community wellbeing. This responsible custodianship of the wildlife estate might be considered appropriate requirements of any responsible business that relies upon wildlife use, whether that is consumptive (such as trophy hunting) or non-consumptive (such as eco-tourism).

The criteria for whether a lion trophy could be imported into the UK should be that its hunting (a) was unlikely to cause detriment to the lion population from which it was taken and (b) contributes to lion conservation. Although in CITES terms the burden of proof rests with the CITES exporting authority, there is a strong case that the requirement should be made of the industry to prove that lion trophies are from populations where (a) lion offtake is strictly regulated to levels that minimise the risk of extirpation and (b) 500 km ^{2} or more of wildlife habitat is maintained within the hunting zone. These conditions should sit alongside other requirements of a high code of professional practice, ensuring for example that robust animal welfare standards are met.

However, lions are hunted from populations with different conservation status, and under widely different conditions, in countries facing variously punishing poverty and infrastructural challenges, so these general principles need to be tuned accordingly. We propose categorising hunting operations into three categories, with varying import conditions. We propose that the UK takes the lead in an international effort to categorise hunting operations according to the sustainability of their practice as set out below, and applies concomitant import regimes with an effective import ban from the least sustainable operations.

We strongly recommend a best-practice approach based on robust and on-going surveys of lion populations and long-term population trends and threats, to obtain precise data from which a safe offtake can be calculated, and on the consequences of trophy hunting and other threats. However, due to constraints such as funding, there is a need to consider other methods, at least in the short-term, for ensuring that offtake is not detrimental.

It is incumbent upon the hunting area management to demonstrate that its lion hunting operations are sustainably managed. We would recommend accepting these methods of demonstrating appropriate levels of sustainability:

- Monitoring data to show that lion populations are sustainably managed (this would be considered best practice)
- Data to show that the population is managed using age-restricted hunting, aiming for an ideal threshold of $\geqslant$7 year old males

4.3.2.1 Best-practice: Lion populations are sustainably managed, as determined by professional-standard science-based monitoring

In order to establish directly that trophy hunting of lions is sustainable, a prerequisite is that reliable, standardised, and independently verifiable surveys are conducted in the hunting area. Possible methods could include spoor counts (Funston et al. 2010), camera-trapping (Cusack et al. 2015) or by individual lion recognition depending on local circumstances. Once the lion population has been surveyed the information can be fed into a harvest rate model, such as that proposed by Caro et al. (2009), to calculate an appropriate, scientifically-based quota. Assuming the population is well managed and no external factors are jeopardising it, the harvest model should ensure that the hunted population increases or remains stable.

Within an appropriate monitoring system, successive surveys will reveal trends in the lion population, and should demonstrate sustainability. If it is increasing or stable within the hunting area (without causing negative impacts on any adjacent area), then there should be no grounds for significant concern that hunting is detrimental. Hunting areas that have achieved these 'ideal' conditions of an independently stable or increasing lion population would be eligible for best-practice hunting status, and could be advertised as such to responsible hunters.

4.3.2.2 Age-based harvesting

Two methods have been proposed for implementing age-based lion trophy hunting. One model would be to limit hunting to Creel et al.'s (2016) conservative prescription (i.e. only harvesting $\geqslant$7 year old males at a level not exceeding 0.5 males per 1,000 km^2 – unless there is clear scientific evidence that the population can sustain a higher offtake without supplementation – with resting periods. As described above, this should carry a low risk of population extirpation and

still keep land in the lion estate[33]).

Alternatively, an option would be the implementation and enforcement of an adaptive age-based quota system. Such systems have been trialled in Mozambique's Niassa National Reserve and adopted in Zimbabwe, with apparent benefits to lion conservation. Each hunted lion results in points being awarded to (or taken away from) the outfitter based on the age of the lion, with the aim of rewarding hunters for hunting older males (ideally of $\geqslant$7 years) and penalising them for hunting younger males.

An example of a possible points-based system (which may have to be adapted depending on the lion population) is shown in Appendix D.

4.3.2.3 Interim scenario

If a hunting block failed to qualify under the suggested criteria above, then the area would not be considered suitable for importing trophies into the UK until it qualified for one of them. Mindful of the risk of such land being lost from the lion estate, this disqualification might, at the discretion of the UK importing authorities, be postponed for a grace period of up to 3 years under very strict criteria and annual review by the national committee. For continuation of the grace period within those 3 years, the managers should demonstrate at each annual review that significant progress has been made towards implementing the necessary criteria. While it takes time for changes to take full effect, Zimbabwe has seen marked improvements with benefits for lion conservation within three years so that should be a sufficient period for change. During any grace period, lion trophy hunting should be limited to a minimum area and age-based quota, such as a maximum of 0.5 lions 1,000 km^{-2} aged $\geqslant$7 years, or similar precautionary figure calculated to be locally appropriate. Failure to meet the required conditions after the grace period would result in a moratorium on UK imports from the area until they are in place. In these circumstances, every effort should be made to ensure that the land was not lost from the lion estate. This scenario is intended to ensure minimal detrimental impact on the lion population during the grace period, while incentivising improved management that will benefit lion conservation.

[33] *When considering a precautionary off-take that will be sustainable we have followed Creel et al.'s (2016) simulation as a safe starting point. However, the number of male lions that can be hunted sustainably will obviously vary with their population density and this will certainly vary between populations and may vary in any one population at different times.*

4.3.2.4 Dealing with areas which do not meet the desired conditions

Trophy hunting areas whose management does not meet the conditions set out in the three systems described above would not usually be able to import their trophies into the UK. In the highly undesirable event that a hunted lion population is declining unsustainably, under any of these systems, and thus that hunting further lions would risk additive mortality and worsening the conservation of lions, then no import permit would normally be issued. Indeed, under circumstances where a hunted population is declining unsustainably best hunting practice would normally not countenance further hunting until the population was stable, and the strongest pressure should be applied to the operator to remedy the situation. However, we are mindful of a scenario that, although perhaps uncommon, could perversely damage lion conservation. That is, if the cessation of lion hunting caused the financial viability of the hunting operation to collapse and thereby the land to be converted to agriculture and lost, effectively irretrievably, from the wildlife estate. Where the risk of this outcome was imminent, the local auditing committee should look assiduously, on a case-by-case basis, for any interim steps to forestall the loss of land from the wildlife estate – this being the ultimate disbenefit to conservation. A judgement would have to be made, with lion conservation as the criterion, on whether a short, interim period of grace, perhaps involving a very low quota, was justifiable on the grounds of providing sufficient respite to enable the situation to be remedied and the lion population returned to a sustainable state and the area retained for wildlife.

4.3.3 Notes on scale and conditions of import

4.3.3.1 Recommended scale at which criteria are applied

The foregoing criteria should ideally be applied at ***the scale of the hunting area and not the national level***. This is because, while exports and imports are legally conducted at a national scale, allowing imports only from a country where all operators have implemented best-practice hunting would disincentivise good operators within a poorly-regulated country and would therefore risk damage to lion conservation. There is already precedent for this scale of operation – for example, the EU approved trophy imports from Niassa due its good management rather than the whole of Mozambique (Sigsworth, pers. comm.). The exporting country should, via an independent panel

of stakeholders, transparently assess its hunting areas and report (with requisite proof) which ones fulfil the criteria above, and the UK Government could determine the scale of imports depending on the extent of compliance.

4.3.3.2 Verification of hunting practices

Each lion-hunting country should have an independent, competent and inclusive committee that is tasked with regulating and enforcing hunting practices. Ideally committees of this sort would be overseen by an independent international organization such as International Organisation for Standardisation (ISO). Their remit should involve the following components, some of which have also been recommended by Di Minin et al. (2016):

i. Auditing to ensure that lion monitoring practices (where they are in place; e.g. for the gold standard scenario) meet the required standards

ii. Setting quotas where necessary, i.e. based on the results of the population monitoring (for the gold-standard blocks) or based on the adaptive points system

iii. Ensuring that minimal quotas (e.g. of 0.5 lions 1,000 km^{-2} or less for low-density areas) are adhered to, unless there is clear scientific evidence that the population can sustain a higher level

iv. Encouraging certification of hunting-block operators modelled after a well-defined system such as FSC, etc., and which should ideally require considerable investments by the operator in anti-poaching, community benefit programmes etc.

v. Facilitating training of Professional Hunters regarding field assessment of lion age (e.g. Miller et al. 2016) and helping set formal appropriate standards for lion hunts, particularly with regard to welfare concerns (e.g. demonstrating adequate evidence of competence in shooting and other necessary skills, rapid dispatch of wounded animals, using large-bore rifles, no night-hunting, etc.)

vi. Ensuring transparency of the process: there should be full disclosure to the public of results and reasons for block allocations (which should be allocated in order to maximise the funds available for conservation), results of lion surveys, results of trophy age verification trophy inspection, offtake levels and other relevant information, and all records (e.g. of samples for lion ageing) must be kept for any later inspection

vii. Ensuring compliance, so that the same criteria are imposed on all block holders, enabling independent observers to be placed without advance warning on

trophy hunts, and ensuring that trophies and permits are confiscated if illegal practices are discovered, and that operators who break the laws are barred from future hunting

viii. Verifying the age of trophy hunted animals before export. This should be based on the following information:

- *Hunt report forms confirming information such as the date and location of the hunt.* These forms are also required to be completed for blocks even if no successful lion hunt is completed in that area that year in order to encourage complete information and discourage underreporting.
- *Photos of the lion immediately postmortem*, to allow inspection of a range of indicators of age, e.g. mane development, facial markings and scars, nose and teeth colour. The photos must be stamped with the date and time or they would be considered ineligible.
- *X-rays of the upper premolar PM2 and examination the degree of pulp closure in that tooth*, as this has been shown to be a very accurate measure of lion age (White et al. 2016). Both the upper premolars should be presented to the inspection team to reduce the chance of fraud. Presentation of the skull will also allow wear on the premolars and canines to be easily judged – this could be an alternative method of age estimation if an X-ray is not possible, but all efforts should be made to obtain the X-rays. It would also be desirable to take and bank DNA from all hunted lions.

5. An overview: Framing trophy hunting in the context of wider lion conservation

Although many of the topics covered in this report are hotly debated – such as the amount of revenue generated by trophy hunting, or its replaceability with photo-tourism – some points are beyond debate. Key amongst those is that the lion – one of the world's most iconic species – has undergone severe declines in numbers and range over the past few decades. Lions now remain in only 8% of their historic range, with fewer wild lions now thought to exist in Africa than rhinos (Bauer et al. 2016). Nobody knows how many lions there were in Africa a century ago, but the widely quoted speculation that there were about 200,000 is a tenfold contrast with current estimates closer to 20,000 (Bauer et al. 2016).

African lion populations are likely to be to be declining everywhere, except in four southern countries (Botswana, Namibia, South Africa, and Zimbabwe; Bauer et al. 2015). The contrast between countries in southern Africa and the rest of the continent is related to their lower human population densities, better management budgets and the less damaging impacts on prey abundance and lion by-catch of unsustainable and increasingly commercialized bushmeat trade. Furthermore, Packer et al. (2013b) showed that presence of wildlife-proof fencing, which is more common in southern Africa, was an important determinant of short-term population trends. Awkwardly, the populations that seem to be declining fastest are also those that are least well-monitored (and probably have the least conservation effort), so inadequate data may be shrouding an even worse situation. However, Bauer et al.'s (2015) population models suggest that the chance of populations declining by half over the next two decades is 67% in West and Central Africa and 37% in East Africa. So it is indisputable that effective, range-wide lion conservation strategies are urgently needed to halt this precipitous decline.

The overarching priority is to secure and better manage existing populations of lions – although there is a pressing need for more surveys of lion populations to assess numbers and trends. Dickman et al. (in prep.) used the latest available data and concluded that there are only six remaining populations (Selous-Niassa, Serengeti-Mara, Kavango-Zambezi, Greater Limpopo, Katavi-Ruaha and Kgalagadi) with more than 1,000 lions. These 6 are amongst 60 priority areas where lions are far from secure, over half of them with fewer than 100 lions left. An apt conservation slogan, and call to arms, would therefore

be: *secure the six, and save the sixty.*

Rising to this challenge will require us to secure and better manage existing protected areas (which form the core of lion populations), establish and monitor lion presence and population trends across lion range, improve the economic security of local people to reduce the intensity of bushmeat poaching, and ensure that people have some power over wildlife on their land and receive sufficient economic benefits from their presence to outweigh any costs and incentivise their protection.

These steps cannot be taken by conservationists alone – they will require effective collaboration across a huge diversity of stakeholders, including protected area managers, development experts, economists, national and local governments, and those people who live with lions on their land every day. Most importantly, enacting real change at a range-wide scale will require a level of funding that is orders of magnitude higher than that allocated to wildlife conservation today. For example, Panthera et al. (2016) estimate that just effectively managing all protected areas within current lion range would require an annual budget of at least US$1.25 billion – and many lions live outside those protected areas, very many of them on trophy hunting concessions.

Especially because constellations of threats may interact, and because the impacts of each threat may often be difficult to measure, it is hard to be precise when ranking them, and the ranking anyway varies from place to place. Nonetheless, overall the major threats to lions are the loss and degradation of habitat, the loss of prey, and conflict with people over livestock, and those pressures are exacerbated when the lion populations being affected are small, isolated and poorly managed, as is often the case (IUCN 2006a, b; Henschel et al. 2014). Experts agree that – certainly at a national and regional scale – trophy hunting ranks low amongst the threats to lion populations (IUCN 2006a, b), and that it can, perhaps counter-intuitively, have positive impacts through habitat protection and funding national wildlife agencies (Di Minin et al. 2016; IUCN 2016). The fact that trophy hunting occurs in an area does not necessarily make it a threat to the lion population there, although it can be.

So, trophy hunting can be a locally important threat to lion conservation, and should be fiercely regulated to avoid this. A broader perspective, however, ranks trophy hunting generally not in the first division of threats to lion conservation. Scanning the horizon, the greatest threats over the next few decades are likely to descend from the increasing footprint of a human population set to double, or more, by 2050. With this perspective, the real challenge for the UK Government, and the community of those concerned for this iconic species

(and all the species for which it is an ambassador), is to develop holistic conservation strategies likely to require long-term partnerships with stakeholders across the world, chiefly the Governments and local people in countries that still manage lions.

5.1 Summary of lion trophy hunting in the context of conservation

So, finally to take stock, why is trophy hunting of lions a topic of concern to conservation? Because lions are charismatic top predators, already classified as threatened or endangered (depending on the area) by the IUCN and demonstrably declining fast in parts of their range, and trophy hunting is an obvious concern because it involves killing them. There are two categories of reasons why this may attract the attention of conservationists and wider society. First, the killing of individuals of a threatened species for sport may be ethically unacceptable to some people and for those that hold this as a moral absolute, trophy hunting of wild lions (and, obviously, farmed lions) will be ruled out. Second, for those who could countenance sport hunting of a threatened species, perhaps on utilitarian grounds of securing a greater good to conservation such as habitat protection (Macdonald et al. 2016b), the killing of lions nonetheless raises two obvious fears of over-harvest and thus unsustainability. First, lions are difficult to count and therefore harvests may be miscalculated and, anyway, there is an incentive to over-harvest for short-term profit, and documented evidence shows that this happens (sometimes with dire consequences that have drawn a comparison with strip-mining; Packer 2015). Trophy hunting is most straightforwardly[34] acceptable to conservation if it is demonstrably sustainable (it should also adhere to high standards of animal welfare), and demonstrating

[34] *The adverb 'straightforwardly' acceptable is not a descent into weasel words, but a caveat necessary to take account of argument in extremis with respect to the priority of retaining land in the lion estate and under wildlife use. The straightforward case is that trophy hunting is demonstrably sustainable, and that demonstration necessitates monitoring data, and therefore for trophy hunting to be acceptable there must be monitoring data and they must demonstrate sustainability. This should be the driving logic behind the regulation of trophy hunting as a potential contributor to lion conservation. However, and without relenting on the drive to demand high standards of trophy hunting, or other uses of wildlife, the logical possibility of an extreme possibility requires mention: even undesirably unsustainable trophy hunting may, in the short term, 'buy time' in keeping land in the lion estate and, irreversibly, out of agriculture, and this situation, while infuriating and lamentable, may be more tolerable than losing the land to wildlife.*

its sustainability requires adequate data on lion numbers and their ages, ergo trophy hunting is straightforwardly acceptable only where lion numbers are monitored – and there are direct and indirect methods of doing this.

The most strongly evidenced benefit of trophy hunting to lion conservation is that it gives lions monetary value, which can provide a marginal economic advantage to keeping some land under wildlife use that would otherwise more profitably be converted to other uses and thereby lost from the lion estate (at a time when this is already shrinking perilously). All else being equal, there might be no difference in the conservation outcome if lions are given the necessary monetary value by trophy hunting or by some other means (for example, some form of international payment to encourage coexistence; Dickman et al. 2011). However, all else is often not equal; killing animals that are members of complex societies where they will be survived by sentient companions capable of behavioural and psychological perturbation, may contribute to a mood in at least some sections of society that, even if sustainable and a benefit to conservation, hunting lions for sport is a recreation that is not compatible with 21st-century civilization. A plausible speculation is that this opinion will soon prevail (notwithstanding clear cultural differences between East and West, North and South). Insofar as this creates pressure for a ban on trophy hunting it also risks unintended consequences for lion conservation if it causes the marginal value of land previously retained under wildlife use for hunting to fall below that for non-wildlife uses (such as farming), and thus the lion estate to be diminished. Anticipating that possibility, there is an urgent imperative to find alternative means of giving those threatened parts of the lion estate sufficient monetary value to prevent their degradation. Indeed, the report strongly re-emphasises Bauer et al.'s (2015) conclusion that unless political and funding commitments are scaled up to address mounting levels of threat, lions may disappear from most of Africa.

It seems that public opinion, in many places, is strongly against trophy hunting, particularly of threatened species (Macdonald et al. 2016a). This creates pressure for a ban on trophy hunting, but also risks unintended consequences for lion conservation. This report acknowledges that where there is evidence of scientifically-based regulation that is strictly enforced, lion hunting can contribute to lion conservation, and that this constitutes a good reason to tolerate it at least on land that might otherwise be lost to the lion estate. However, societal pressure may stop this recreation; were this to happen before some alternative means of giving lions monetary value were in place (where photo-tourism cannot do so), there are grounds to be fearful of serious detriment to the lions' already deteriorating conservation status. In this regard, Macdonald et al. (2016a)

contrast the consequences of a jump versus a journey: a precipitate jump to ending lion trophy hunting might risk grave unintended consequences for the species' conservation, consequences that could be avoided by a carefully planned journey to that end. An obvious, and perhaps the only plausible, mechanism to achieve this would be some form of international payment to encourage coexistence with lions; to the nearest order of magnitude, and considering only the costs of substituting other land uses for trophy hunting, this could cost as much as the US$1.25 billion estimates by Panthera et al. (2016) adequately to safeguard current protected areas for lions. For perspective, and while mindful that society may face parallel expenses in funding custody of other global commons, the amount needed seems less daunting when we realise that US$12 billion is spent annually in Europe and the US on perfume alone[35]. Until such a mechanism is in place, the risk to lion conservation of a complete ban on trophy hunting is too great to take, but in the meantime the establishment of strictly enforced regulations to ensure that trophy hunting does benefit lion conservation is a priority.

[35] http://www.worldwatch.org/node/764

Tapia, Brenda <brenda_tapia@fws.gov>

Fwd: Zimbabwe's Lion NDF Submission-Final Report

1 message

Vannorman, Tim <tim_vannorman@fws.gov> Wed, Jan 25, 2017 at 12:14 PM
To: Brenda Tapia <brenda_tapia@fws.gov>

---------- Forwarded message ----------
From: **Patience Gandiwa** <pgandiwa@zimparks.co.zw>
Date: Mon, Dec 5, 2016 at 4:08 AM
Subject: Zimbabwe's Lion NDF Submission-Final Report
To: tim_vannorman@fws.gov
Cc: Patience Gandiwa <patience.gandiwa@gmail.com>

Dear Tim

Greetings and hope you received the email I sent earlier on the submission of the Lion NDF Report by the Republic of Zimbabwe. Reference is made to the email below

Kindly note that a section in Chapter 9 of the report describing the Socio-economic findings had been omitted from the version that was sent through to you…(I am still looking forward to receive acknowledgement of receipt thereof, which I haven't received). The section should have been mistakenly deleted in the editing process, and now is has been put back in the document

The corrected final version is attached herewith.

Sincerely,

Patience Gandiwa (Interim CITES Coordinator)

For DIRECTOR GENERAL-ZIMPARKS

Patience Gandiwa| International Coordinator

Transfrontier Conservation Areas Unit| Botswana South Africa Zimbabwe

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To: 'tim_vannorman@fws.gov' <tim_vannorman@fws.gov>
Cc: 'Geofreys Matipano' <gmatipano@zimparks.co.zw>; 'pmupazviriho@environment.gov.zw' <pmupazviriho@environment.gov.zw>
Subject: Zimbabwe's Lion NDF Submission

Dear Tim

Greetings from southern Africa and hope this email finds you well in North America.

Kindly find attached letter and document-being Zimbabwe's Non-Detriment Findings for *Panthera leo*

Looking forward to your feedback,

Patience Gandiwa (Interim CITES Coordinator)

For DIRECTOR GENERAL-ZIMPARKS

Patience Gandiwa| International Coordinator

Transfrontier Conservation Areas Unit| Botswana South Africa Zimbabwe

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--
Timothy J. Van Norman, Chief
Branch of Permits
Division of Management Authority
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(703) 358-2350

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2 attachments

Zimbabwe Lion NDF_Enhancement Finding_Final.pdf
3867K

Zimbabwe Lion NDF_Enhancement Finding_Cover letter.pdf
270K

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Ref: USFWS/L/1116-02

29 November 2016

The United States Fish and Wildlife Service (USFWS)
U.S. Department of the Interior
1849 C Street, NW
Washington, DC 20240
United States of America

Attention: Mr. Tim Van Norman (Email: tim_vannorman@fws.gov)

Dear Sir

Ref: Zimbabwe's Enhancement and Non-Detriment Findings for Lion *(Panthera leo)* to the United States Fish and Wildlife Service (USFWS)

The government of Zimbabwe hereby submits the Enhancement and Non-Detriment Findings (NDF) for the African Lion (*Panthera leo*) in Zimbabwe. The NDF submission is in line with our obligations under article III and IV of the Convention on International Trade in Endangered Wild Flora and Fauna (CITES) which state that any import or export of a species/ specimen from a species under Appendix 11 shall only be granted when the Scientific Authorities involved have advised that the import/export will not be detrimental to the survival of the species. Zimbabwe subscribes to the precautionary principle of sustainability in the management and conservation of our lion population and application of practically effective environmental stewardship ethics for the benefit of our local communities and species survival, rooted on sound ecological principles and science.

We hope the Scientific Authority of the United States of America will find this document useful for reference in executing its functions in line with the requirements of CITES and any other applicable instruments in the Homeland. Kindly find attached **document on Zimbabwe's Enhancement and Non-Detriment Findings for *Panthera leo***

With regards,

G. Matipano
ACTING DIRECTOR GENERAL

Board of Directors: Mr.T.E.Mundangepfupfu (Chairman), Mrs.I.E.Mupamhanga (Vice chairperson), Mr.W.Mutinhima, Mr.C.Mudenda, Mr.N.Mutsvangwa, Mr.I.D.Kunene, Dr.H.Rukato, Mrs.D.Mabika, Mr.E.Chidziya(Ex Officio)

Republic of Zimbabwe

Enhancement and Non-Detrimental Findings for

Panthera leo in Zimbabwe

Zimbabwe Parks and Wildlife Management Authority



October 2016

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1 INTRODUCTION

The United States Fish and Wildlife Service (USFWLS) made a ruling in terms of its Endangered Species Act of 1973 (ESA) that the status of the southern and eastern African lion subspecies (*Panthera leo melanochaita*) is threatened (see http://www.regulations.gov). This ruling, which came into effect on January 22, 2016, now requires that the importation of all trophy lion from Zimbabwe will require an import permit. The decision whether to issue an import permit will in future be based on a Non-Detrimental Finding (NDF) that takes into consideration four main factors outlined under 50 CFR 17.22 and 17.32. These are:

- What direct and indirect impacts would occur on the wild population?
- Would issuing a permit conflict with any known programs intended to conserve the species?
- Would the purposes of the permit reduce the threat of extinction facing the species?
- What are the opinions of experts?

In addition to these factors USFWLS will also take into consideration the IUCN Species Survival Commission (SSC) *Guiding Principles on Trophy Hunting as a Tool for Creating Conservation Incentives, Ver. 1.0* (IUCN/SSC 2012). This document identifies five guiding principles of a hunting program that creates "*incentives for the conservation of species and their habitats and for the equitable sharing of the benefits of use of natural resources*" and recognizes that trophy hunting can contribute to biodiversity conservation and the conservation of the hunted species.

These are:

- **Biological sustainability** i.e. the hunting program:
    - Cannot contribute to the long-term decline of the hunted species
    - It should not alter natural selection and ecological function of the hunted species or any other species that share the habitat
    - It should not inadvertently facilitate poaching or illegal trade in wildlife by acting as a cover for such illegal activities
    - It should also not manipulate the ecosystem or its component elements in a way that alters the native biodiversity.

- **Net Conservation Benefit** i.e. the biologically sustainable hunting program should be:
    - Based on laws, regulations, and scientifically based quotas, established with local input, that are transparent and periodically reviewed
    - It should produce income, employment, and other benefits to create incentives for reducing the pressure on the target species
    - It should create benefits for local residents to co-exist with the target species and other species

- **Socio-Economic-Cultural Benefit** i.e. a well-managed hunting program can serve as a conservation tool when:
    - It respects the local cultural values and practices
    - It involves and benefits residents in an equitable manner
    - It adopts business practices that promote long-term economic sustainability

- **Adaptive Management: Planning, Monitoring, and Reporting** i.e. can the hunting programme enhance the species when it is based on appropriate resource assessments and monitoring (e.g., population counts, trend data), upon which specific science-based quotas can be established. Resource assessments should be objective, well documented, and use

the best science available. Adaptive management of quotas, based on the results of resource assessments and monitoring, is essential

- **Accountable and Effective Governance** i.e. a biologically sustainable trophy-hunting program should be subject to a governance structure that clearly allocates management responsibilities. The program should account for revenues in a transparent manner and distribute net revenues to conservation and community beneficiaries, and take steps when needed to eliminate corruption and ensure compliance with national and international requirements and regulations.

To address the points raised above, a systematic review of the status of lion in Zimbabwe has been undertaken with the full cooperation of stakeholders from the Government, Private Hunting Sector, Community NGOs and research organisations to demonstrate that the lion populations in Zimbabwe are being managed sustainably for benefit of both the conservation of the species and that the management programme is also providing economic incentives for local communities to protect and expand lion habitats. In doing so this assessment addresses the following issues:

- That the Zimbabwe hunting industry is based on sound scientific information and identifies mechanisms that would arrest the loss of habitat or increase available habitat (where feasible) and ensuring adequate protection from human encroachment.
- Demonstrate that there are government incentives in place to encourage habitat protection by private landowners and communities and incentives to local communities to reduce human-wildlife conflicts.
- Demonstrate that hunting concessions are managed to ensure the long-term survival of the listed species and its habitat.
- That trophy hunting provides financial assistance to the Zimbabwe Parks and Wildlife Management Authority, including the communal CAMPFIRE programme and private sector, to carry out various wildlife management programmes. It will also highlight how local communities directly and indirectly benefit from the presence of lion in their areas.
- Finally, this document will demonstrate how the participation of U.S. hunters in the Zimbabwe hunting industry contribute to the overall management of lion within the country.

2 Status and Distribution of Lion in Zimbabwe

Bauer et al (2015) summarise time series data for 47 lion populations across West, Central, East and Southern Africa where regular survey data are available. Using a Bayesian state space model to estimate growth rate-λ for each population, this study concludes that lion populations are declining everywhere across Africa, except in four southern countries (Botswana, Namibia, South Africa, and Zimbabwe). The population models indicate a 67% chance that lions in West and Central Africa will decline by one half, while estimating a 37% chance that lions in East Africa will also decline by one-half over two decades. It is concluded that almost all lion populations that historically exceeded ~500 individuals are declining, *but lion conservation is successful in southern Africa, in part because of the proliferation of reintroduced lions in small, fenced, intensively managed, and funded reserves.* This statement reflects the situation in Zimbabwe where lion populations in the conservancies have flourished under sound management regimes. They have also recovered rapidly in instances where appropriate actions have been taken to arrest unsustainable practices (i.e. Hwange) and where protected areas are receiving adequate funding (i.e. Gonarezhou).

2.1 The extent of lion distribution in Zimbabwe

The Zimbabwe Parks and Wildlife Management Authority (ZPWMA) is responsible for managing one of the largest estates in the country which constitutes approximately 5 million hectares of land or 13%

of the Zimbabwe's total land area (see Table 1 below). The bulk of Zimbabwe's wildlife occurs within the Parks Estate which includes 11 national parks, 16 safari areas, 16 recreational parks, 6 sanctuaries, 12 botanical reserves and 3 botanical gardens, all spread across the country, among other wildlife tourism related activities (Parks and Wildlife Act 2001 Chapter 20:14).

Wildlife populations also occur on the state Forest Areas, Communal CAMPFIRE areas and private conservancies dedicated to wildlife-based land use (Figure 1). Table 1 below provides a summary of these different categories, and whether they support lion populations (see Annex 1 for the details of each area).

Table 1. Summary of the National Parks Estate, CAMPFIRE, Forestry and Conservancies where lion populations are resident

Land Category		**Presence of Lion**				**Total (ha)**	**Total (km^2)**
		Yes (ha)	**%**	**No (Ha)**	**Migratory (Ha)**		
Parks Estate	National Parks	2,608,710	96	61,850	47,150	2,717,710	27,177
	Safari Area	1,745,300	92	146,600	-	1,891,900	18,919
	Botanical gardens	-	-	2,069	-	2,069	21
	Sanctuary	-	-	18,980	-	18,980	190
	Recreational	-	-	357,161	-	357,161	3,572
Forestry		436,165	47	491,701	-	927,866	9,279
CAMPFIRE		8,953,700	36	5,435,100	10,319,000	24,707,800	247,078
Private Conservancies		758,200	66	243,500	150,897	1,152,597	11,526
Matetsi Farms		-	-	-	155,627	155,627	1,556
Total Ha		**14,502,075**		**6,756,961**	**10,672,674**	**31,931,710**	**319,317**
Total km^2		**145,021**		**67,570**	**106,727**	**319,317**	
Percentage		**45%**		**21%**	**33%**		

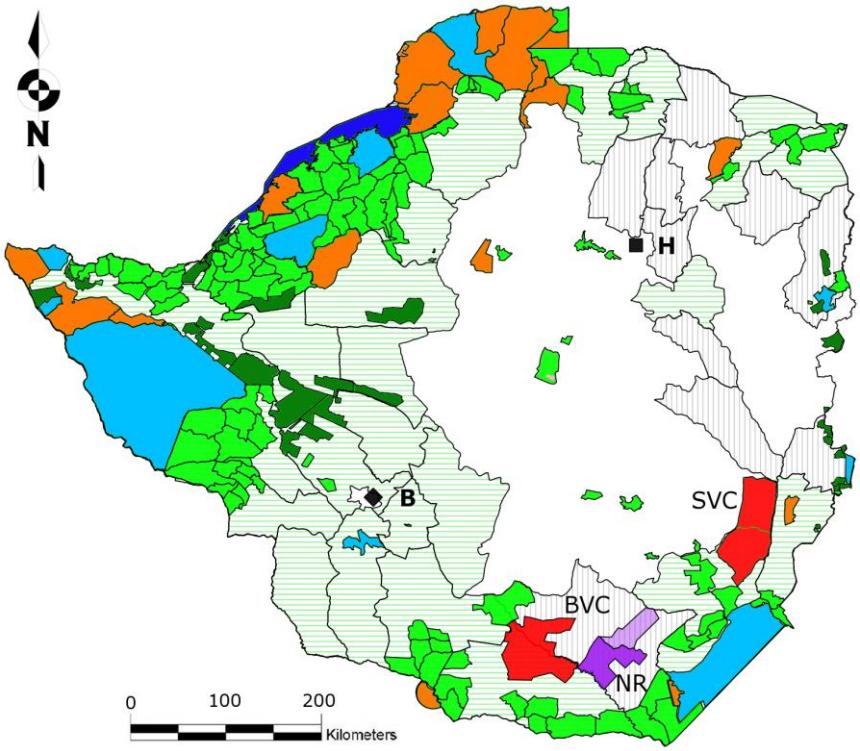


Figure 1: Map of Zimbabwe's main wildlife areas: [i] National Parks are represented in light blue; [ii] Safari areas are represented in orange; [iii] Forestry areas are represented in dark green; [iv] Community and Private wildlife areas are represented in light green; [v] Communal Land (CAMPFIRE Areas) in which sport-hunting may occur is represented by light green horizontal stripes; [vi] Communal Land in which sport-hunting does not occur is represented by grey vertical stripes. [vii] The Bubye Valley [BVC] and Savé Valley [SVC] Conservancies are represented in red. [viii] The Nuanetsi Ranch [NR] on which sport-hunting takes place is represented in dark purple (light purple represents the Nuanetsi Ranch cattle area); [ix] Lake Kariba is represented in dark blue. Harare (the capital city) is represented by a black square and letter '**H**'. Bulawayo is represented by a black diamond and letter '**B**'. Sport-hunting may occur in areas: ii, iii, iv, v, vii & viii (from du Preez, B. Groom, R., Mufute, O., Mandisodza-Chikerema, R. and Booth, V. (2016).

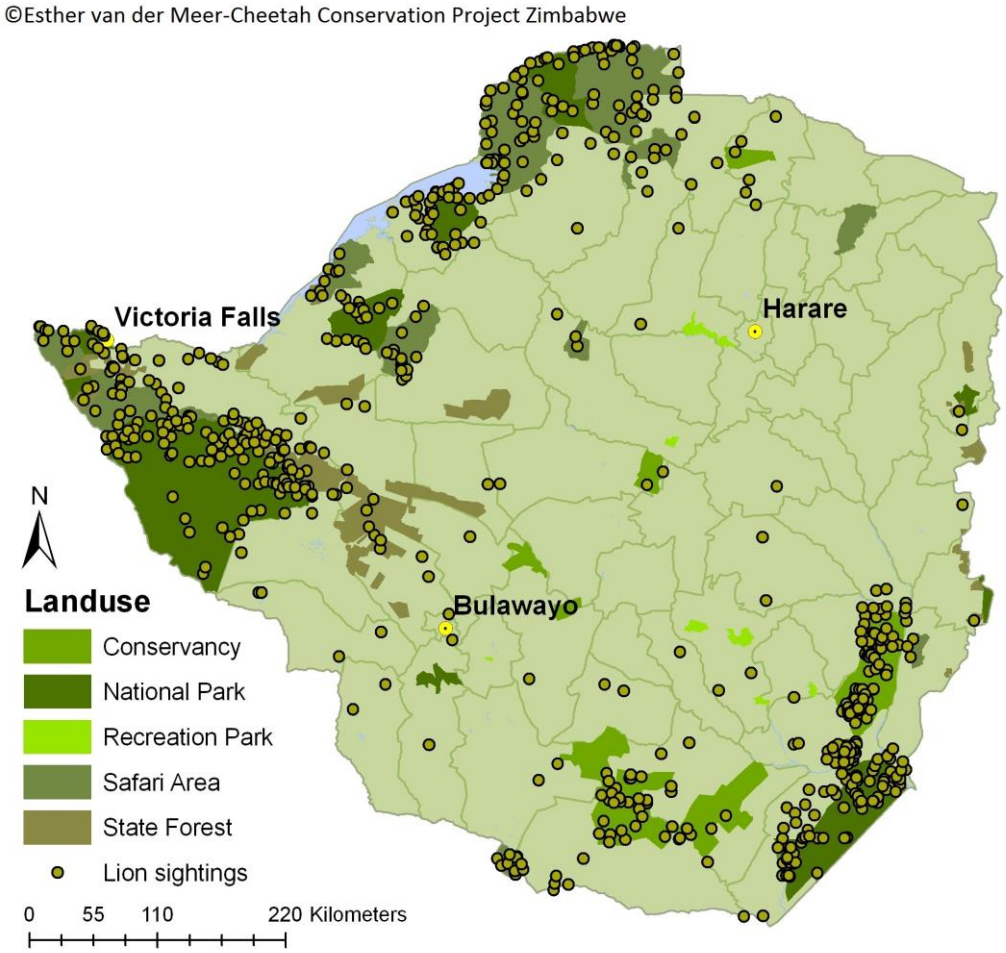


Figure 2: Range of African Lion Distribution in Zimbabwe

There are approximately 319,317 km^2 of land where some form of wildlife based land use is practiced in Zimbabwe. Lion occur permanently in 45% of this available range (c. 145,00km^2), with the majority occurring in State protected national parks (96%) and safari areas (92%). Lion also occur permanently in 47% of the State forest areas and 66% of privately owned Conservancies. The CAMPFIRE areas comprise approximately 247,000km^2 and lion occur in 36% of these areas. Lion are transient in CAMPFIRE, Conservancy and resettled areas adjacent to the major protected areas, and move across the border into Zambia, Mozambique, South Africa and Botswana (Figure 2).

There are two established Transfrontier Conservation Areas (TFCAs), the Great Limpopo Transfrontier Park (GLTP) which includes Gonarezhou National Park, and the Limpopo/Shashe TFCA. Other TFCAs that are at various stages of development are the Kavango-Zambezi (KAZA), Lower Zambezi-Mana Pools, Zimbabwe-Mozambique-Zambia (ZiMoZa) and Chimanimani.

2.2 Minimum population of lion in Zimbabwe

The minimum number lion that occur in approximately 51,642km^2 of land where reliable survey data are available is estimated to be c.1,917 (range 1,800 – 2,000) and is summarised in Table 2. The Western sector of the country dominated by Hwange National Park and the surrounding safari areas, forest areas, communal areas and private conservancies supports c.737 lion (or 38% of the overall population). The Southern sector dominated by the two major conservancies (Save and Bubye) and

Gonarezhou National Park supports c. 896 lions (48%) while the Central and Northern sectors of the country support c.284 lions (15%).

Table 2: Estimated minimum population of Wild Lion populations in Zimbabwe – September 2016 (Data compiled from a variety of reports)

REGION	AREA	AREA (km^2)	Estimated Number of Lions	Percentage
Western	Hwange NP	14,900	559	38%
	Matetsi Units 1-5	1,934	59	
	Matetsi Units 6-7 and Zambezi NP	1,585	67	
	Kazuma Pan NP	313	20	
	Kazuma Forest	240		
	Panda Masuie Forest	355		
	Matetsi ECA	1,556	15	
	Ngamo and Sikumi Forest	1,386	6	
	Gwaai Conservancy	927	22	
	Hwange Communal Land	392	2	
	Tsholotsho buffer adjacent HNP	1,275	7	
Subtotal		**24,863**	**737**	
Central	Chizarira NP	1,948	31	4%
	Chirisa SA	1,713		
	Omay	1,865	10	
	Matusadona NP	1,427	31	
Subtotal		**6,953**	**72**	
Northern	Chewore North and South	1,648	45	11%
	Dande	1,155	21	
	Hurungwe (Nyakasanga and Rifa)	1,709	32	
	Charara/Mukuti	1,692	20	
	Mana Pools	1,287	94	
Subtotal		**7,491**	**212**	
Southern	Gonarezhou National Park	5,053	125	48%
	Malilangwe	400	37	
	Bubye Valley Conservancy	3,440	450	
	Save	3,442	284	
Subtotal		**12,335**	**896**	
Overall Total		**51,642**	**1,917**	

2.2.1 Captive Breeding Facilities

Currently there are only two properties registered as captive lion breeders (Lion and Cheetah Park, and Antelope Park) and < 10 non-registered captive lion breeding operations (Table 3). Most of these centres keep lions for non-consumptive tourism and environmental education purposes with only a few keeping lions as pets. Altogether there are 345 lions held in captivity.

Table 3: Record of lions held in captivity – September 2016

Property	TOTAL
Doddieburn	13
Lion & Cheetah Park	40
Sentinel	2
Vhuka	5
Antelope Park	114
Safari Par, Masuwi Lodge (Lion Encounter)	4
Mhondoro Game Park	2
Chedgelow Farm	9
Chengeta	5
Turk Mine	6
Bally Vaughan	8
Mwanga Lodge	8
Masvingo	17
Karoi	2
Oscro	10
Simply Wild	19
Sondelani	9
Ruwazi	7
Imire	2
Makado Ranch	2
Chipangali	32
Crocodile Farm, Victoria Falls	1
Kuimba Shiri	2
Pamuzinda	6
Shearwater	10
Inyathi Ecogame Park	10
Total	**345**

3 Conservation and Management

3.1 Policy And Legislation

The Ministry of Environment, Water and Climate has a comprehensive suite of policies and legislation that provides the Zimbabwe Parks and Wildlife Management Authority (ZPWMA) with a mandate to conserve and protect all fauna and flora in the country.

The legal framework is enshrined in the National Legislation and associated Regulations that are informed by the Wildlife Policy (1992) that seeks to maintain a protected area network for the conservation of the nation's wild resources and biological diversity. Amongst others it seeks to create

economic activity to enhance rural development and encourages the conservation of wild animals and their habitats outside the protected areas.

The ZPWMA is established by the Parks and Wildlife Act of 1996 (Chapter 20:14) as amended by Act Number 19 of 2001 which came into operation on the 1st of June 2002 through a Statutory Instrument 144C of 2002. The Act provides for the:

- Establishment of a Parks and Wildlife Board;
- Confers functions and imposes duties on the Board;
- Establishment of national parks, botanical reserves, botanical gardens, sanctuaries, safari areas and recreational parks;
- The preservation, conservation, propagation or control of wildlife, fish, and plants of Zimbabwe and the protection of her natural landscape and scenery;
- Conferment of privileges on owners and occupiers of alienated land as custodians of wildlife, fish and plants;
- Giving of certain powers to environment committees (formerly intensive conservation area committees); and matters incidental to or connected with the foregoing.

The Act that was originally passed by Parliament in 1975 was unique in that it provided a legal basis for the devolution of Authority to private landowners over all wildlife on their land which resulted in in the rapid development of the country's wild life industry. It also paved the way for the partial extension of this principle to the Communal Lands through the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) in the 1980s that granted Appropriate Authority Status to the communal areas to manage the wildlife resources for their own benefit.

The Act was subsequently revised in 1996 and 2001 with the latest revision paving the way for the establishment of the current Parks and Wild Life Management Authority to replace the former Department of National Parks and Wild Life Management.

The legal and regulation framework applicable to the conservation and protection of lion and all other species includes:

- Parks and Wildlife Act; Chapter 20:14 (1996) as amended in 2001.
- Environmental Management Act; Chapter 20:27.
- Forest Act; Chapter 19:05.
- Statutory Instrument 362 of 1990: Parks and Wildlife (General) Regulations, 1990.
- Statutory Instrument 76 of 1998: Import and Export of Wildlife Products.
- Statutory Instrument 40 of 1994: Parks and Wildlife Act (General) Amendments.
- Statutory Instrument 26 of 1998: Parks & Wildlife Act (General) Amendment.
- Statutory Instrument 92 of 2009: Compensation Values for Wildlife.
- Statutory Instrument 93 of 2009: Compensation Values for Trapping of Animals.
- Trapping of Animals Control Act 20.16.

A summary overview of these instruments is provided in Annex II.

3.2 The Zimbabwe Parks and Wildlife Management Authority

The Parks and Wildlife Management Authority is mandated by the Parks and Wildlife Act [Chapter 20:14] with the responsibility of conserving Zimbabwe's wildlife heritage through effective, efficient and sustainable protection and utilisation of natural resources for the benefit of present and future generations. The Authority was established to allow it to retain the revenue that it generates for

funding its operations and thereby reducing its dependence on Treasury. This entailed introducing a commercial dispensation and putting in place effective revenue generation and financial management systems.

The ZPWMA has the mandate to manage the entire wildlife population of Zimbabwe, whether on state, private and communal land. Vision, mission and core values of ZPWMA are as follows:

Vision: *To be the world leader in sustainable conservation*.

Mission: *To conserve Zimbabwe's wildlife heritage through effective, efficient and sustainable utilisation of natural resources for the benefit of present and future generations and stakeholders*

Core Values: Teamwork, Commitment, Transparency, Professionalism, Integrity, Accountability, Fairness, in harmony with nature.

While private landowners may utilise the wildlife on their land, they are still accountable to the ZPWMA for the welfare of the wildlife in terms of Statutory Instrument 26 of 1998, which, among other things, states that "*No person shall permit any person who is not ordinarily resident in Zimbabwe to hunt on any land for which he is the appropriate authority any animals other than those entered on the authority to hunt…*'

3.3 Conservation Strategy and Action Plan for Lion

A *Conservation Strategy and Action Plan for the Lion (Panthera leo) in Zimbabwe* was prepared in 2006 by the ZPWMA, local and international NGOs. This was in response to the proposal submitted by Kenya at the 13th Conference of the Parties to the Convention on International Trade in Endangered Species of Flora and Fauna (CITES) calling for the transfer of the lion population from Appendix II to Appendix I. The Parties recommended a detailed examination of the issues surrounding the conservation of the African lion, through a series of regional workshops.

IUCN responded to this and together with other key stakeholders, organised the first workshop in 2005 which involved the 14 West and Central African lion range states. The second workshop brought together 15 lion range states from Eastern and Southern African in January 2006 (Bauer, Chardonnet and Nowell, 2005). Each workshop included the Directors of Wildlife Conservation Departments and their technical advisors, safari operators, community leaders, non-governmental organisations involved in conservation, as well as researchers on the African lion.

The workshops came up with several recommendations which included:

- The need for African lion range States to follow up the workshops by developing and implementing national lion management plans.
- The need for a Pan African Conservation strategy to form the basis of a region wide collaboration in the conservation of the lion and which would also form the basis for the management of other wildlife species on regional scale.

Responding to the first recommendation, the ZPWMA, together with IUCN, convened a workshop in November 2006 to develop a national lion conservation strategy and action plan for Zimbabwe attended by conservation NGOs, the private sector, and Rural District Councils (RDCs), as well as ZPWMA and IUCN (Conservation Strategy and Action plan for the Lion (*Panthera leo*) In Zimbabwe, 2006).

The deliberations of this workshop identified the following issues related to lion conservation in Zimbabwe:

- Management and research including technical advice, policy formulation and management interventions
- Capacity needs as reflected by adequate human, financial and material resources
- Mitigation of human-wildlife conflict
- Socio-economic costs and benefits of long-term lion conservation
- Communication and information dissemination for key decision makers at different levels
- Framework for captive breeding of lions
- Trade and regulations to ensure non-detriment findings related to trade in all lion related products
- Regional collaboration to strengthen bilateral and regional lion conservation strategies

The analysis of these issues led to the formulation of the conservation strategy whose vision is that *Lions (*are*) conserved and managed sustainably for their aesthetic, cultural and ecological values, and the socio-economic development of Zimbabwe*. The immediate objective of this strategy is *to secure and where possible, restore as many viable lion populations as possible in Zimbabwe whilst mitigating their negative impacts and enhancing their value for the benefit of people through sustainable use*.

Three broad targets were identified to achieve this objective:

1. Ensure the persistence of key lion populations and other important populations including those of doubtful viability;
2. Human and livestock loss reduced, and
3. Optimize wildlife conservation-related net benefits to local communities

Table 4 summaries the progress with achieving the results identified in the strategy:

Table 4: Summary of implementation progress of the 2006 lion conservation strategy.

Output 1. Lion Management - Lion populations, their habitats and wild prey effectively conserved and managed in collaboration with local stakeholders	
Target 1.1 Establish a baseline survey and monitoring programme for identified lion populations and their range inside and outside the Parks & Wildlife Estate	Baseline surveys have been completed for the Parks Estate using monitoring protocols for key variables (populations, habitats, prey). Selected surveys undertaken of areas outside National Parks in conservancies and some communal land and forest areas.
Target 1.2 Maintain and strengthen capacity for lion conservation, management, monitoring and research within PWMA and amongst other key stakeholders	Carnivore research programmes undertaken by NGOs (Mana, Matusadona, Gonarezhou, Zambezi and Hwange NPs, Matetsi, Chirisa SA) and research institutions (Bubye and Save Conservancies) in various parts of the country. Personnel trained in data collection and capture, management, lion aging and analysis.
Target 1.3 Identify and implement best management standards and practice for all trophy hunted lion populations, ensuring their viability and sustainable, equitable and adaptively managed trophy quotas	Quota setting methodology reviewed and annual quotas and offtakes analysed considering population changes, trophy quality and levels of PAC over time. Trophy hunting database in place and in process of being refined to provide cost-effective system for collation, entry, analysis, reporting and feedback to key stakeholders in the wildlife industry (ZPWMA, RDCs, SOAZ, ZPHGA, conservation NGOs, Researchers etc.). System of fixed and optional quotas reviewed and age-based criteria for male trophy animals in place and functioning.
Target 1.4 Develop and implement a national lion captive breeding management policy	Policy in place (see discussion below).
Target 1.5 Develop and implement co-management frameworks for wildlife management	Collaborative national lion action plans to co-management lion populations in place for NW Matabeleland and SE Lowveld, including three conservancies (Bubye Valley, Save and Malilangwe).
Target 1.6 The geographic distribution range of the lion population expanded	Conservancies and neighbouring communities are working together to maintain existing geographic distribution of lion populations. Zimbabwe proactive in the KAZA and GLTFCA programmes.
Output 2. Lion Research - Information for effective and adaptive lion conservation management generated	
Target 2.1 Initiate targeted research on lion ecology, management and mitigation of conflict	Extensive research programmes focussing on lion ecology and biology undertaken in Hwange, Bubye, Save, Malilangwe, Matusadona, Chizarira and Chirisa. ZPWMA have cooperated with NGOs, such as Panthera, to develop cost-effective age determination methods for lions. Key threats to lion populations, with focus on human-lion conflict, snaring and poisoning, undertaken and continually monitored.
Output 3. Mitigation - Human-lion related conflicts minimized and, where possible, eliminated	

Target 3.1 Develop and establish databases on lion/human conflict	Data on Problem Animal Control (PAC) reports on lion related problems collated.
Target 3.2 Identify and implement methods to reduce and mitigate livestock losses and lion attacks on humans	Approaches to mitigate livestock losses and lion attacks on humans being tested and implemented in Hwange. Methods to mitigate lion attacks on livestock being implemented as appropriate at selected sites (e.g. Tsholotsho).
Target 3.3 Trained and properly staffed PAC Units established to conduct rapid response, restrained and precisely targeted problem animal control	PAC Units at ZPWMA field station and/or RDC levels partially established.
Target 3.4 Incidents of human-lion conflict reduced by at least 30% in 5 years while also reducing retaliatory killing	Specific awareness and education package on lion conservation and management developed and implemented in Matusadona, Hwange and Gonarezhou regions.
Output 4. Socio- Economic - The costs and benefits of long-term lion management equitably distributed	
Target 4.1 Complete an inventory of stakeholders directly affected by lion conservation	Stakeholder groups (e.g. local communities, CAMPFIRE RDC representatives, commercial safari hunting operators (SOAZ, ZPHGA), tourism operators (ZATSO) identified. Financial impacts of lion conservation and extent and magnitude of socio-economic impacts on each stakeholder group completed.
Target 4.2 Deliver appropriate training and capacity building to prioritised stakeholders	Representative stakeholder groups in some regions identified (Hwange, Matusadona, Gonarezhou). Limited training undertaken. Implement adaptive programme across four wildlife regions
Target 4.3 Agree and implement collaboratively developed area-specific lion management plans with identified stakeholder groups in each wildlife region within 5 years	In progress. Hwange NP Management Plan approved.
Target 4.4 Implement transparent mechanisms to equitably distribute lion-related/generated income to identified stakeholders (groups and/or communities)	Scale of income generated from lion conservation reviewed and use of funds to encourage protection of lion populations reach local stakeholders undertaken (see CAMPFIRE generated revenues)
Output 5. Regulations - Effective regulation of consumptive lion utilisation ensured	
Target 5.1 Implement approved policy and practice at national and local levels regarding problem animal control (PAC) of lions within 2 years	Current policy and practice regarding problem animal control of lion reviewed, at national and local levels. PAC offtakes reconciled with trophy hunting quota offtake to ensure that the overall offtake (i.e. total quota) is sustainable.
Output 6. Communication, Awareness and Information Dissemination	

Target 6.1 To carry out awareness programmes in 50% of the districts in Zimbabwe within the next three 3 years	Awareness programmes initiated at a national level, with professional hunters, communities and NGO community. Awareness campaigns being carried out by the Extension and Interpretation Unit in all the regions.
Target 6.2 Create lion conservation and management information units within one year	Databases established at some key research centres using dedicated external research programmes (e.g. WILDCRU).
Output 7. Regional and Trans-Boundary Collaboration	
Target 7.1 Undertake an inventory of national strategies for lion management	Done.
Target 7.2 Encourage the development of national lion conservation strategies where these are missing &/ or incomplete	National lion conservation strategies discussed at AWCF (meeting held under auspices of KAZA).
Target 7.3 Develop an integrated and harmonised lion management strategy for Transfrontier Conservation Areas (TFCAs)	Lion conservation strategies for SADC discussed at AWCF meeting held under auspices of KAZA.
Target 7.4 Implement lion conservation strategy and management plan	Strategy under review.

3.3.1 National Lion Captive Breeding Policy

A target of the Conservation Strategy and Action Plan for the Lion in Zimbabwe was to develop and implement a National Lion Captive Breeding Management Policy. This was achieved in 2011 when the ZPWMA met with lion breeders, keepers and animal welfare organizations to define the purpose of breeding and keeping lions; identify and discuss issues related to breeding and keeping of lions in captivity and to chart the way forward on the breeding and keeping of lions in captivity.

The objectives of the policy are to provide a national approach and minimum standards to all aspects relating to the management of captive bred lions including the role of captive bred lions upon reaching maturity and regulate the import and export of captive bred lions. The policy also defines the measures to protect the genetic integrity of indigenous lion populations. The use and welfare of captive bred lions is monitored by a captive lion inspection team.

In terms of this policy, lions that are kept in captivity for species conservation and commercial purposes are subject to the following conditions:

1. No permit for the keeping of lions in captivity will be issued before the facility has been inspected and approved by ZPWMA as a Captive Lion Holding Facility.
2. Lions may not be allowed to breed in captivity unless the holding facility is registered as a Captive Lion Breeding Centre. If a breeding permit is not issued, it is the responsibility of the owner to ensure that the animals do not breed. If breeding occurs without a permit the owner will be fined and the animals are subject to confiscation and possible destruction by ZPWMA.
3. Lions may not be captured from the wild population and kept in captivity unless the animal is orphaned or injured and is captured with the purpose of rehabilitating the animal and returning it to the wild within as short a time as possible.
4. Captive bred lions may not be released into the wild or transferred from the facility without prior permission from ZPWMA, and are subject to an approved release plan.

No lion can be transported without the necessary internal and national permits and without being micro-chipped, and all transportation of live animals must comply with CITES Resolution Conf. 10.21(Rev. CoP 14). To safeguard the integrity of the indigenous gene pool, no import permits will be issued for non-indigenous lions. Any lion that are to be transported must be issued a certificate of health by a competent veterinarian confirming that the premises of origin has been free from anthrax, panleukopenia and canine distemper for six months, and that each predator is free from diseases such as FIV, BTB or any other disease which may threaten local populations. The animal should also have been vaccinated for rabies and treated with a broad spectrum de-wormer and acaricide.

It is an offence to export lions from Zimbabwe without a ZPWMA export permit, and all export permit will only be considered if the exporting facility holds a current permit to keep captive lions. Moreover, an export permit will only be issued if the importing facility, in the country of import, conforms to regulations laid out in this policy document.

4 Population Trend Data For Key Lion Populations In Zimbabwe

Zimbabwe has in recent years taken proactive actions to enhance the conservation of lion populations both inside and outside the protected areas. These have included implementing moratoriums on hunting, reducing quotas, implementing an age-based hunting regulation and undertaking independent monitoring programmes conducted by international research institutions. Emerging from this is evidence that by implementing appropriate regulatory, management and monitoring actions, coupled with raising awareness, the lion populations respond rapidly and recover to near

former levels. The section below summarises the data from key range areas both inside and outside the National Parks Estate to substantiate this.

4.1 LION SURVEY TECHNIQUES

The population estimates of lions in Zimbabwe are determined through carnivore spoor surveys, systematic lion collaring and call-up surveys. With the strategy to maintain the wilderness values of most protected areas, there is low road penetration in the parks estates, however all suitable roads are used as transects, and in areas of suitable substrate, spoor surveys have shown to be an effective and efficient means to assess wildlife densities (Stander 1998, Fuston et al. 2001, Davidson and Romanach 2007). Patrol reports, field observations by ZPWMA rangers and other sightings by tour operators and tourists also contribute to the knowledge of the status of lions in Zimbabwe's protected areas. Similarly, the occurrence of lion in Safari Areas is recorded by resident safari operators, including those operating in CAMPFIRE areas.

4.2 RESULTS OF REGIONAL LION SURVEYS

Lion population surveys provide indices of abundance that can be used to determine spatial distribution, as well as temporal trends in population numbers. The results of the different survey methods are used to generate information for setting sustainable lion trophy hunting quotas and for population management.

4.2.1 Gonarezhou National Park

Spoor count surveys of the Gonarezhou National Park have been conducted since 2009 using the same methodology to obtain direct estimates of lion populations to compared actual lion densities with potential density estimates (Groom, 2009, Groom et. al. 2014). Table 5 below illustrates the growth of the lion population in the Park (Groom and Watermeyer, 2015).

Table 5: Population estimates of lion in the whole of Gonarezhou National Park (extrapolated from survey area) from 2009 – 2015 (Groom and Watermeyer, 2015).

2009	2010	2011	2012	2013	2014	2015
31	45	72	64	77	116	125

As with many lion populations anthropogenic factors can be key drivers of lion population dynamics, and in areas with high human impact lion numbers may be significantly lower than those predicted by prey biomass models. This was found to be the case in the Gonarezhou National Park. Groom et. al. (2014) concluded that high hunting quotas either within or around the protected area were the most likely cause of the low lion numbers, with quotas in some areas being as high as seven lions per 1,000km^2 in some years. Other factors included persecution, poisoning and problem animal control, as well as disease and competition with spotted hyaenas (*Crocuta crocuta*).

Following decisions to halt lion hunting, and reducing human-lion conflict, the lion population responded and steadily increased, reaching a density of 2.5 lions / 100km^2 in 2014 (as compared with 0.6 / 100km^2 in 2009). Relative to other populations (average over Kruger NP, Hwange NP, Selous GR and Serengeti NP = 9.6 lions / 100km^2) this is still low, suggesting the population could continue to increase further. Groom et. al. (2015) conclude that the lack of artificial water in Gonarezhou means that natural carrying capacity will be lower but based on prey biomass availability predictions of lion carrying capacity could support between 200 and 300 lions (Groom 2010). It is therefore still possible that the lion population in the park could at least double before reaching carrying capacity (especially because prey biomass is now greater than it was in 2010 – see Section 8.5 below).

4.2.2 Save Valley Conservancy

The African Wildlife Conservation Fund carries out an annual large carnivore spoor survey to assess population trends of the carnivores in the Savé Valley Conservancy (SVC) to aid management decisions. A standardised methodology is used to ensure consistency through time and comparability with other studies. Since 2008, the spoor surveys have been done using the same roads and the same observer. The results of these surveys are provided in Table 6 showing that the lion population has increased from 40 in 2005 to 284 in 2015 (Groom and Watermeyer, 2015, du Preez et al, 2016).

Table 6: Population estimates of lion in the whole of Savé Valley Conservancy from 2005 – 2015

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
40	50	52	76	114	143	105	130	115	182	284

The lion population has increased substantially in the last two years, and there are now an estimated 284 lions in the whole of the conservancy. This is a notable increase since the 2013 estimate of 115 lions and 2014 estimate of 182, and is perhaps a latent effect of no hunting for over several years. Of the 149 lion tracks encountered, 28% were big adult males with 53% identified as females/juveniles and 15% as young cubs (3% of tracks were unidentified). The number of lions in SVC equates to a density of 11.7 lions/100km². This is slightly higher than other population estimates of 9.6 lions/100km² (average over Kruger, Hwange, Selous and Serengeti).

4.2.3 Bubiana Valley Conservancy

After originally being eradicated by cattle ranchers in the area, 13 lions were reintroduced to the Bubye Valley Conservancy in 1999, and four young males broke into the Conservancy that same year. From the original 17 animals present in 1999, the Bubye Valley Conservancy lion population was estimated at approximately 280 individuals in 2009 when robust population surveys were initiated by a team from the University of Oxford Wildlife Conservation Research Unit (WildCRU), and this population has continued to grow. Today it is estimated that there are over 500 lions on the Bubye Valley Conservancy (Figure 3, du Preez et. al., 2016).

The exponentially increasing Bubye Valley Conservancy lion population currently exists at one of the highest densities in Africa (~0.190 lions/km^2: du Preez et al. 2015, du Preez et al. 2016), greater than that of the Serengeti, Tanzania (0.10 lions/km^2), Selous, Tanzania (0.080 – 0.130 lions/km^2: Creel and Creel 1997), Kruger National Park, South Africa (0.096 – 0.112 lions/km^2: Mills et. al. 1995), and Hwange National Park, Zimbabwe (0.027 lions/km^2: Loveridge et. al. 2007). This equates to the largest contiguous lion population in Zimbabwe.

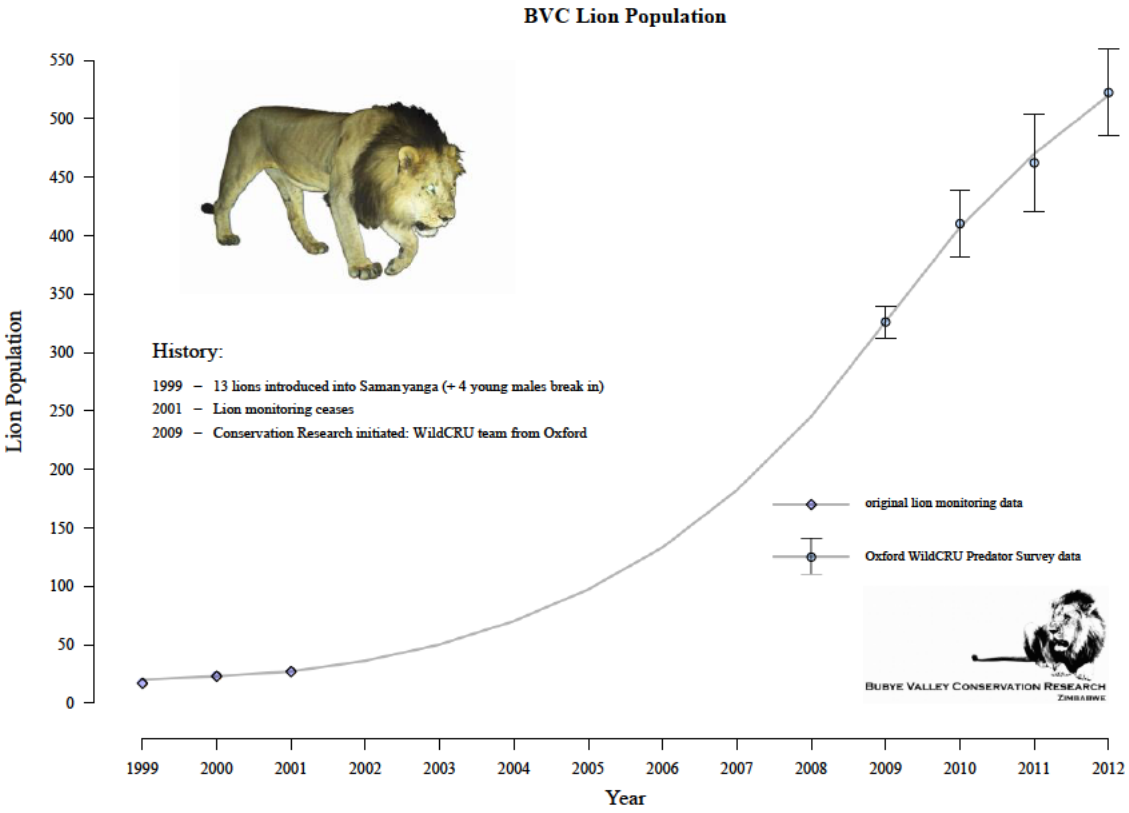


Figure 3: The Bubye Valley Conservancy lion population has increased exponentially since the original reintroduction of the species to the conservancy in 1999.

4.2.4 Mana Pools National Park

In conjunction with ZPWMA, Zambezi Society and the Cheetah Conservation Project, the Wildlife Conservation Research Unit (WILDCRU) based in Oxford (U.K.) conducted a camera trap and spoor count survey of Mana Pools National Park with the objective of:

- To undertake park wide surveys to estimate population density, distribution and habitat occupancy of common predator species in Mana Pools National Park.
- To contribute to Cheetah Conservation Project Zimbabwe's (CCPZ) cheetah monitoring protocol.
- To provide presence/absence data on all the larger mammal species.

A Facebook page was also created for the survey that was regularly updated on the progress of the survey (Facebook.com/Mana Pools Survey 2015).

The preliminary results of this survey identified 67 individual lions from the 267 images captured. When combined with the spoor count surveys, the population was estimated at 94 lions at a density of 4.5 lion/km^2 (Seymour-Smith and Loveridge, 2015),

4.2.5 Hwange National Park

The Hwange Lion Research Project undertaken by the Wildlife Conservation Research Unit (WILDCRU, Oxford University) works in association with the Zimbabwe Parks and Wildlife Management Authority. Since 1999 this project has identified over 600 lions and currently monitors approximately 15 prides and 12 male coalitions in a 5,000km^2 study area. This is one of the most intensive and long-term lion

projects in Africa. A key finding of this research programme has been to demonstrate that the way lion trophy hunting is managed can rapidly improve the status of lion populations by implementing a biologically sustainable system of allocating quotas. This project has also increase the understanding of human related impacts on lion populations (and vice-versa) along the park boundary. More recent research is focussed on understanding connectivity between Hwange NP and other areas such as parks in Botswana and in Zimbabwe.

This project was initiated because there was a perception that levels of sport hunting of male lions' in the hunting concessions surrounding the Hwange National Park were having a negative impact on the conservation of the population (Loveridge, et. al. 2007). Data collected between 1999 and 2004 suggest that this was indeed the case and this contributed to a suspension of sport hunting of lions in the area surrounding the Park between 2005 and 2009. This was a crucial shift in management policy for this species and an important step towards sustainable management and conservation of lions. Following the imposition of the hunting moratorium, lion densities increased (Figure 4).

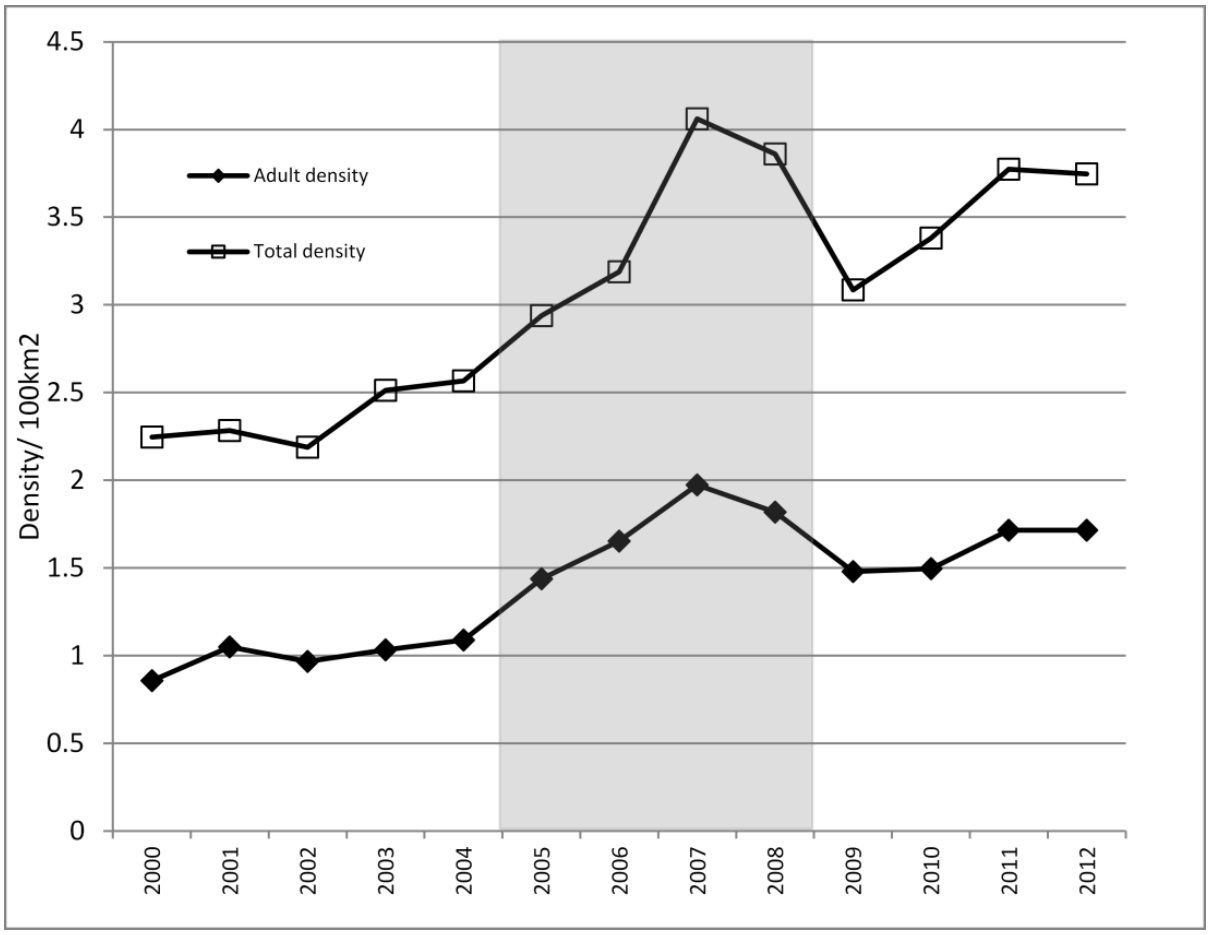


Figure 4: Lion densities in the Hwange area between 2000 and 2012

Following the lifting of the moratorium, and by implementing strict monitoring and hunting guidelines, the overall Hwange lion population has continued to show a positive trend, and is now estimated at over 550 animals.

4.2.6 Zambezi National Park and Units 6 and 7

Victoria Falls Wildlife Trust (VFWT) in collaboration with ZPWMA and the Hwange Lion Research Project has recently completed both spoor count transects and a camera trap surveys in Zambezi National Park, and Units 6 and 7 of the Matetsi Safari Area. The preliminary results of these surveys show that the lion population has increased since 2013 to approximately 67 (Rodger Parry, pers comm.).



Coalition males, Zambezi National Park, June 2016 (*Photo credit: Jessica Dawson, Victoria Falls Wildlife Trust)*

4.2.7 Chizarira National Park and Chirisa/Sengwa Safari Area

A survey was undertaken jointly by the Zimbabwe Parks and Wildlife Management Authority and the African Lion and Environmental Research Trust in September 2015 (Dr Norman Monks pers comm.). The survey area consisted of the 1,910 km^2 Chizarira National Park (a non-hunting area) and the adjoining 1,713 km^2 Chirisa/Sengwa Safari Area (a hunting area). No large carnivore counts using the call-up method had previously been conducted in these contiguous protected areas.

The survey method used the standardized protocol of audio broadcasts of a buffalo calf in distress. Spoor counts were not used for these surveys since previous research had shown that the call-up method was more precise, took less time, and was less costly to complete to achieve accurate results. Up to three stations were sampled nightly commencing just after sunset.

Twelve call-up sites were sampled. Response to the call-up stations by lions was low with only 2 of the 12 stations visited. The population abundance was estimated to be 31.6 (0.872 lion 100/km^2), suggesting a decline of 68.4% since 2004 when estimates of lion numbers were provided to Bauer and van der Merwe, (2004).

5 CONSERVATION IN ZIMBABWE

Zimbabwe Parks and Wildlife Management Authority (ZPWMA) falls under the Ministry of Environment, Water and Climate and it was established under the Parks and Wildlife Act of 1996 (Chapter 20:14) as amended by Act Number 19 of 2001. The rationale behind the establishment of the Authority was to allow it to retain all the revenue it generates to be ploughed back into conservation. The functions of the Authority are provided for in detail in section 4 of the Parks and Wildlife Amendment Act Number 19 of 2001. The Act gives the Authority power to control, manage and maintain Zimbabwe's wildlife resources.

Its **vision** is "*To be a World Leader in sustainable conservation*" and its **mission** is "*To conserve Zimbabwe's wildlife heritage through protection and sustainable utilisation of natural resources for the benefit of present and future generations*."

5.1 STAFF ESTABLISHMENT

The staff strength at the beginning of January 2015 was 2,043 and ended at 2,044 on 31, December 2015 (2015 Annual Report (unpublished). Fifty (50) rangers were recruited in 2015. The following is the staff status report as at 31st December, 2015 (Table 7).

Table 7: Summary Staff Establishment by Region

Position	Grade	HQ	VMU	Northern	Western	Southern	Central	Total
Executive	F & E	3	0	0	0	0	0	**3**
Department Managers/Sectional Heads	D3-D5	19	0	3	4	3	3	**32**
Ecologists/ Area Managers/Officers	D1-D2	11	1	19	19	13	4	**67**
Snr Rangers /Officers	C1-C5	29	6	64	89	49	34	**271**
Rangers/Clerical	B2-B5	33	12	507	461	310	197	**1,520**
Gen. Hands / Lodge Attendants	B1	2	2	30	66	33	17	**150**
TOTAL		**97**	**21**	**623**	**639**	**408**	**255**	**2,043**

The current remuneration levels have remained low with the lowest paid worker receiving a gross salary of $375 per month. The last salary increase of 23% was in January, 2014. A comparison with other Parastatals within the same parent ministry, shows that the Authority has the lowest salary scales.

5.2 TRANSPORT OPERATIONS

As indicated in Table 8, the total cost of operating the Parks transport fleet was is $1,547,172.82 (excluding insurance and licensing) in 2015. The existence of old and obsolete vehicles in the fleet increases costs as most of them require major component replacements thereby increasing vehicle downtime.

Table 8: Overall travel and fuel consumed by Region

Station	Km travelled	Fuel Consumed		Repairs & Maintenance Cost ($)	Total Cost ($)
		Litres	Cost ($)		
Head Office	1,489,294	190,644	272,620	136,419	409,039
Northern	1,429,260	149,577	213,895	147,113	361,007
Southern	1,075,077	110,111	157,458	59,548	217,006
Western	1,313,263	142,012	203,077	161,120	364,196
Central	392,885	47,995	68,632	127,288	195,920
TOTAL	**5,699,779**	**640,339**	**$915,684**	**$631,486**	**$1,547,172.**

Table 9 below summarises the status of the Authority's vehicle fleet as of 2015. Out of the fleet complement of 316 (including tractors and motor cycles), only 70% are in sound condition.

Table 9: Number of vehicles per region

Region	Runners	Non-Runner	Total	% of Non-Runner
Head Office	41	6	47	13
Northern	53	19	72	26
Southern	30	21	51	41
Western	80	39	119	33
Central	17	10	27	37
Total	**221**	**95**	**316**	**30**

The Authority also owns three aircraft: Bell Jet Ranger and Robinson R22 Beta 11 helicopters, and a Cessna 185. The Jet Ranger is based at Hwange National Park and is used for game capture and law enforcement. The remaining aircrafts are non-operational.

5.3 LAW ENFORCEMENT

A major component of the Authority's mandate is law enforcement. This has become increasingly more important with the escalation in illegal wildlife trade, particularly involving elephant and rhino. The Authority has an establishment of 2,146 rangers however by the end 2015, there were 1,448 rangers in post (67%). Of the 1,448 rangers in post, 1,004 are deployable for anti-poaching operations.

The level of effort of law enforcement over the last 3 year is summarised in Table 10. In 2015 there were 2,139 incursions detected, and arrest of 1,354 local and 129 foreign poachers. The number of armed contacts declined from 26 in 2014 to 23 in 2015, and number of poachers killed declined from 13 in 2014 to 11 in 2015. Recoveries made in the field included 25 rifles, 276 rounds of ammunition, 496 pieces of elephant ivory, 4 rhino horns and 5,133 wire snares.

Table 10: Detections, Arrests and Recoveries for 2013, 2014 and 2015

Year	No of Incursions	No of contacts		Number of poachers				Recoveries					Other recoveries and arrests		
				Killed		Arrested									
		Armed	Visual	Local	Foreign	Local	Foreign	Rifles	Ammunition	Ivory	Rhino horn	Snares	Gold	Poachers Camp	Dogs
2013	1842	27	344	9	0	1421	131	20	945	436	5	4415	93	264	180
2014	1571	26	362	10	3	4161	94	20	163	202	19	4864	221	186	272
2015	2139	23	356	6	5	1354	129	25	276	496	4	5133	134	339	167

5.3.1 Illegal Harvesting of Wildlife

Commercial wildlife poaching involving both local and foreign nationals continues to plague Zimbabwe, especially with respect to elephant and rhino located in the Zambezi Valley, Sebungwe, North-West Matabeleland, South-East Lowveld. The species targeted are shown in Table 11 and 12. Note that 21 lions were killed illegal between 2013 – 2015, with 6 animals killed through snaring in the area adjacent to Hwange National Park in 2015.

Table 11: Trends in wildlife poaching in the parks estate

Year	Illegally killed wildlife										
	Elephant	Buffalo	**Lion**	Kudu	Zebra	Impala	Warthog	Nyala	Eland	Crocodile	Waterbuc k
2013	293	65	**12**	65	21	67	22	5	6	2	15
2014	176	44	**2**	34	8	65	26	2	5	3	15
2015	317	78	**7**	76	21	92	46		9	17	6
2016*	101	23	**0**	23	22	54	12	1	4	1	5
Total	**807**	**210**	**21**	**200**	**72**	**278**	**106**	**8**	**24**	**23**	**41**

*To September 2016

Table 12: Illegally killed wildlife 2015 in the four regions

Region	Elephant	Buffalo	**Lion**	Kudu	Sable	Zebra	Croc	Impala	Eland	Warthog	B/Buck	waterbuck
Central	46	30	**0**	16	0	6	1	28	0	17	7	
Northern	75	6	**0**	6	0	0	0	0	0	0	0	0
Southern	65	38	**1**	42	0	9	4	31	4	25	1	6
Western	131	4	**6**	12	1	6	12	33	5	4	1	0
Total	**317**	**78**	**7**	**76**	**1**	**21**	**17**	**92**	**9**	**46**	**9**	**6**

5.3.2 Illegal trophy hunting – the "Cecil" effect

Professional hunter Theodor Bronkhorst was arrested for allegedly illegally hunting of a lion popularly known as 'Cecil' with a foreign client on Antoinette and Antoinette farm in Gwayi River Conservancy (which is adjacent to Hwange National Park). The same case involved Umguza Rural District Council in alleged illegal quota transfer[1]. At the time of writing, this case has not been brought before the court, and is still under judicial review[2].

The Authority immediately implemented the following measures in response to this incident:

- Hunting of lions, leopards and elephant in areas outside of Hwange National Parks required confirmation and authorization in writing by the Director-General of the Zimbabwe Parks and Wildlife Management Authority, and all hunts are to be accompanied by the Authority's staff whose costs will be met by the landowner.
- Bow hunting was suspended except with confirmation and authorization in writing by the Director-General of the Zimbabwe Parks and Wildlife Management Authority.
- Members of the hunting fraternity were reminded that it was illegal for quotas to be transferred from one hunting area to another. Any case of quota transfer would be regarded as poaching, and the Authority will not hesitate to arrest, prosecute, and ban for life any persons including professional hunters, clients and land owners who were caught on the wrong side of the law.

[1] This system facilitated the transfer of a quota from one property to another has since been suspended by the Authority.

[2] Note: This case has been dismissed by the court on 12th November 2016.

- 2015 hunting quotas and permits for Antoinette and Antoinette farm, Railway farm 33, Umguza Rural District Council and Kusile Rural District Council were suspended.
- Professional hunters' license for Theodor Bronkhorst was suspended.

5.4 Human Wildlife Conflict

The Authority is called upon to deal with human-wildlife conflict (HWC) issues across the country, and this continues to be a challenge. A total of 863 reports of problem wild animals causing threat to human life and property were received in 2015 compared to 1,637 reports in 2014 (Table 13). From these incidents, a total of 39 human fatalities by crocodiles, elephants, lions and buffaloes were recorded in 2015 compared to the 27 fatalities in 2014.

Table 13: Trends of Human and Wildlife Conflict Incidents

Year	Total Reports Received	People killed	People Injured	Cattle killed	Goats killed
2013	1 088	21	16	67	65
2014	1 637	27	24	217	129
2015	863	39	23	232	213
Total	**3 588**	**87**	**63**	**516**	**407**

The scale and species involved in HWC is summarised in Table 14. The authority received 200 problem lion reports and responded to 177. One person was killed by lion, and 206 livestock. The Authority elected to capture problem lion (6) rather than destroy the animals.

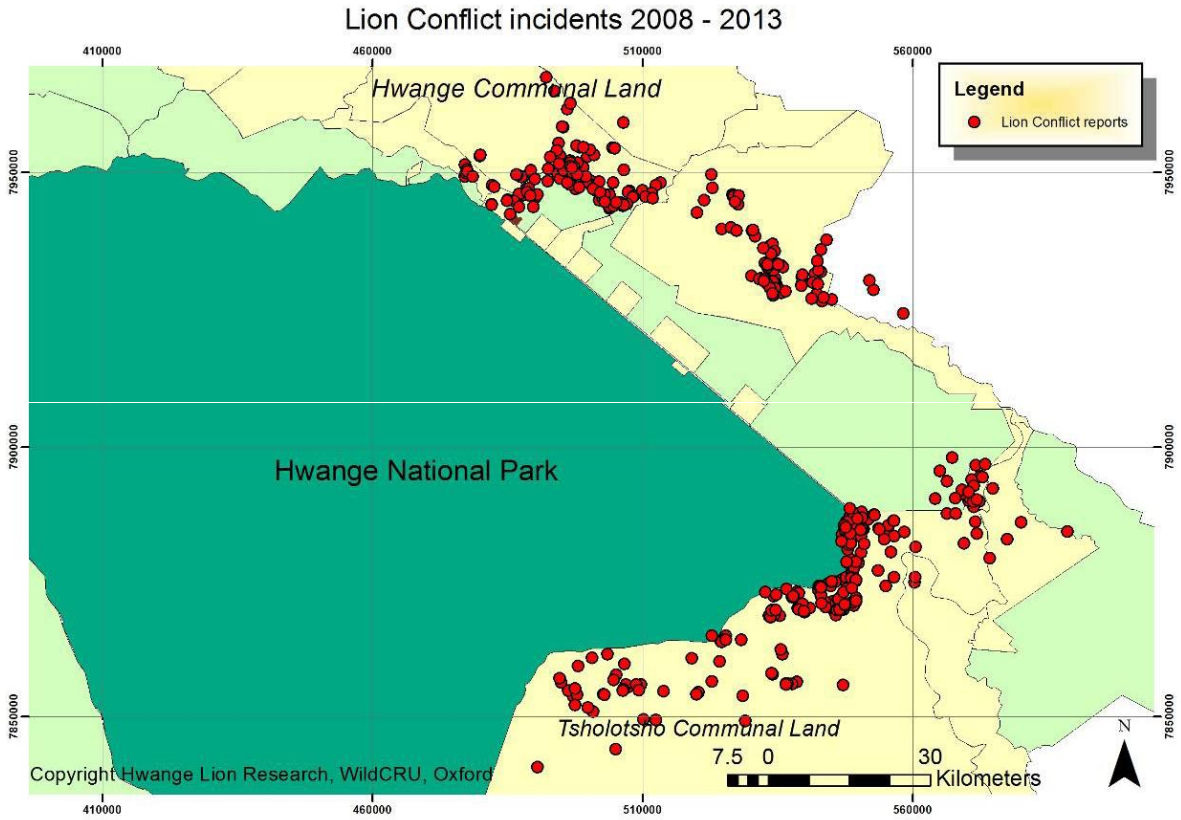
Table 14: Scale of countrywide human wildlife conflict in 2015.

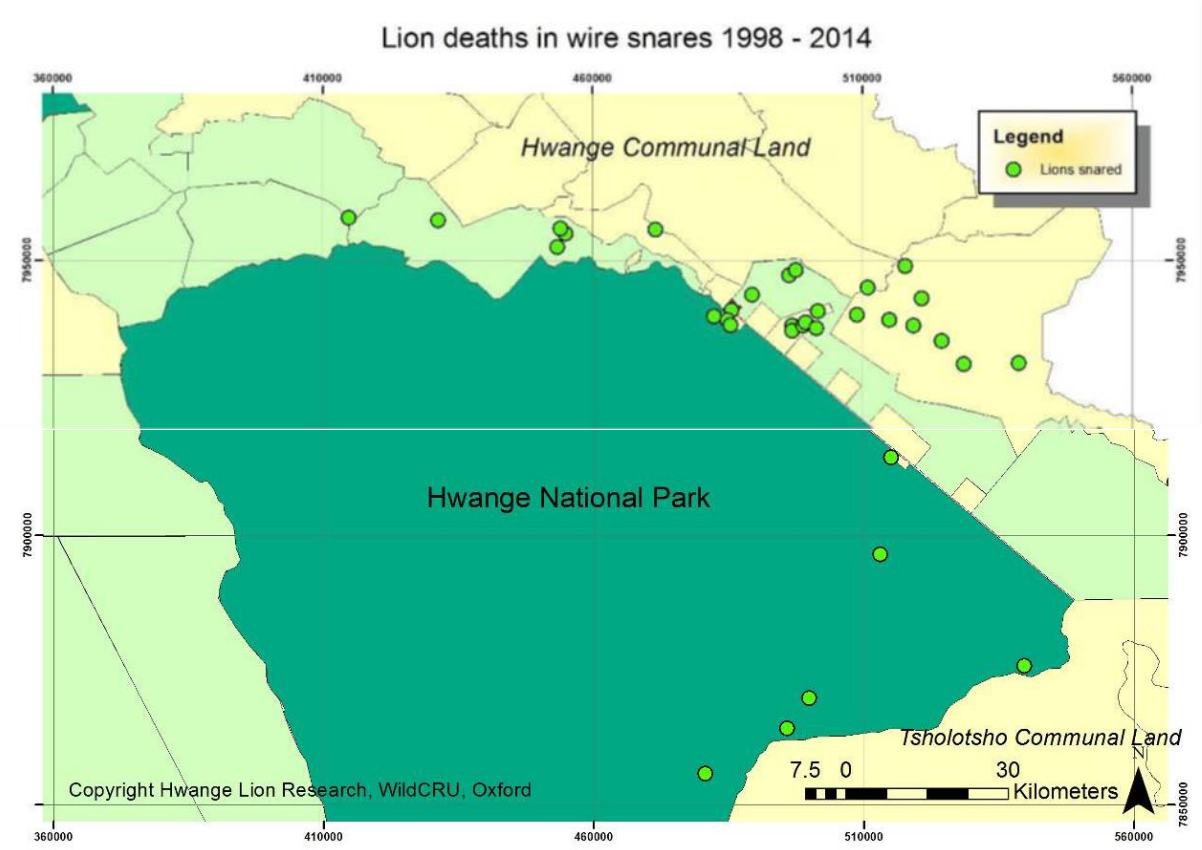
Species	Nature of problem	No of reports received	Reports attended	Number of animals eliminated		People		Livestock killed		
				Killed	Captured	Killed	injured	Cattle	Donkeys	Goats
Baboons	Damage to infrastructure, crop raiding, threat to humans	109	105	51	48	0	0		0	0
Buffalo	Threat to human life and crop raiding	46	40	0	15	2	1		0	0
Elephant	Threat to human life, crop raising, destroying property	216	177	0	38	4	5	0	0	0
Hippo	Threat to human life and crop raiding	131	87	0	34	0	0	0	0	0
Crocodile	Threat to human life and killing livestock	106	85	39	9	27	14	16	1	47
Hyenas	Killing livestock	36	18	0	7	0	0	68	2	54
Leopard	Killing livestock	19	11	0	1	0	0	32	0	33
Lion	**Threat to human life and livestock killing**	**200**	**177**	**0**	**6**	**1**	**0**	**115**	**12**	**79**
Total		**863**	**700**	**90**	**158**	**34**	**20**	**231**	**15**	**213**

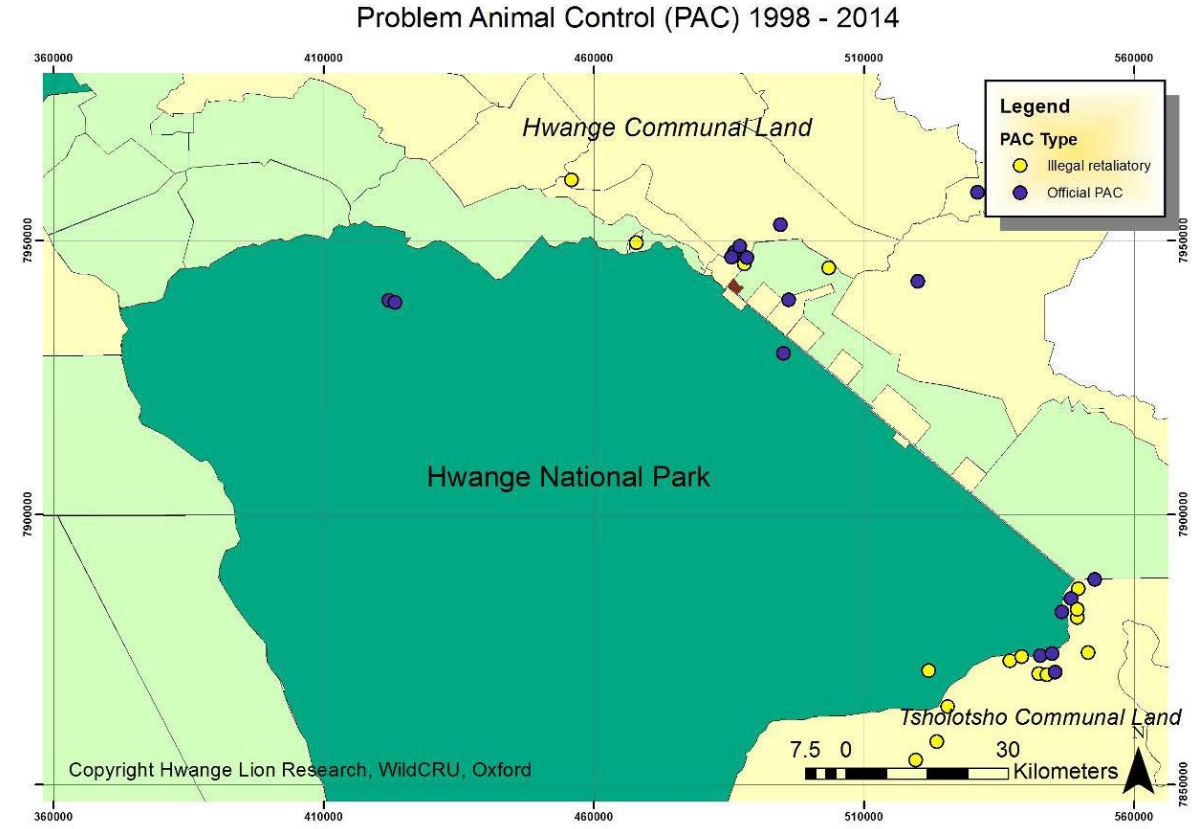
5.4.1 Case Study of Human- Lion Conflict from Hwange National Park

The following information has been extracted from the Hwange National Park Management Plan (ZPWMA, 2016) and is provided here to illustrate the challenges facing the management of lion populations residing adjacent to communal and commercial properties. Variations of the scenario described here apply to other areas of the country where hyaenas and lions are the most problematic carnivores in the communal areas adjacent to protected areas. Hyaenas are perceived to be more of a problem than lions as they account for large numbers of livestock (cattle, goats and sheep). The data presented here has been extracted from the WildCru Lion Research project in Hwange and considers only lions.

Since its inception in 2007 a significant component of the WildCru Lion Research project has focused on understanding the ecological and human socio-economic factors of conflict between the local agro-pastoralist people residing in Tsholotsho and Hwange Communal Land and lions. The project developed an intensive reporting system to record conflicts and has undertaken a detailed survey to record the baseline data on human wildlife conflict at the household level. Between 2007 and 2013 a total of 1,113 conflict incidents were recorded in the Hwange area in which 915 head of stock was lost to lions.







To mitigate this conflict, the project has initiated the "Long Shields Guardian Programme" whereby communities are notified of movements of collared into their areas via cell phone who then motivate the community to take appropriate action (i.e. moving the cattle, chase the lions etc.). In 2013 alone,

1,850 warnings were passed to the "Long Shields". In addition, the project is working on improving bomas and husbandry techniques as another way to lessen the conflict between lions and people, and although these actions may reduce the incidents of livestock marauding lions, cattle deaths still occur resulting in retaliatory killings or action on the part of National Parks to destroy the animals.

5.5 Trend in Financial Performance of the Authority

The average Income and Expenditure for the period 2010 – 2015 is shown in Table 15 that highlights the inability of the Authority to generate adequate revenue to cover both the capital and operating requirements. The average total income over this period is US$22.4 million (range US$16.5 – US$29.3 million). For the period ending December 2015, the Authority generated total revenue of $24,1million, which is 32% below the anticipated budget of $35.5 million. This includes a government grant of $716 000 and a donation of vehicles and equipment worth $2,1 million from the Government of China.

The average total expenditure for the period 2010 – 2015 is US$25.3 million (range US$18.1 – US$30.7 million). The Authority has thus incurred a loss of approximately US$2.8million/year. For the year ended December 2015, the Authority incurred a loss of US$5,4 million including depreciation.

The Authority is dependent on income from Conservation Fees (i.e. entry fees to Parks etc.) that accounted for 39% in 2015 (average 34%/year), hunting (13% in 2015) and leases (10% in 2015, Table 15).

Although individual salaries remained low, staff costs in 2015 were $20,7 million which is 71% of total revenue raised (average 64%). This is unsustainably high and leaves very limited resources for operation (16%), marketing (1%) and administrative expenses (7%, Table 15).

The major reasons for the budget deficits in the past six years can be attributed to:

- Declining income from hunting – this has been exacerbated by the recent bans imposed on elephant trophy imports into the United States by US Fish Wildlife Service (USFWS) and the much-publicised death of *Cecil the lion* that had a negative effect on revenue generated from hunting.
- Government Grant – The Authority has not received meaningful funding from the fiscus despite requests made by management that non-revenue generating activities which are of national nature be funded by Government.
- The Authority failed to dispose of its ivory stock pile due to the continued ban on ivory trade by CITES. The ivory stock which the Authority is currently holding exceeds 80 tons.

Table 15: Statement of Comprehensive Income for period 2010 – 2015 and the year ended 31 December 2015 (extracted from 2015 ZPWMA Annual Report).

Revenue	US$ 2015	%	Average 2010 - 2015	%
Conservation Fees Land	$7,879,987	33%	$6,506,508	29%
Conservation Fees River	$1,409,160	6%	$1,136,041	5%
Accommodation	$1,720,640	7%	$1,904,477	8%
Annual registration	$507,211	2%	$722,847	3%
Permits	$1,476,176	6%	$849,916	4%
Service and Facilities	$307,692	1%	$152,616	1%
Law enforcement (fines etc.)	$224,657	1%	$215,591	1%

Revenue	US$ 2015	%	Average 2010 - 2015	%
Hunting income	$3,256,698	13%	$5,049,089	22%
Fishing permits	$561,797	2%	$941,833	4%
Leases and rentals	$2,434,676	10%	$1,880,258	8%
Parks product sales	$623,084	3%	$767,347	3%
Examinations	$116,000	0%	$70,873	0%
Projects	$349,864	1%	$248,614	1%
Other income/donations	$2,555,729	11%	$907,169	4%
Government grant	$716,000	3%	$1,141,119	5%
Total	**$24,139,371**			
Expenditure				
Operational costs	$4,801,815	16%	$5,146,091	20%
Staff costs	$20,766,023	71%	$16,311,677	64%
Marketing and promotions	$212,406	1%	$147,334	1%
Administration costs	$2,056,681	7%	$2,631,019	10%
Depreciation	$1,531,000	5%	$1,069,138	4%
Total expenditure	**$29,367,925**		**$25,305,258**	
Operating surplice/deficit	**-$5,365,082**		**-$2,810,962**	

The Authority receives considerable support from many local and international NGOs who undertake a variety of routine management activities e.g. supply and maintain artificial game water supplies, provide logistic support to law enforcement operations. This is in addition to the support provided by hunting operators that hold concessions in the Safari Areas.

6 STAKEHOLDER INVOLVEMENT IN LION MANAGEMENT AND CONSERVATION

There are several private sector initiatives that are directly or indirectly involved with lion management and conservation both inside and outside the Parks estate. These stakeholders are represented by companies from the consumptive and non-consumptive sectors of the industry.

6.1 BENEFICIARIES OF WILDLIFE BASED LAND USE

Various forms of wildlife based land use occur in Zimbabwe that benefit different segments of the community depending on the authority for the land. Table 16 summarises these broad categories. The Authority is the direct beneficiary from the use of wildlife in National Parks and Safari Areas while the Forestry Commission is the beneficiary in Forestry Areas. In terms of the Act, Communal CAMPFIRE areas are the primary beneficiaries where the income generated from hunting is shared between the Rural District Council and Community Wards (see below). Similarly, private conservancies and land owners are the primary beneficiaries.

Collectively, these different management regimes contribute to the overall conservation of the wildlife both inside and outside the Parks Estate, and is supported through the existing policy and legal framework that facilitates incentives to promote wildlife based land use.

Table 16: Direct beneficiaries from Wildlife Based Land Use

Land category	Direct Beneficiary
National Parks and Safari Areas	Zimbabwe National Parks and Wildlife Management Authority
Forestry Areas	Forestry Commission
Communal Campfire Areas	Rural District Council and Wards
Private Conservancies	Private Landowners

6.2 CONTRIBUTION OF THE PRIVATE SECTOR

A questionnaire was circulated to all safari hunting operations to gather data on:

- Area and land category where hunting takes place
- Payments in terms of concession fees
- Number of people employed
- Approximate value of investment in assets
- Approximate costs of the hunting operations
- Hunter days generated through various packages
- Indication of the prey base

Data from 18 companies that have been allocated lion on quota and offer these trophies as part of their hunting packages is summarised below (Table 17). These data indicate that

- The average hunting concession covers 1,590km^2 and generates $178,488 in concession fees annually.
- Each company on average employs 109 people of which 24 are seasonal staff (22%). Law enforcement staff make up 26% of the staff complement.
- On average, each company has invested approximately $1.3 million in fixed and moveable assets (buildings, tents, vehicles, equipment etc.).
- On average, each company incurs approximately $1 million in expenses annually, with staff wages (24%) and operating expenses (27%) forming the bulk of these costs.
- Lion safaris contribute approximately 9% (126 hunter days) to the 3-year average number of hunter days generated (1,405) with the bulk of hunter days generated from buffalo safaris (see below for more details on the financial significance of this contribution).
- On average, each hunting area supports 2,000 large mammals, 3,000 medium sized mammals and 6,000 small sized mammals. However, there are large differences between state, forestry, CAMPFIRE and conservancies areas. State areas tend to support more large animals (buffalo, giraffe) while conservancies support greater numbers of medium and small animals.
- Observations on the status of lion populations indicates that each area supports on average 5 prides of 7 animals (i.e. 35 lions) although there is a wide variation in these numbers with more prides occurring in the conservancies than on Forest and CAMPFIRE areas. In these areas, the operators report that lion are transient/migratory rather than permanent.
- All areas report incidents of human-lion conflict, including incidents of snared animals.

Table 17: Summary of 18 hunting company statistics where lion hunting occurs

Companies (N=18)	**Total**	**Average**	
Total Hunting Area (ha)	2,872,932	159,607	
Concession fee	$2,141,860	$178,488	
Number people employed			
Owner/Manager	65	4	3%
Administration	59	3	3%
Camp Maintenance	308	17	16%
Safari operations	295	17	16%
Professional Hunters	82	5	4%
Skinners	59	3	3%
Trackers	138	8	7%
Law enforcement	449	28	26%
Seasonal/Casual staff	379	24	22%
Average Staff employed/company		**109**	
Approximate Asset Value (US$)	**$21,557,610**	**$1,347,351**	
Major Expense Items			
Central Government Licenses:	$415,700	$25,981	3%
ZNWMA Fees:	$1,932,472	$128,831	13%
Community Development:	$525,378	$35,025	4%
Law Enforcement:	$1,319,562	$87,971	9%
Staff wages & Welfare:	$3,601,439	$211,849	24%
Administrative costs:	$1,870,267	$116,892	13%
Operating expenses:	$3,986,619	$249,164	27%
Management and Marketing costs	$661,974	$41,373	4%
Any other costs	$411,693	$25,731	3%
Overall costs	**$14,725,104**	**$922,818**	
Hunter days generated over 3 years			
Lion	2,137	126	9%
Leopard	4,565	269	19%
Buffalo	10,344	608	43%
Elephant	3,131	184	13%
Plains game	999	59	4%
Total Hunter days	**25,294**	**1,405**	
Prey base status			
Large mammals (Buffalo, Giraffe)	28,190	2,014	
Medium mammals (Eland, zebra, kudu, waterbuck etc.)	53,273	3,552	
Small mammals (Bushbuck, warthog, impala)	82,297	5,878	
Status of lion population			
Number of prides	71	5	
Average pride size	80	7	

Companies (N=18)	Total	Average	
Number of cubs	243	19	
Number Coalition males	89	7	
Monitoring of lion population			
Natural deaths	4	1	
Reports of Human-Lion Conflict	33	5	
Incidents of infanticide recorded	6	2	

6.3 CAMPFIRE COMMUNITY PROGRAMMES

The right to exploit and benefit from wildlife was extended to communal areas through granting of Appropriate Authority Status over their wildlife resources to Rural District Councils in 1982. The intention was to return rights of access to natural resources through legislative change, devolve responsibility and economic empowerment. The CAMPFIRE model focuses on three main criteria:

- Voluntary interest in participation by communities and their Rural District Councils (RDCs),
- Presence of wildlife populations capable of producing sustainable and economically significant revenues.
- Benefit sharing for local communities based on:
    - The number of animals harvested within a local community's area each hunting season.
    - The extent of wildlife habitat present within a local community's area annually.

Currently 58 Rural Districts have been granted the Appropriate Authority status to manage wildlife resources in their areas, however only 16 are actively engaged in some form of wildlife based land use (see Figure 5).

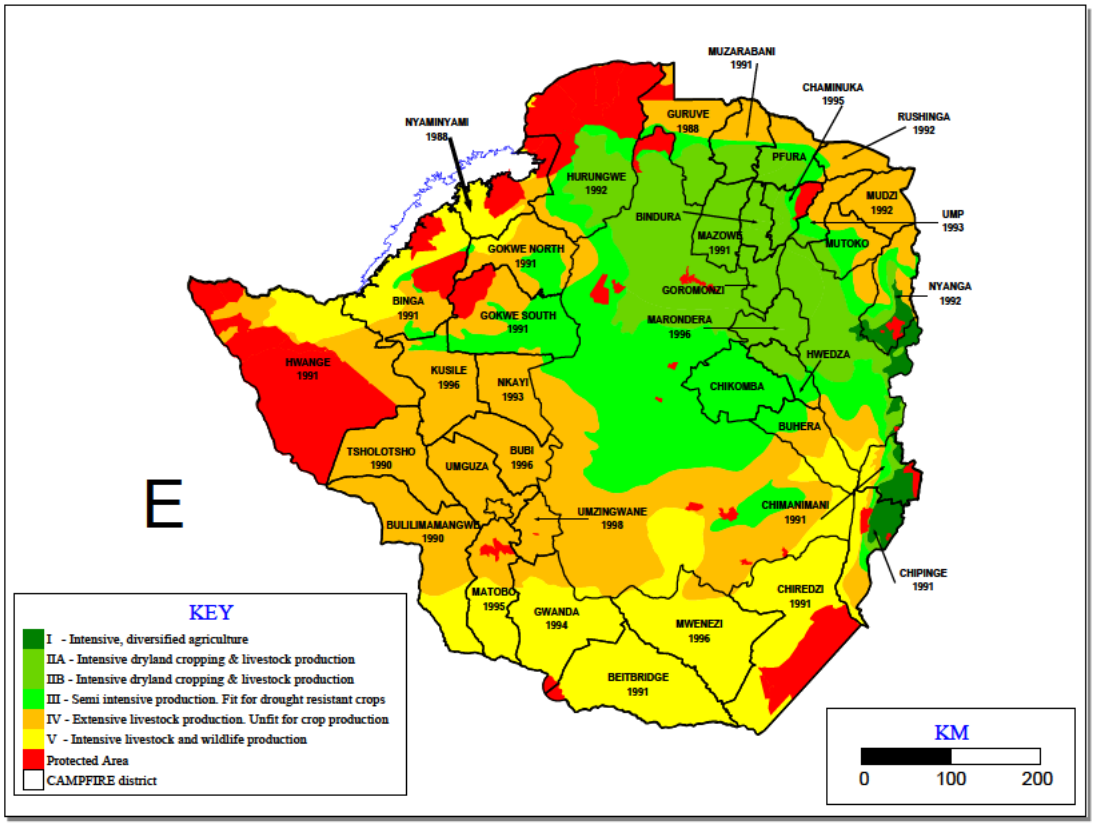


Figure 5: Map of Zimbabwe showing CAMPFIRE districts and year of establishment

The performance of ten key CAMPFIRE Districts is summarised below to illustrate the level of benefits that flow to RDCs, Wards and households, and the role that income from lion play in this process.

1. OVERALL QUOTA ALLOCATION, UTILISATION AND INCOME GENERATION FROM KEY SPECIES: All Districts: 2010 - 2015

	Elephant	Lion	Leopard	Buffalo	Hippo	Crocodile	Total
Quota	1,079	140	487	2050	602	471	
Offtake	655	45	193	908	270	305	
% Utilisation	61%	32%	40%	44%	45%	65%	
Total income N=6 years)	**$7,129,658**	**$240,000**	**$532,675**	**$2,263,150**	**$464,000**	**$441,903**	**$11,071,386**
Average/year	**$1,188,276**	**$40,000**	**$88,779**	**$377,192**	**$77,333**	**$73,651**	**$1,845,231**
Percentage	64%	2%	5%	20%	4%	4%	

The overall income generated over a 6-year period was US$11 million. An overall quota of 140 lions (average 23/year) were allocated to the CAMPFIRE programme over which 45 (32%) were utilised (8 per year). This generated US$240,000 or 2% of the overall income.

2. SOURCE OF CLIENTS AND GROSS INCOME TO SAFARI OPERATIONS:2010 - 2015

Origin of Clients	USA	Canada	South America	Europe	Asia	Middle East	Oceania	Africa	Total (N=6 years)
Total	**880**	**16**	**54**	**456**	**82**	**9**	**51**	**131**	**1679**
Percentage	51%	1%	3%	27%	5%	1%	3%	8%	
Total	**$8,624,059**	**$150,987**	**$543,003**	**$5,201,168**	**$550,062**	**$781,076**	**$394,208**	**$567,897**	**$16,812,459**
Average/year	**$1,462,508**	**$25,165**	**$90,500**	**$866,861**	**$91,677**	**$130,179**	**$65,701**	**$94,650**	**$2,802,077**
Percentage contribution	**51%**	**1%**	**3%**	**31%**	**3%**	**5%**	**2%**	**3%**	

Hunting clients from the USA are by far the most numerous (880 over 6 years) contributing 51% (or US$8.6 million) of the estimated US$16 million generated from hunting in CAMPFIRE areas from 2010 - 2015.

3. INCOME TO DISTRICTS: 2010 - 2015

	Hides (US$)	Trophy fees (US$)	Percentage of daily rate	Hunting concession fees	Photographic (lease fees/bed night levy)	Other (vehicle hire, grinding mill etc.)	Total	Average (N=6)
Total	$131,741	$10,618,127	$1,277,525	$862,721	$737,613	$731,218	$14,358,945	$2,393,158
Percentage	1%	74%	9%	6%	5%	5%		

The CAMPFIRE districts that benefit from hunting rely heavily on trophy fees (74%) as their primary source of income.

4. INCOME TO WARDS, VILLAGES AND HOUSEHOLDS: 2010 – 2015

Overall Income to CAMPFIRE Wards: 2010 - 2015						
	No Concessions	Area (ha)	Number Wards	Number Villages	Number Households	Gross Income
Total	**26**	**2,288,284**	**62**	**603**	**56,297**	**$5,946,370**
Income (n=6 YEARS)	**$228,706.55**	**$3**	**$95,909.20**	**$9,861.31**	**$105.6**	

Income generated at the District level is then disbursed to Wards. Since 2010, this is estimated to be approximately US$5.9 million. The available data shows that 62 wards representing 603 villages (or 56,297 households) received the equivalent of US$95,909/ward (or US$105/household).

These levels of income are not sufficient to make a significant impact at the individual level, and require that the Districts and Wards channel these revenues into activities that benefit the overall community. This is achieved through supporting several communal projects such as schools, clinics, water provisions etc.

5. DISTRICT EXPENDITURE AND COMMUNITY BENEFITS: 2010 - 2015

	Administration	Law Enforcement	Compensation	Management	Social Services	Other	Total
Total	**$2,486,268**	**$1,778,100**	**$67,600**	**$682,740**	**$1,084,779**	**$779,030**	**$6,878,517**
Average	**$414,378**	**$296,350**	**$11,267**	**$113,790**	**$180,796**	**$129,838**	**$1,146,420**
Overall costs	**$5,014,708**				**$1,084,77**	**$779,039**	
Percentage	**73%**				**16%**	**11%**	

At the District level, 73% of the revenues from hunting are channelled towards administration, law enforcement, compensation and general management while limited funds are used to support social services (16%).

6. WARD EXPENDITURE AND COMMUNITY BENEFITS

	Administration costs					Community Benefits				
	Meetings & Admin	Wages/salaries	Compensation schemes	Management activities	Project Management Costs	Social services	Food security	Direct cash benefits	Other	Total
Total	**$553,260**	**$815,639**	**$56,432**	**$312,178**	**$345,762**	**$2,468,216**	**$223,659**	**$216,077**	**$139,565**	**$5,302,709**
Overall costs	**$2,083,271**					**$2,907,952**			**$139,565**	
Percentage	**39%**					**55%**				

At the Ward level, where communities are directly involved, the tendency is to channel most the income towards community benefits (55%) rather than administration which is seen to be the responsibility of the local government. This means that the bulk of the income from hunting is used to support social services such as schools, clinics, irrigation schemes etc. where the impact at the community level (village, household) is far greater (Figure 6).



Figure 6: Bhemba Clinic in Ward 2 of the Tsholotsho Communal Area (top) and Masera Secondary School (Beitbridge, bottom) that are supported by funds generated through the CAMPFIRE programme

Lessons learnt

1. Quota utilisation of lion (32%) is low in CAMPFIRE areas, equating to 8 lion/year.

2. Trophy fees from key species (elephant, lion etc.) contributed $1,845,231/year to CAMPFIRE revenues:
    a. Elephant (64%) and buffalo (20%) are major contributors
    b. Lion and leopard contribute 7%

3. Income from the sale of safaris generate approximately $2,802,077/year
    a. Hunters from USA contribute 51% and Europe 31% of this income.

4. Income to Districts from a variety of wildlife related revenue streams is approximately $2,510,783/year:
    a. Trophy fees are responsible for 74% of this income, of which lion play a small role.
    b. Fees from photographic tourism are responsible for 5%.

5. Wards receive $5,830,244 (57%) from district trophy fees. These revenues are used to support a variety of social services that benefit a large proportion of the local community.

The cessation of import of lion (and elephant) trophies into the USA has had a significant impact on these revenue streams and consequently on the benefits reaching communities at the local level. These revenues cannot be replaced through alternative revenue streams.

7 Management and Administration of the Safari Hunting Industry in Zimbabwe

7.1 Performance of the industry

To fully account for earnings in the Hunting Sector, the Reserve Bank of Zimbabwe, in collaboration with all the relevant stakeholders, introduced the Tourism Receipts Accounting System (TRAS2) in January 2015. The TRAS2 is a web-based system which links Safari Operators, Zimbabwe Parks and Wildlife Management Authority, Taxidermists, Shipping Agents, International Marketing Agents and Reserve Bank for the purposes of authorizing hunts, capturing hunting data, monitoring hunting quota utilization and tracking hunted trophies.

On an annual basis, Exchange Control Division of the Reserve Bank of Zimbabwe attends the SCI Conventions to achieve the following objectives: -

1. To assess regional price differentials of same hunts at the SCI Convention and the reasons thereof;
2. To present Form TRAS2 systems updates to the users including international marketing agents;
3. To engage international marketing agents of sport-hunting (standardised international marketing agreements, payment arrangements and follow up on overdue export receipts);
4. To obtain relevant insights on governing of the hunting sector; and
5. To come up with an effective mechanism to fully account for export proceeds from the hunting sector.

7.1.1 Global earnings of the industry

The TRAS2 system was introduced in January 2014, and has since recorded a total of $44.6 million ($18.9 million in 2015 compared to $25.9 million in 2014) as shown in Figure 7. The figures are inclusive of daily rates, trophy fees and other incidental revenue. In line with other regional

countries offering safari hunting, the market is dominated by the USA (59%) and Europe (25%) with the remainder of the market taken by the Americas (Canada, Argentina etc.), Asia, Africa, Oceania and Africa (mostly South Africa). Appendix III illustrates the distribution of total hunting revenue by country of destination (Chitauro, 2016).

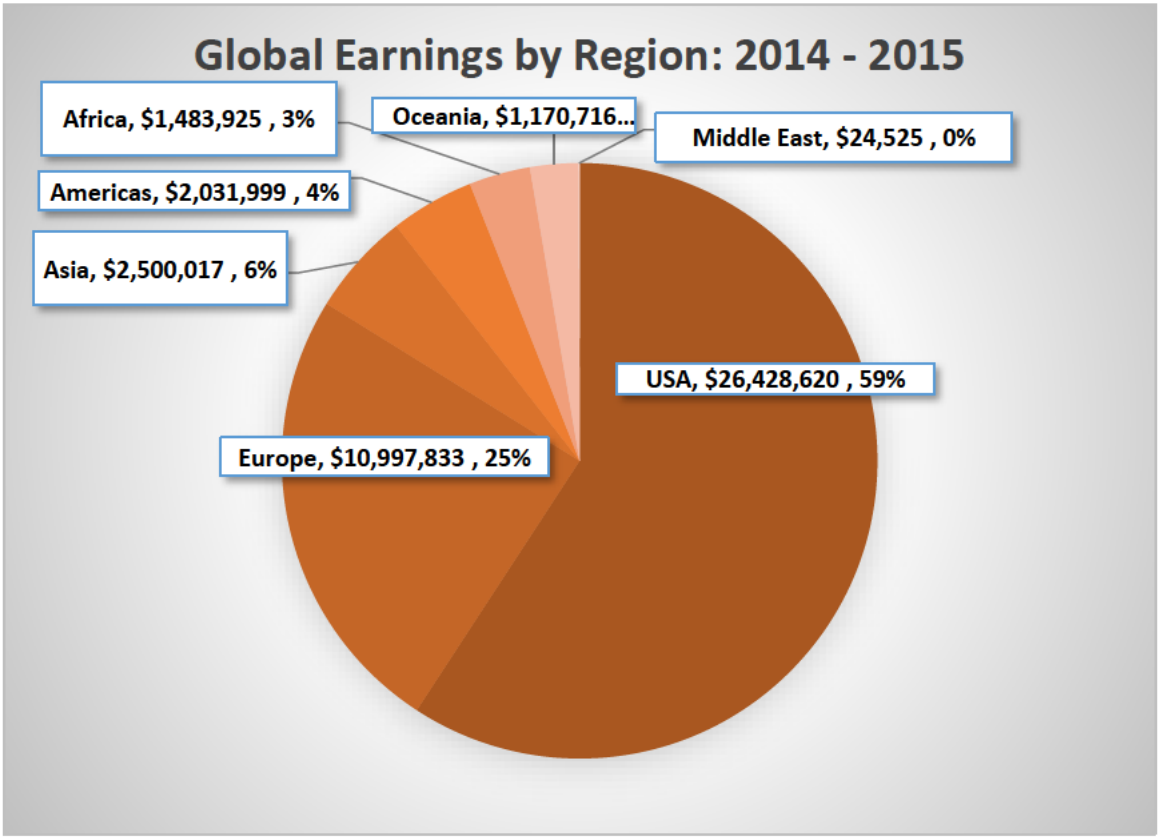


Figure 7: Breakdown of source of hunting income (2014 and 2015) from various regions in the world (adapted from Computerised Exports Payments Exchange Control System, CEPECS - TRAS2)

7.1.2 Quota allocation, Utilisation and Total Trophy Fees Earned

The total income from the sale of trophies in 2014 and 2015 is shown in Table 18. The income in 2015 (US$8.2 million) is less than that in 2014 (US$11.1 million) because of the import restrictions of elephant and lion into the USA.

Table 18 also provides data on the quotas allocated in 2015 and the number of level of utilisation. The complete list of species is provided in Appendix III (Chitauro, 2016). These data show that levels of utilisation for all species varies from 10 – 40% for most mammals and far less for birds etc.

Table 18: Summary of the revenue generated from the 11 most common species utilised for hunting, and the percentage utilisation in 2015 (adapted from Computerised Exports Payments Exchange Control System, CEPECS - TRAS2)

Species	2014	2015	Total	2015 Quota	Utilised	% Utilised
Buffalo	$2,528,559	$1,962,570	$4,491,129	1,635	482	29%
Elephant (Tusks)	$2,042,610	$1,447,090	$3,489,700	246	64	26%
Elephant (Tuskless)	$1,444,040	$229,860	$1,673,900	462	113	24%

Species	2014	2015	Total	2015 Quota	Utilised	% Utilised
Lion	**$630,950**	**$753,000**	**$1,383,950**	**82**	**49**	**59%**
Leopard	$714,100	$668,490	$1,382,590	530	151	28%
Zebra	$594,239	$555,744	$1,149,983	2,480	600	24%
Sable	$456,615	$309,260	$765,875	718	78	11%
Kudu	$341,092	$357,963	$699,055	2,503	289	12%
Waterbuck	$293,903	$256,133	$550,036	988	156	16%
Hippo	$310,321	$217,470	$527,791	303	83	27%
Impala	$277,198	$242,624	$519,822	8,594	1,261	15%
Other Species	$1,465,560	$1,287,845	$2,753,405			
Grand Total	**$11,099,187**	**$8,288,049**	**$19,387,236**			

7.1.3 Total trophy fees generated by land category

The ZPWMA allocated quotes to all owners and occupiers of land in terms of SI 26. Any person utilising wildlife on these properties is required to submit a TRAS2 form to process any export of trophies and other animal products. Approximately 262 companies/properties submitted returns in 2014 and 2015. From these data, it is possible to determine the income generated from trophy fees and daily rates per company. To protect the privacy of the individual companies, these data have been arranged to show the level of income generated by different land categories from trophy fees (Figure 8),

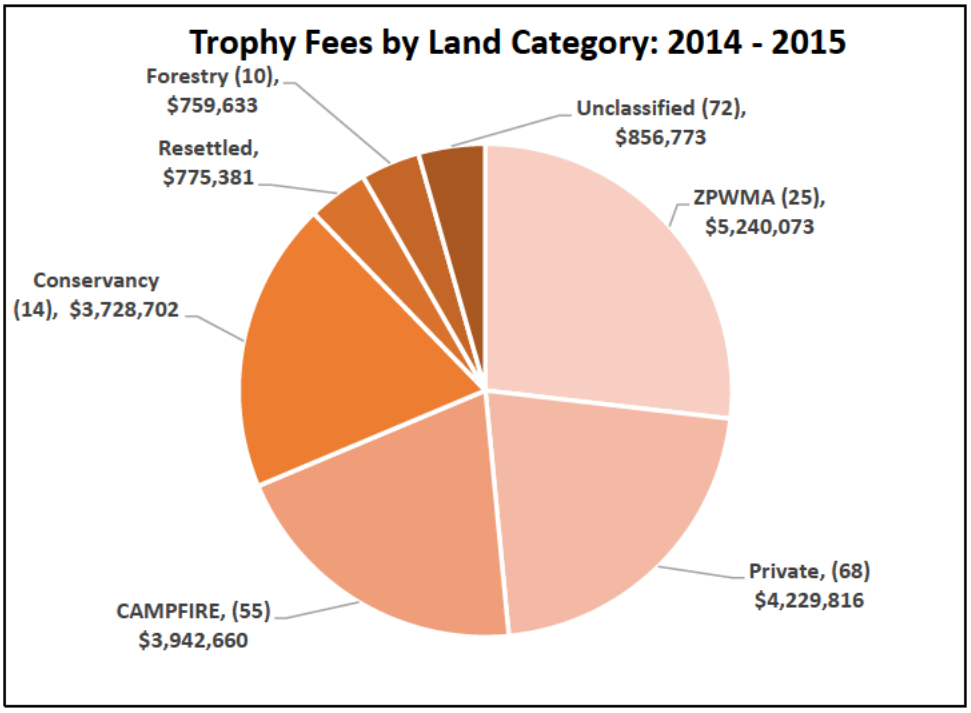


Figure 8: Hunting Trophy Fee Earnings by Land Categories (2014 - 2015). Note that from the description provided in the database, it was not possible to allocate some individual properties to a specific category. These have been recorded as unclassified (adapted from Computerised Exports Payments Exchange Control System, CEPECS - TRAS2).

Overall, approximately US$10.7 million was generated in 2014 and US$8.7 million in 2015 from the 62 species on offer. The ZPWMA represented by 25 properties that it either offers on tender to the private sector or operates as hunting areas itself generated the largest income from trophy fee sales

(US$5.2 million). The 14 Conservancies accounted for US$3.7 million while the 68 private properties are recorded as generating US$4.2 million. The CAMPFIRE areas (N=55) generated US$3.9 million.

Together with the income from daily rates (US$13,190,372 in 2014 and US$9,684,396 in 2015 (gross US$22,874,768), extracted from Computerised Exports Payments Exchange Control System, CEPECS - TRAS2), these funds are used to pay for several operational expenses including employment, law enforcement, administration and management.

7.5 Quota Setting Process

The process for quota setting follows procedures agreed to by all stakeholders (ZPWMA, 2014).

- Step 1: Allocate existing quota to each block/hunting area

The starting point for implementation of age-restrictions and adaptive quota management was to allocate existing lion quotas. This quota would then be managed adaptively in line with the age of lions hunted. In future, it is envisaged that fixed quotas for lions would fall away as quotas would be based on the age of lions hunted in the previous year.

- Step 2: Hunters complete and submit return forms and photos after each lion hunt

The data would be compiled into a database by a ZPWMA representative (currently Ms Roseline Mandisodza-Chikerema, Senior Ecologist, ZPWMA). Export permits for trophies will not be issued unless completed hunt return forms (all the required photographs and the first upper premolar) is provided to ZPWMA for aging and monitoring purposes. Furthermore, because the following year's quotas will be based on the ages of the lions hunted in the current year, operators must submit their lion hunt returns and photographs soon after the hunt. At the end of the season, all the teeth would be taken to a dentist to have x-rays conducted to allow for measurement of the size of the pulp cavity.

- Step 3: ZPWMA and Panel of experts assign an age value to each lion trophy

Lion trophies will be aged by ZPWMA, with input from lion scientists and representatives from the hunting industry at a trophy aging session. This is conducted at the end of each hunting season.

- Step 4: Calculate the next years' quotas based on a points system for the ages of lions hunted

A quota setting meeting is held where lion quotas are established for each area based on the age of lions hunted in those areas the year before. This programme commenced in 2014, and so the ages of lions hunted in 2014 will affect the lion quotas in 2015. Table 19 summaries the trend in lion quota allocations since 2002 while Table 12 provides a detailed overview of the lion trophies taken in 2015.

Table 19: Summary of lion quota allocations and offtake since 2002 (Data provided by ZPWMA)

Year	Lion Allocated Quotas	Female Offtake	Male Offtake	% Utilisation
2002	126	22	49	56%
2003	138	5	11	6%
2004	155	4	9	8%
2005	108	3	20	21%
2006	124	1	17	14%

Year	Lion Allocated Quotas	Female Offtake	Male Offtake	% Utilisation
2007	117	0	9	7%
2008	90	0	17	18%
2009	111	0	9	8%
2010	98	12	30	43%
2011	121	20	38	48%
2012	101	18	27	44%
2013	101	1	34	34%
2014	101	0	37	26%
2015	82	0	49	60%
2016	81	0	33	41%

Table 20: Analysis of lion trophies taken on various properties in 2015

Hunting Area Name	Sex	Killed Wounded	Grid Ref	Date Shot	Trophy Size
Sapi Area	M	KILLED	35l0783	03/06/2015	
Matetsi Safari Area - Unit 3	M	KILLED	307551	05/04/2015	61.31
Antoinette & Antoinette Extension	M	KILLED	187159	02/07/2015	26 7/16"
Tsholotsho District Area 2-South	M	KILLED	S1926181 E02652250	27/10/2015	25 6/8 inches
Hurungwe Safari Area - Rifa	M	KILLED	35K178113	10/05/2015	24.5
Deka Tail	M	KILLED	651 480	10/04/2015	60.38 cm
Hurungwe Safari Area - Nyakasanga	M	KILLED	s15.56.457 e029.15.584	07/06/2015	26
Msaise	M	KILLED	VN204700	14/05/2015	23
Mapari	M	KILLED	VN798124	09/06/2015	23SCI
Ngamo/Sikumi	M	KILLED	456923	09/05/2015	
Deka Safari Area	M	KILLED	278493	26/06/2015	61.5
Mbire (Guruve) South Area 2	M	KILLED	919056	09/08/2015	25.3
Bubye Valley Conservancy	M	KILLED	0194090 7625410	21/02/2015	25"
Bubye Valley Conservancy	M	KILLED	9337	29/03/2015	26"
Bubye Valley Conservancy	M	KILLED	31129	07/04/2015	25
Woodlands Farm	M	KILLED	644972	22/05/2015	25"
Bubye Valley Conservancy	M	KILLED	35K 453 159	10/05/2015	23.625
Bubye Valley Conservancy	M	KILLED	36K 908 852	25/04/2015	25"
Chewore Safari Area - North	M	KILLED	TT015643	05/06/2015	25
Bubye Valley Conservancy	M	KILLED	36K 227 593	12/05/2015	26"
Matetsi Safari Area - Unit 4	M	KILLED	4.05E+12	09/06/2015	24
Matetsi Safari Area - Unit 5	M	KILLED	865505	09/06/2015	25.25
Gunundwe	M	KILLED	822094	11/06/2015	
Bubye Valley Conservancy	M	KILLED	36K 004 971	24/06/2015	25.5625

Hunting Area Name	Sex	Killed Wounded	Grid Ref	Date Shot	Trophy Size
Bubye Valley Conservancy	M	KILLED	942 151	25/06/2015	12
Kusile District Area 1	M	KILLED	S185604.9 E0271547.4	02/07/2015	
Mokore Ranch	M	KILLED	VN110030	15/07/2015	15"
Bubye Valley Conservancy	M	KILLED	36K 229 607	29/07/2015	26"
Bubye Valley Conservancy	M	KILLED	191 623	25/07/2015	27.0625
Nyaminyami District Area 2 (Omay)	M	KILLED	657019PM	18/07/2015	24 1/8"
Matetsi Safari Area - Unit 5	M	KILLED	862 451	15/07/2015	25 8/16 inches
Matendere	M	KILLED	781021	26/07/2015	23.875
Matetsi Safari Area - Unit 1	M	KILLED	740726	13/08/2015	25
Bubye Valley Conservancy	M	KILLED	213 602	15/08/2015	15
Sango	M	KILLED	62691	23/08/2015	23.125
Sango	M	KILLED	320548	27/08/2015	
Dande Safari Area	M	KILLED	945352	13/10/2015	24in
Hurungwe Safari Area - Rifa	M	KILLED	35k062038	30/09/2015	25.25
Bedford	M	KILLED	190429	06/09/2015	
Ngamo/Sikumi	M	KILLED	456919	07/09/2015	
Bubye Valley Conservancy	M	KILLED	206 622	23/09/2015	26"
Hammond	M	KILLED	35k880103	17/10/2015	23.375
Kazuma/Panda Masuei	M	KILLED	s18.44144 & E025.64434	09/10/2015	
Nyaminyami District Area 1 (Omay)	M	KILLED	PM453354	13/11/2015	26"
Chewore Safari Area - South	M	KILLED	ST967260	25/10/2015	
Riverside Ranch	M	KILLED	35k227702	31/10/2015	24.78
Matetsi Safari Area - Unit 6	M	KILLED	18.06.55.68.25.22	03/12/2015	
Chewore Safari Area - South	M	KILLED	QN975310	06/12/2015	
Sapi Area	M	KILLED	Mtawatawa	11/06/2015	24"

7.6 POINTS SYSTEM FOR ADAPTIVELY MANAGING LION QUOTAS IN ZIMBABWE

The points system used to adaptively manage lion quotas has been developed following similar systems that have been implemented in Tanzania and northern Mozambique. The systems that are in place in Tanzania and Niassa differ slightly, but both lion quotas are set per the age of the lions harvested during the previous hunting season (Begg and Begg, 2008; Tanzania Wildlife Division 2013). The Tanzanian system is more punitive with significant quota reductions, trophy confiscation and fines for non-compliance, whereas the Niassa system is more accommodating but nevertheless can result in quota reductions if five-year-old lions are hunted. The latter was aimed at a means of accommodating the difficulty of telling five-year-old lions apart from four year olds.

After reviewing the Tanzanian and Mozambican age restriction systems and debating possible models for application in Zimbabwe, an adaptive quota management system for lion hunting based on the ages of lions hunted was agreed on in July 2013 in Harare, Zimbabwe, during a meeting hosted

by the Zimbabwe Parks and Wildlife Management Authority (ZPWMA) and an independent non-governmental conservation organisation. The approach adopted by Zimbabwe recognises four as opposed to three key age categories (Table 21).

Table 21. Proposed points system for lion age restrictions and quota setting in Zimbabwe

	≥6 years	**No trophy**	**5 years' old**	**4 years' old**	**<4 years**	**Failure to submit hunt return/incomplete hunt returns**
For quotas of 3/more	4	3	3	2	-3	0
For quotas of 2	4	3	3	2	0	0
For quotas of 1	6	3	3	2	0	0
Quota setting process	These points are added up and divided by 3 to yield the quota for next year					

During 2013, operators were requested to submit hunt returns and photos as a trial run to get the system up and running. In 2014 operators were requested to do the same but were informed that the age of the lions hunted in 2014 would determine their lion quotas in 2015. The 2015 lion hunt results would thus also determine the 2016 quota. The key distinction of the Zimbabwean system is that the quota will not be affected if they hunt animals that are five years old. This position was adopted after considering various the population models that suggested that the hunting animals of five years of age or older is predicted to be comparatively safe from a population perspective (Whitman et al. 2007). Moreover, after reviewing aging techniques, the consensus was that professional hunters could be distinguish between lions that are five or above. The system therefore rewards operators with increased quotas if they hunt animals of six years and older, but it does not penalize them if they hunt animals of five years. Neither are they penalised if they do not shoot a lion that they have on quota, however, the quotas will be reduced if they hunt animals younger than five years or if they failed to complete hunt returns.

Lions are aged by triangulating multiple different aging characteristics, including:

- The degree of facial scarring;
- The teeth colour and degree of wear;
- The mane development (particularly regarding the shape around the ear and the mohawk);
- Through post mortem analysis of the width of the pulp cavity of the second premolar (which becomes narrower with age).

7.6.1 Results of the Adaptive Lion Quota Management System: 2013 to 2016

In 2013, only 28% of the lions hunted were 5 years or older, in 2014 that figure had risen to 49% and in 2015 to 77.3% (Figure 5). The proportion of lions hunted that were less than 5 years of age dropped overall between 2013 and 2015 (Figure 9).

In 2015 the Zimbabwe national lion hunting quota was set at 82 lions. Of this 82, only 49 were hunted in 2015, and based on the resultant score from aging the trophies, and the fact that operators chose not to hunt lions of inadequate age (see Figures 9, 10 and 11), the recommended quota for 2016 was set at 81. In 2015 there was a marked increase in the age of lions hunted. Notably, only one lion of <4 years of age was hunted and the large majority of lions were 5 years or older (Figure 9).

As was agreed upon at the 2013 lion management meeting in Harare, the CAMPFIRE areas in which lions occur are currently exempted from the age restrictions. This approach was adopted as a means of ensuring that impoverished communities obtain the opportunity to benefit from the presence of lions, recognising the potential negative impacts the species has on the livelihoods of livestock farmers.

Using these figures and estimating the average value of a lion safari at approximately US$ 80,000 then a 50% offtake would generate approximately US$ 2,800,000 annually. If management costs are approximately $150 km^2, then the lion safaris alone can support 18,600 km^2 of wildlife habitat in Zimbabwe.

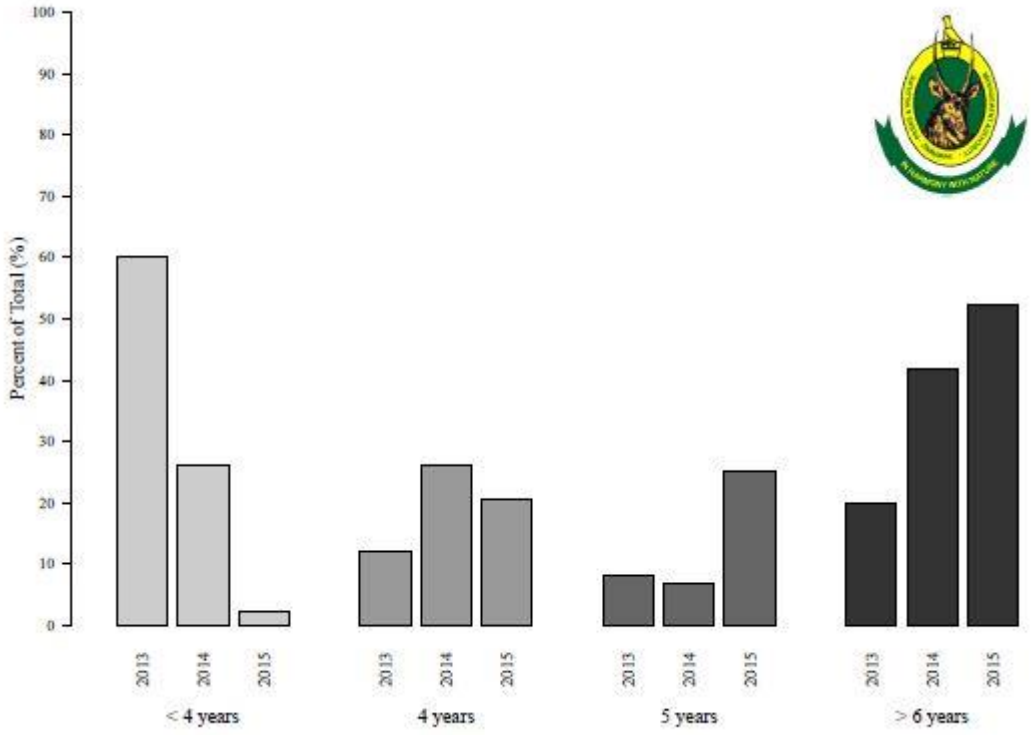


Figure 9: The percentage of lions hunted in each age class in 2013, 2014 and 2015 in Zimbabwe.

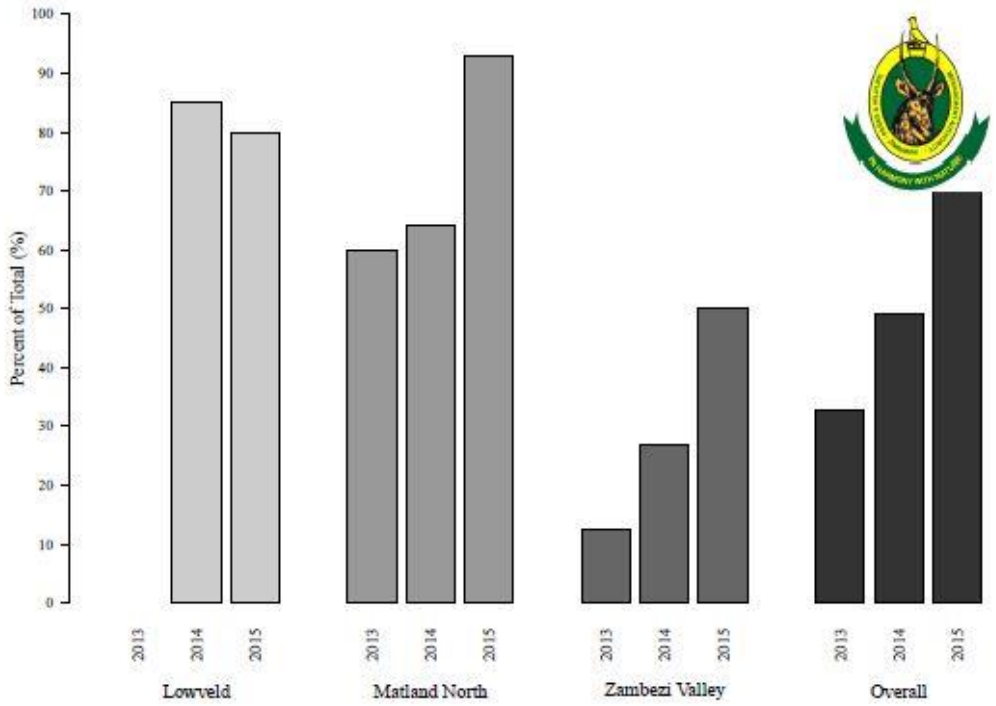


Figure 10: The proportion of lions hunted that were 5 years or older in the three main lion-hunting areas of Zimbabwe.

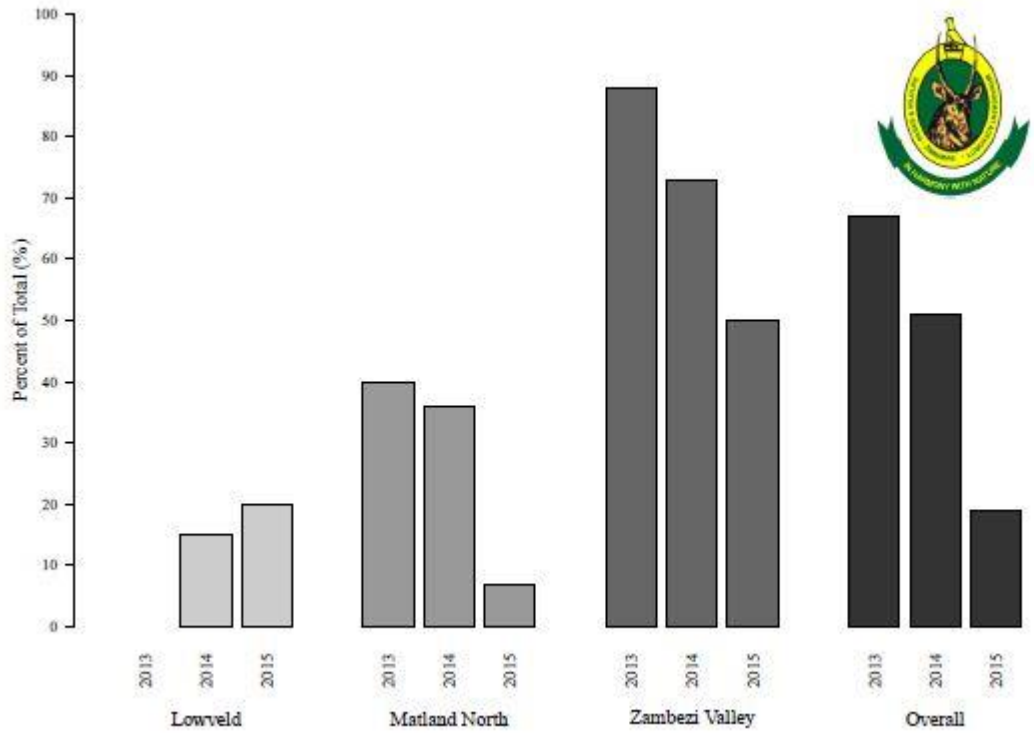


Figure 11: The proportion of lions hunted that were less than 5 years of age in the three main lion-hunting areas of Zimbabwe.

7.6.2 Case study: Safari Hunting surrounding Hwange National Park

The Hwange National Park is surrounded by hunting areas that fall under the Authority, Forestry Land, Private Land and Communal Land. The ZPWMA is responsible for setting and administrating quotas in conjunction with stakeholders for the safari areas, forestry areas, communal lands and private properties.

The Matetsi Safari Area to the north of Hwange National Park was established in the 1970s when several unsuccessful private sector mixed faming properties were expropriated, compensated and the resultant block of land turned over to safari hunting – a largely untried venture at that time on a large scale. An intensive monitoring system was set in place to gauge the effectiveness of the scheme and this continues to this day (Crossmary et al. 2013, Figure 12). The seven concessions (six given over to safari hunting) are leased on five year terms and concessionaires pay a 5 year "right to lease" fee, an annual rental, a fixed quota fee (payable if animals are shot or not) and a supplementary quota fee which allows additional animals to be bought as per need.

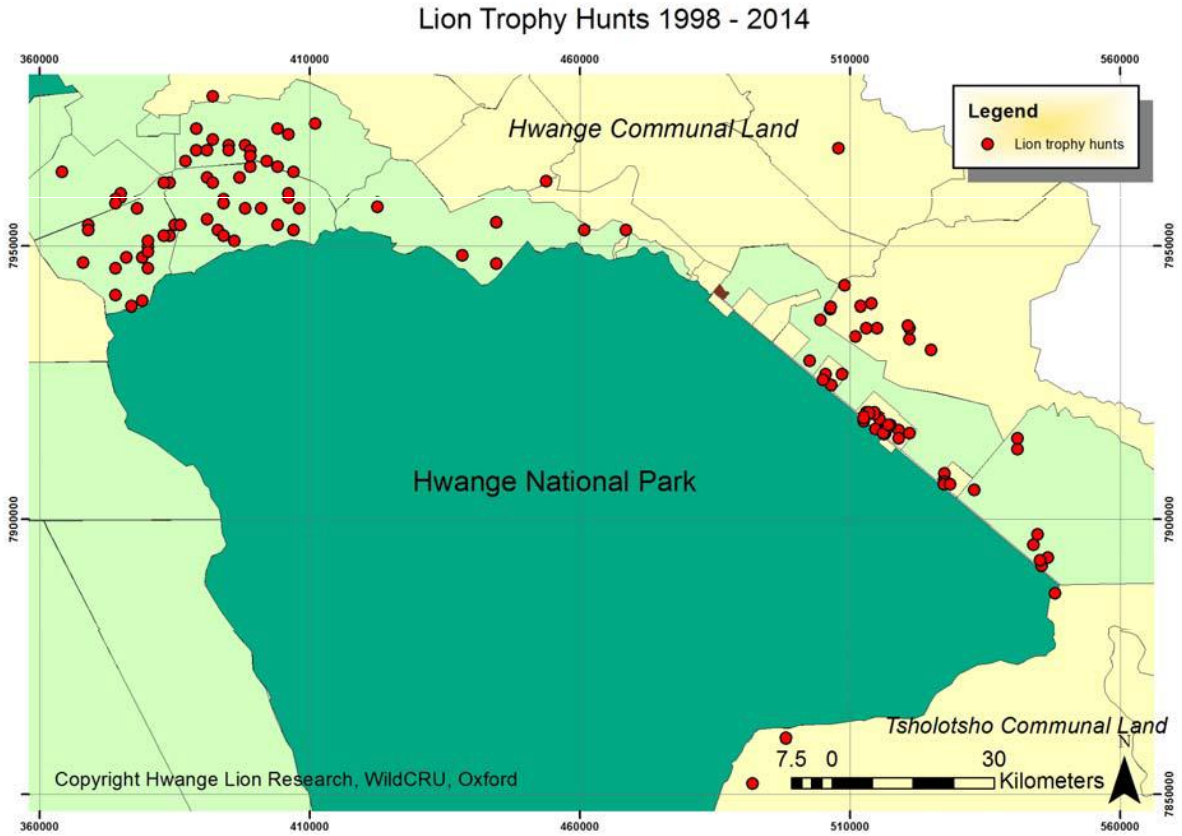


Figure 12: Record of where lion have been hunted on the land surrounding the Hwange National Park since 1998 (data extracted from the Hwange National Park Management Plan).

8 THREATS AND MITIGATION

The consensus of the scientific and animal welfare community is that the populations of lion in Africa has declined by 43% in the last two decades, with the greatest declines having occurred in west Africa. The exception to this are the populations of southern Africa, notably South Africa, Namibia, Botswana and Zimbabwe that are home to 24- 33% of the overall population has increased (Funston et. al. 2016).

Nonetheless, as is the case in other range states, the greatest threats to lion in Zimbabwe are from habitat loss, snaring and retaliatory killings where livestock are involved.

8.1 HUMAN-LION CONFLICT

The main source of illegal killing of lions is a result of Human-Lion conflict. The human population of Zimbabwe has increased since 1960 (estimated at 13 million). There is considerable pressure to convert land to agro-pastoral production, and the pressure is expected to increase. It is not unexpected therefore that the incidence of Human-Lion conflict will increase. ZPWMA records show that 200 attacks occurred on humans and 150+ on livestock (cattle, goats, sheep, dogs etc.) were killed in 2015 (see Table 13 above).

Retaliation for these livestock losses is usually done poisoning or hunting. The exact number of lions killed in this way is difficult to assess, but may number over 50/year. These indiscriminate killings pose the most significant threat to the species, and is of major concern to the management authorities. For example, the Area Manager for Hwange National Parks reported that 6 lions were killed on the Hwange National Parks boundary in 2016, and the Authority responded to several problem animal attacks on livestock.

In accordance with the Parks and Wildlife Act of 2001 when a lion attacks a human or kills livestock, it shall be eliminated. However, despite the numerous incidents reported across the country, less than 10 lions are killed through official "problem animal control" (PAC).

8.2 HABITAT LOSS

Zimbabwe supports substantial populations of lions outside of its protected areas and extensive conservancies. Moreover, despite its expanding human population, many of the protected areas are still intact however, the threat to lions from habitat loss exists in the Sebungwe and the South East Low Veld where the fragmented nature of the protected areas is compounded by an increasing human and livestock populations surrounding these areas. In these areas, habitat loss, reduction in prey populations and killing of problem lions are the major threats to long term lion survival.

Due to the large size of the protected area system in the Zambezi Valley and North West Matabeleland, threats are limited to lion range which extends into adjacent settled areas. The huge natural prey base in these protected areas, reduced killing of problem animals associated with lions preying on livestock in adjacent settled areas.

The potential and real loss of habitat and the fragmentation of range and conflicts with people in the absence of effective incentive mechanisms to maintain such habitat is probably the second greatest threat to lions after retaliatory killings. Increasing livestock numbers is reducing the available habitat in buffer areas adjacent to the protected areas, and increasing the incidents of human-lion conflicts. Lions are being more and more regarded as a liability and economic cost to rural communities. Reversing this trend is difficult under normal circumstances, and this has been made that much more difficult with the cessation of lion hunting. Integrating income from lions into rural economies, and demonstrating that lions contribute to the welfare and development of people is regarded as one strategy to mitigate against this. The involvement and empowerment of rural people in natural resource management through the CAMPFIRE programme that strives to provide economic and financial incentives through sustainable use, is one of the main driving forces behind changes in attitudes towards wildlife in communities where lion-livestock conflicts occur.

8.3 ILLEGAL TRADE IN LION PRODUCTS

Very few lions are poached in Zimbabwe (not to be confused with retaliatory killings). Records, mainly from anti-poaching reports, are for impoundment of body derivatives such as skins, teeth/claws, body

fats and bones. These may be sought after for local traditional medicinal use. Poaching mainly occurs along the boundaries of the protected areas where lions are incidentally snared as non-target prey.

The illegal trade in lions and their products (i.e. bone trade) is very insignificant. There are no records of people found in possession of illegally acquired lion specimens in Zimbabwe, and anyone found in possession of illegally acquired lion specimens is required to pay a fine US$5000 or faces a mandatory jail sentence. On conviction for lion poaching, courts may ask the accused to pay a compensation fee of US$20 000.

8.4 BUSHMEAT POACHING

Poaching for bushmeat is an important livelihood component of rural communities in Zimbabwe and a vast literature exists on this subject (see Lindsey et. al. 2015a and 2015b). Poverty stands as the major driver of illegal hunting, and the livelihoods of illegal hunters have been augmented considerably through revenue generated from bushmeat sales. Illegal hunters use bushmeat both for supplementing household protein and for economic gain.

Poaching for bushmeat does not seem to have impacted directly the overall lion's status in Zimbabwe, but more research is needed to fully understand its impact on lion. However, lions are often inadvertently caught in snares set for animals targeted by bushmeat poachers. Where possible, lions caught in snares are captured and treated (Figure 13).





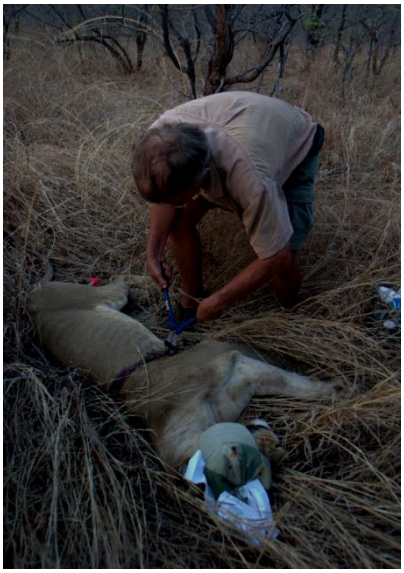




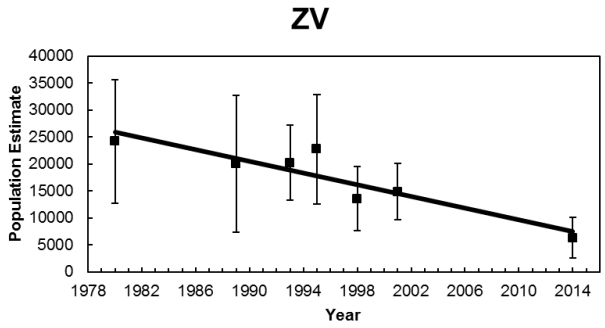
Figure 13: Young lioness being treated by the Victoria Falls Conservation Trust after a snare was removed from around the chest (Source: S. Edwards)

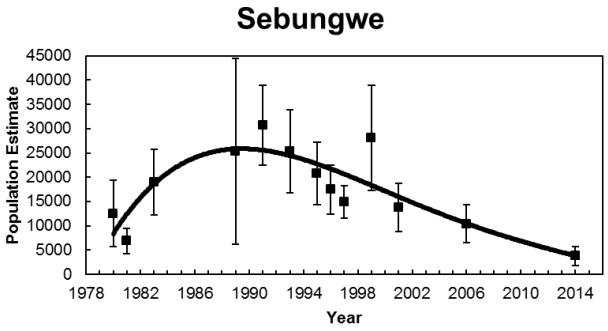
8.5 PREY ABUNDANCE

The extent to which bushmeat poaching outside of the Parks Estate is depleting lion's prey is not known. Prey abundance is still high in all protected areas where lions occur, and as abundance of prey species is highly correlated with lion density (Hayward et al 2007), data on the main prey species for lion, extracted from the 2014 aerial surveys of elephants and other large herbivores (Dunham et. al., 2015, 2015a, b, c, d) are shown in below (ZV = Zambezi Valley, NW Mat = North West Matabeleland).

The overall long term trends show that most population status of most prey species has declined in recent years. There are many possible explanations for these declines, but probably the most critical factor has been droughts, especially that experienced in 2005.

Buffalo


ZV
Population Estimate
40000
35000
30000
25000
20000
15000
10000
5000
0
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year


Sebungwe
Population Estimate
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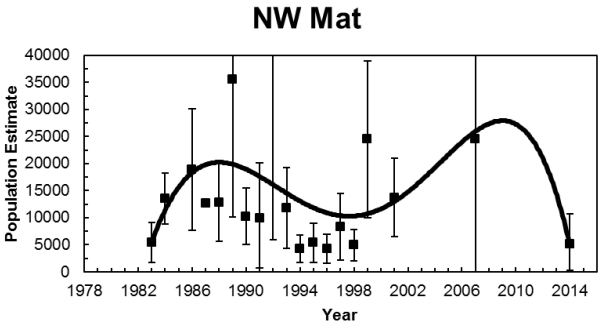
35000
30000
25000
20000
15000
10000
5000
0
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year


NW Mat
Population Estimate
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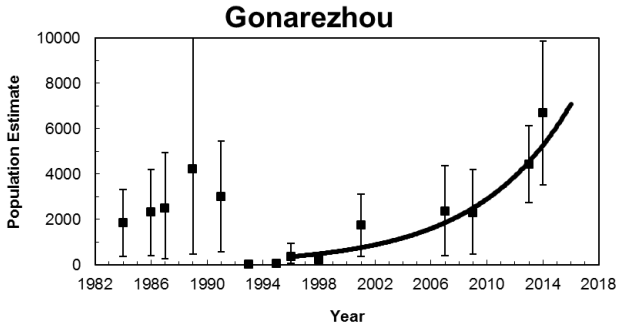
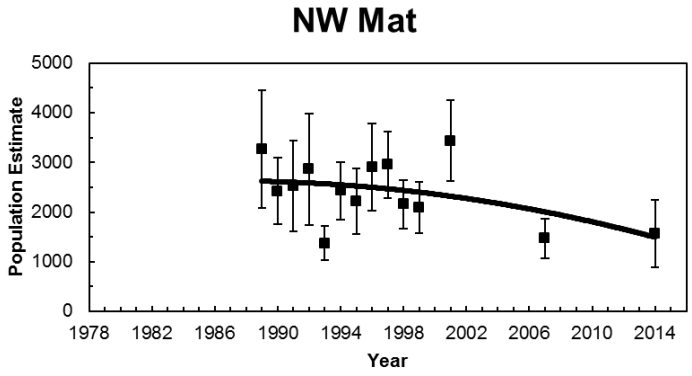
35000
30000
25000
20000
15000
10000
5000
0
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year


Gonarezhou
Population Estimate
10000
8000
6000
4000
2000
0
1982 1986 1990 1994 1998 2002 2006 2010 2014 2018
Year

Giraffe


NW Mat
Population Estimate
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4000
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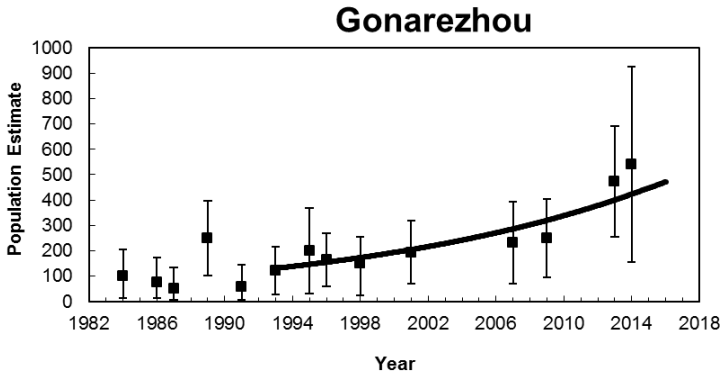
1978
1982
1986
1990
1994
1998
2002
2006
2010
2014
Year


Gonarezhou
Population Estimate
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800
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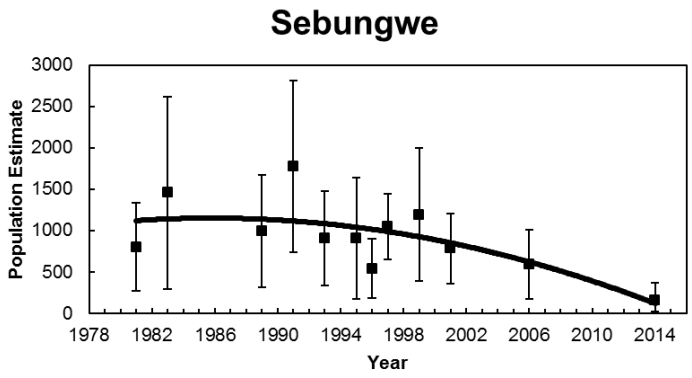
0
1982
1986
1990
1994
1998
2002
2006
2010
2014
2018
Year

Sable


Sebungwe
Population Estimate
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2500
2000
1500
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500
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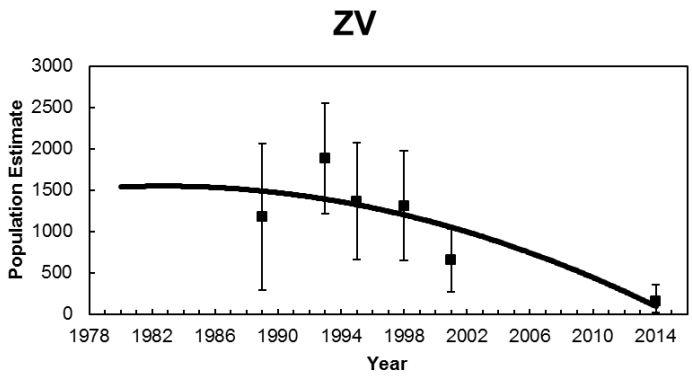
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year


ZV
Population Estimate
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2500
2000
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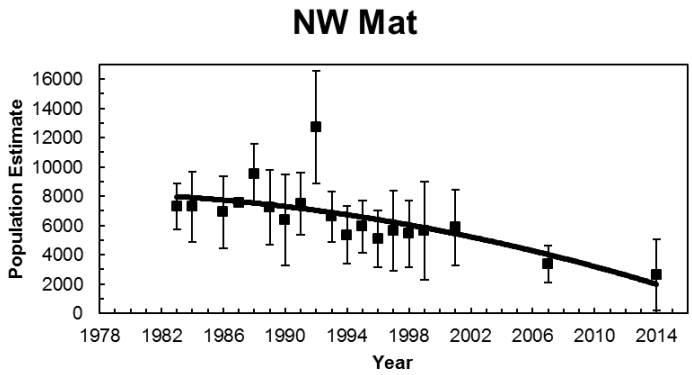
500
0
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year


NW Mat
Population Estimate
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12000
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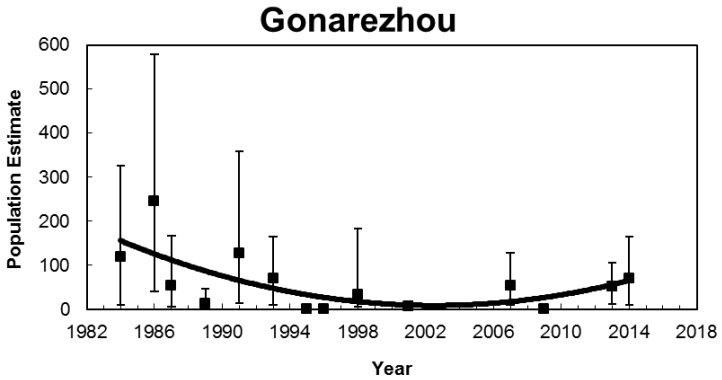
4000
2000
0
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year


Gonarezhou
Population Estimate
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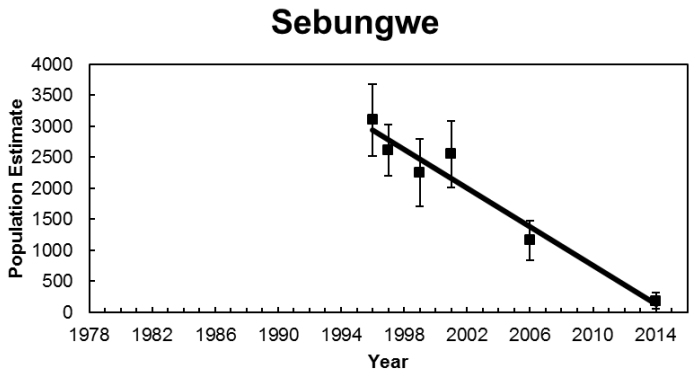
300
200
100
0
1982 1986 1990 1994 1998 2002 2006 2010 2014 2018
Year

Kudu


Sebungwe
Population Estimate
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3000
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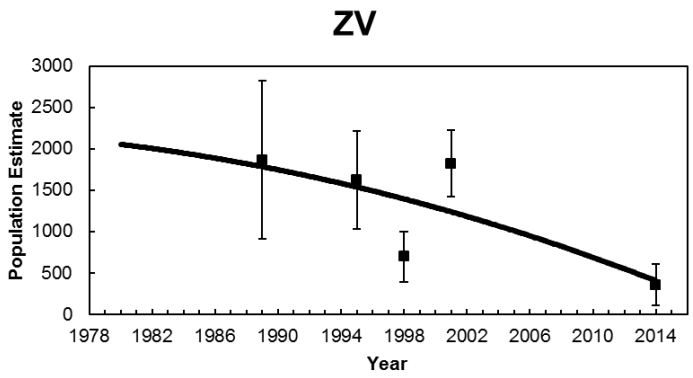
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year


ZV
Population Estimate
3000
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2000
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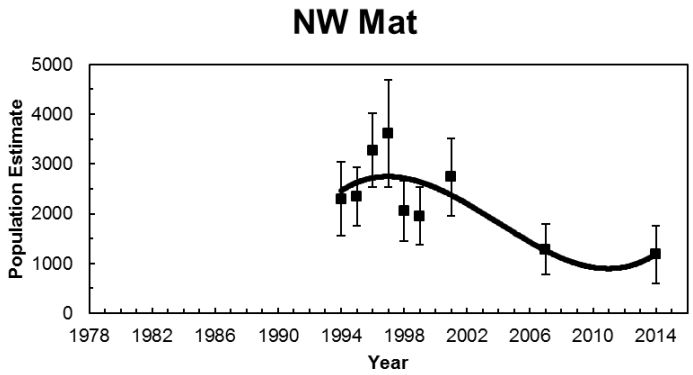
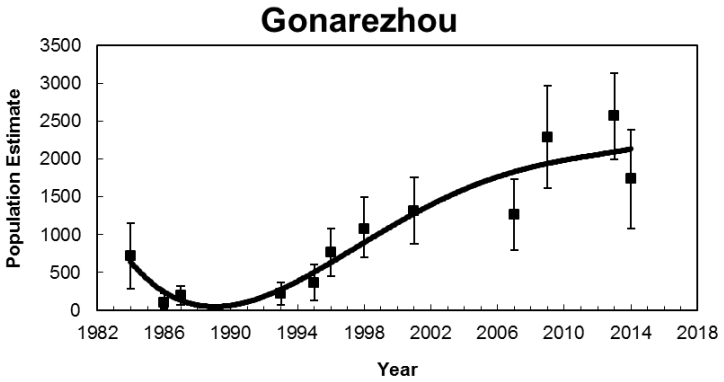
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year


NW Mat
Population Estimate
5000
4000
3000
2000
1000
0
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year


Gonarezhou
Population Estimate
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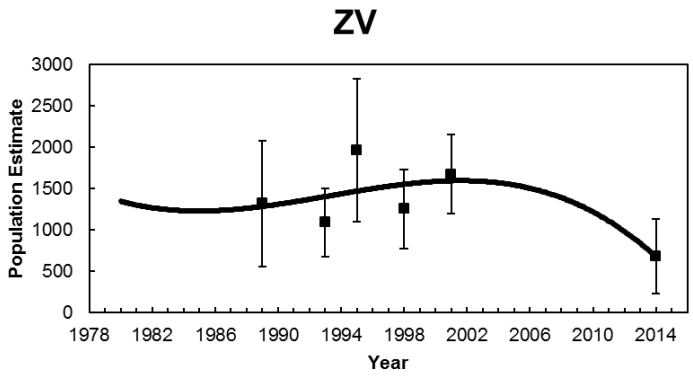
2500
2000
1500
1000
500
0
1982 1986 1990 1994 1998 2002 2006 2010 2014 2018
Year

Zebra


ZV
Population Estimate
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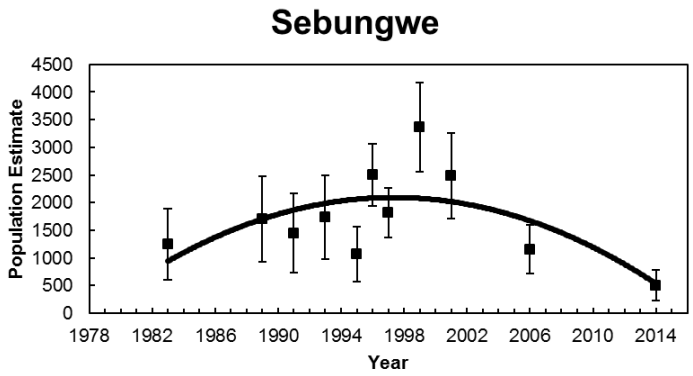
2000
1500
1000
500
0
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year


Sebungwe
Population Estimate
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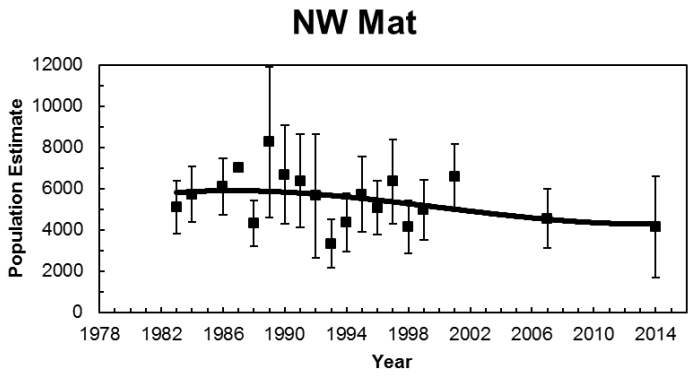
3500
3000
2500
2000
1500
1000
500
0
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year


NW Mat
Population Estimate
12000
10000
8000
6000
4000
2000
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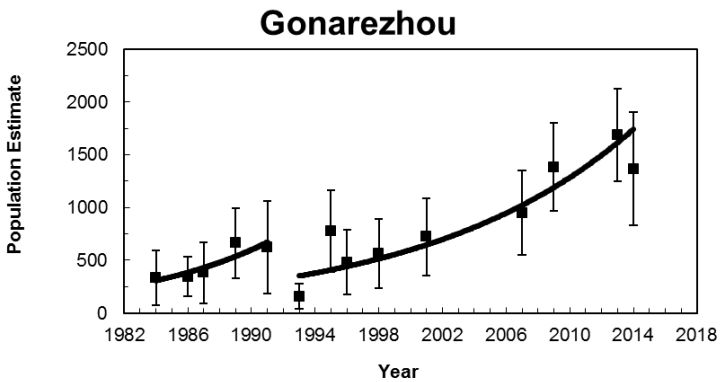
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year


Gonarezhou
Population Estimate
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2000
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1000
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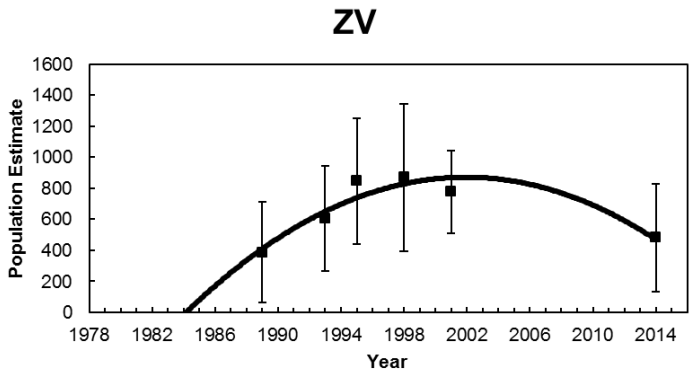
0
1982 1986 1990 1994 1998 2002 2006 2010 2014 2018
Year

Waterbuck


ZV
Population Estimate
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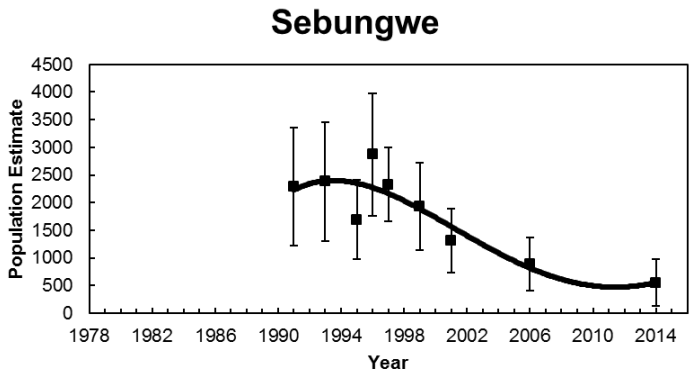
Year


Sebungwe
Population Estimate
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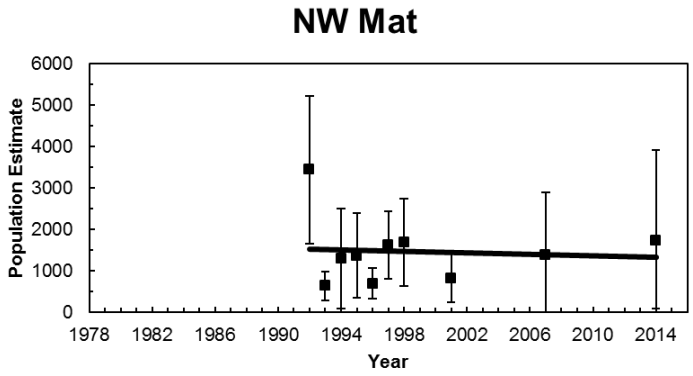
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year


NW Mat
Population Estimate
6000
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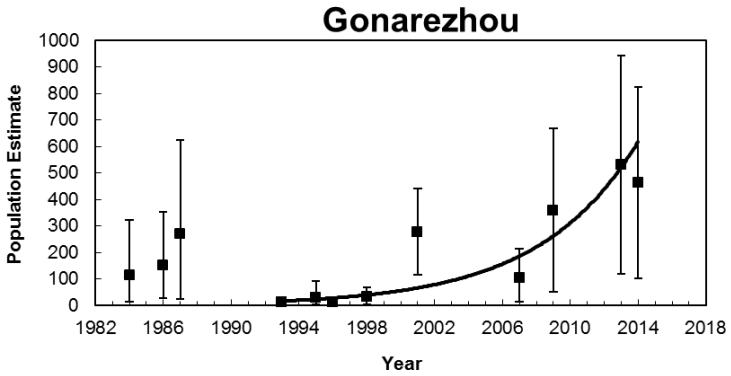
1978 1982 1986 1990 1994 1998 2002 2006 2010 2014
Year


Gonarezhou
Population Estimate
1000
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1982 1986 1990 1994 1998 2002 2006 2010 2014 2018
Year

9 ASSESSMENT OF THE ENHANCEMENT AND NON-DETRIMENT FINDINGS

The assessment of the enhancement and non-detrimental findings for lion in Zimbabwe is presented here using the "IUCN SSC GUIDING PRINCIPLES ON TROPHY HUNTING AS A TOOL FOR CREATING CONSERVATION INCENTIVES. VER. 1.0. IUCN SSC (2012)" as a guide. Zimbabwe recognises the importance of these principles to guide and manage trophy hunting as a legal, regulated conservation activity which provides a critical tool to secure a sound social, economic and ecological conservation scenario.

Biological Sustainability: Trophy hunting can serve as a conservation tool when it:

	Principle	**Remarks**
1	***Does not contribute to long-term population declines of the hunted species or of other species sharing its habitat, noting that a sustainably harvested population may be smaller than an unharvested one***	Considering the latest available estimate of lion population size in Zimbabwe (1,800 – 2,000), trophy hunting harvests a yearly mean of 2.7% of adult male lions. This figure has decreased since the establishment of age restriction rules on lion hunting. This low offtake is sustainable and generates significant financial and other benefits to ZPWMA, Communities and Private Sector.
2	***Does not substantially alter processes of natural selection and ecosystem function; that is, it maintains "wild populations of indigenous species with adaptive gene pools." This generally requires that hunting offtake produces only minor alterations to naturally occurring demographic structure. It also requires avoidance of breeding or culling to deliberately enhance population-genetic characteristics of species subject to hunting that are inconsistent with natural selection***	Safari hunting in does not substantially alter natural selection or ecosystem processes. The limited quota, as further limited by age restrictions, ensures that hunting offtakes do not negatively affect natural processes. This age-based policy was adopted in part to mitigate any social or population impacts from limited safari hunting. (Whitman et al. 2004).
3	***Does not inadvertently facilitate poaching or illegal trade of wildlife***	Safari hunting in Zimbabwe does not facilitate poaching or illegal trade. Poaching and illegal trade in lion products is currently very low suggesting that the existence of licensed, regulated hunting is helping control poaching and not facilitating it. Hunting operators are in the frontlines against poaching, and are obligated through their concession lease agreements to assistance with anti-poaching. Operators spend significant resources on this, and work in close cooperation with the ZPWMA to combat all forms of illegal wildlife trade. Even where anti-poaching is not a legal prerequisite, operators fund their own anti-poaching teams and support government rangers and community scouts e.g. in Sengwa and Dande Safari Area

	Principle	Remarks
4	***Does not artificially and/or substantially manipulate ecosystems or their component elements in ways that are incompatible with the objective of supporting the full range of native biodiversity***	Hunting in Zimbabwe has created financial incentives for the development and retention of wildlife across Safari Areas, Forestry Areas, Communal CAMPFIRE Areas and private Conservancies thereby supporting biodiversity over 145,000km^2 where hunting is a primary land use. Hunting areas on private and communal land outside of the protected areas also serve as buffer zones for many national parks and safari areas which would be converted to other land uses if these were abandoned.

Net Conservation Benefit: Trophy hunting can serve as a conservation tool when it

	Principle	Remarks
1	***Is linked to identifiable and specific parcels of land where habitat for wildlife is a priority (albeit not necessarily the sole priority or only legitimate use); and on which the "costs of management and conservation of biological diversity [are] internalized within the area of management and reflected in the distribution of the benefits from the use"***	Zimbabwe has identified Safari Areas within the Parks Estates where maintaining habitats and wildlife populations is the priority. These gazetted protected areas cover approximately 17,000km^2 where, without safari hunting, it would be difficult to secure and maintain natural ecosystems and prey bases for lions. In addition to these areas, lion occur on 66% (approximately 11,000km^2) of the land set aside as Conservancies. The operational and law enforcement costs incurred by hunting companies on a yearly basis ranges from US$300,000 to US$500,000 per hunting concession, which includes the expense of camps, salaries, anti-poaching, fuel, community assistance, etc. Many of the government's costs of maintaining Safari Areas are transferred to the private sector through the obligations of their concession agreements. Revenues from hunting in communal CAMPFIRE areas are used to support a range of social services (e.g. schools, clinics, irrigation schemes etc.) while operators cover the costs of anti-poaching, maintenance and development, and contributions to communities living nearby (e.g. through boreholes, grinding mills etc.).

		In private hunting areas and conservancies, the costs and benefits of wildlife in the area are internalized and distributed within the area of management. Critically, most of the Conservancies have elected to manage and conserve endangered species, such as black rhino, and offset the costs of this by conducting sustainable hunting of lion and other key trophy species.
2	***Produces income, employment, and/or other benefits that generate incentives for reduction in pressures on populations of target species, and/or help justify retention, enhancement, or rehabilitation of habitats in which native biodiversity is prioritized. Benefits may create incentives for residents to co-exist with such problematic species as large carnivores, herbivores competing for grazing, or animals considered to be dangerous or a threat to the welfare of humans and their personal property***	Hunting produces direct and indirect income, employment, and other benefits that generate incentives that reduce the threats to wildlife populations. Approximately US$44 million accrued to the country from the revenues of trophy hunting over the last two years. This could have been 5% higher if it were not for restrictions on the export of elephant and lion trophies. This revenue pays for the daily wildlife conservation work in all sectors of the wildlife industry, including research projects, surveys, anti-poaching, and other services. Of this amount, approximately 20% is paid directly to the ZPWMA which is then used to support its management activities, including anti-poaching budgets. Local communities benefit from hunting income through leasing the right to hunt and the sale of trophy fees in CAMPFIRE areas as well as from voluntary contributions and meat. Over the last 6 years, payments from hunting operations generated approximately US$16 million. The nature of the hunting industry does not require large numbers of people to be employed. Nonetheless, the average hunting company employs approximately 80 people on a permanent basis and 20 on a seasonal basis. This equates to approximately 3,000 people who would not otherwise secure any form of employment because of the lack of opportunities in the remote areas where hunting takes place.
3	***Is part of a legally recognized governance system that supports conservation adequately and of a system of implementation and enforcement capable of achieving these governance objectives***	All wildlife species in Zimbabwe, including the African lion, are protected under the Parks and Wildlife Act of 1996 (Chapter 20:14) as amended by Act Number 19 of 2001 which came into operation on the 1st of June 2002 through a Statutory Instrument 144C of 2002. The Act that was originally passed by Parliament in 1975 was a unique move in Africa, if not globally, that promoted the rapid development of the country's wild life industry and lead to the partial

		extension of the principle to the Communal Lands through the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) in the 1980s. The Act provided a legal basis for the devolution of Authority through granting Appropriate Authority Status to the communal areas to manage the wildlife resources for their own benefit. The Act was subsequently revised in 1996 and 2001 with the latest revision paving the way for the establishment of the current Parks and Wildlife Management Authority to replace the former Department of National Parks and Wild Life Management. Following the introduction of the Parks and Wild Life (General) (Amendment) Regulations, 1998 (No.2), i.e. Statutory Instrument 26 of 1998, the administration of the wildlife industry experienced increasing centralisation of controls on wildlife management and utilisation on alienated and communal land. The Parks and Wildlife Management Authority is mandated by the Parks and Wildlife Act [Chapter 20:14], with the responsibility of conserving Zimbabwe's wildlife heritage through effective, efficient and sustainable protection and utilisation of natural resources for the benefit of present and future generations. The Authority was established to allow it to retain the revenue that it generates to fund its operations and thereby reducing its dependence on Treasury. This entailed introducing a commercial dispensation and putting in place effective revenue generation and financial management systems. The ZPWMA has the mandate to manage the entire wildlife population of Zimbabwe, whether on state, private and communal land.

Socio-Economic-Cultural Benefit

	Principle	10 Remarks
1 1	***Respects local cultural values and practices (where "local" is defined as sharing living space with the focal wildlife species), and is accepted by (and preferably, co-managed and actively supported by) most members of the local community on whose land it occurs***	Zimbabwe has promoted the CAMPFIRE programme that requires safari operators to work closely with the Wards and villages in the concession areas how to use the contributions from hunting to implement community and infrastructure development and projects. There are currently 33 CAMPFIRE programmes in Zimbabwe but only 13 of these are dependent on income from hunting that is used to invest in conservation work and community development services.
2	**Involves and benefits local residents in an equitable manner, and in ways that meet their priorities**	The CAMPFIRE programme is the foundation upon which the community based conservation system in Zimbabwe is based, and is seen as one of the key components of rural development. The CAMPFIRE programme is critical in areas that are adjacent to the national parks and safari areas since they provide a means to support wildlife and critical habitats outside of the protected areas.
3	***Adopts business practices that promote long-term economic sustainability***	All Rural District Councils and Wards that support CAMPFIRE Programmes have established committees that have the authority to negotiate and enter into contracts with the private sector for both consumptive and non-consumptive agreements. Over the last 6 years, the six key CAMPFIRE districts have generated approximately $2,802,077/year. Hunters from USA contribute 51% and Europe 31% of this income. Income to Districts from a variety of wildlife related revenue streams is approximately $2,510,783/year, and 74% of this income is used to support general administrative and management costs, including law enforcement. At the Ward level,55% the income received (approximately $2.9 million/year) is used to support a variety of social services that benefit a large proportion of the local community.

Adaptive Management: Planning, Monitoring, and Reporting

	Principle	Remarks
1	***Is premised on appropriate resource assessments and/or monitoring of hunting indices, upon which specific quotas and hunting plans can be established through a collaborative process. Optimally, such a process should (where relevant) include local communities and draw on local/indigenous knowledge. Such resource assessments***	Zimbabwe implements an adaptive quota setting quota system that uses inputs from monitoring data and input from a variety of stakeholders including ZPWMA field and research staff, local communities, hunting operators, and independent biologists. Quotas are set based on population estimates or trend

	(examples might include counts or indices of population performance such as sighting frequencies, spoor counts) or hunting indices (examples might include trophy size, animal age, hunting success rates and catch per hunting effort) are objective, well documented, and use the best science and technology feasible and appropriate given the circumstances and available resources	analyses, monitoring data, hunt return data, research work and indices as may be reflected in various reports by field personnel. For lions, specifically, the ZPWMA together with the Safari Operators Association (SOAZ), the Zimbabwe Professional Hunters Association (ZPHGA) and invited independent scientists (such as Panthera) review the returns from the current hunting season and assign points as per the lion aging criteria. The overall quotas allocated and actual offtake have been reduced in recent years as a precautionary measure, including implementing moratoriums in some regions where lion densities have declined. These measures, i.e., age, population trends, maximum overall numbers and levels of utilisation has resulted in lower quotas thus underlining Zimbabwe's commitment to sustainable hunting.
2	***Involves adaptive management of hunting quotas and plans in line with results of resource assessments and/or monitoring of indices, ensuring quotas are adjusted in line with changes in the resource base (caused by ecological changes, weather patterns, or anthropogenic impacts, including hunting offtake)***	Quotas are set adaptively in line with the results of monitoring trends and on regulatory compliance. If an underage lion is harvested, the quota for that area is removed in the next season to allow the population to age and to penalize the non-compliance. In this way, Zimbabwe ensures responsible and sustainable offtakes that have limited impact on the lion population.
3	***Is based on laws, regulations, and quotas (preferably established with local input) that are transparent and clear, and are periodically reviewed and updated***	Safari hunting in Zimbabwe is regulated through the National Parks and Wildlife Act and supporting Regulations that specify when, where and how animals are hunted. Both the professional hunters and the hunting client are licensed in terms of these regulations, and all returns are lodged electronically and tracked through the Reserve Bank TRAS-2 system. As described above, quotas are established in a transparent and participatory way.
4	***Monitors hunting activities to verify that quotas and sex/age restrictions of harvested animals are being met***	The monitoring of the lion hunting is carried out through the implementation of a specific database and a specific safari return form. All hunting permits issued by (and compulsorily returned to) the ZPWMA are registered on a specific database that has been developed under the auspices of the Exchange Control Division of the Reserve Bank that records all parameters related to hunting safaris, including records of lion hunting. The database is accessible to the ZPWMA who can extract reports on all lion hunting activities for all areas in the country.

		Since 2013, all professional hunters conducting lion hunting safaris are required to fill in the return form for both successful and unsuccessful safaris that captures a broad range of general information on the safari (client name, duration, date, payments etc. For the successful lion hunting safaris, additional information related to hunting effort and success, trophy skull measures (total length and width) and specified photographs are taken of the physical features (mane etc.) and upper and lower jaws. These return forms and trophy photographs are compulsory. No CITES export permit can be issued without compliance. All data forms are reviewed by the ZPWMA together with a committee appointed by the SOAZ and ZPHGA to ensure the offtakes and subsequent exports are not detrimental to the survival of the species. Zimbabwe also requires that a ZPWMA ranger accompany all lion safaris both on state land and private land.
5	***Produces reliable and periodic documentation of its biological sustainability and conservation benefits (if this is not already produced by existing reporting mechanisms).***	The Exchange Control Division of the Reserve Bank publishes a detailed report that summarises all data related to sport hunting. This includes country of origin of clients, gross income from daily rates and trophy fees (by company), average trophy and safari values, and the contribution of key species to the overall income generated through hunting. The ZPWMA also produces annual reports that highlight the performance of the hunting industry, listing the challenges that it faces. It also submits periodic reports to CITES.

Accountable and Effective Governance

	Principle	**Remarks**
1	***Is subject to a governance structure that clearly allocates management responsibilities***	The governance structure is described in the Parks and Wildlife Act and its subsidiary regulations that clearly provides for institutional arrangements and administration defining the management responsibilities within the relevant Government Authority.
2	***Accounts for revenues in a transparent manner and distributes net revenues to conservation and community beneficiaries according to properly agreed decisions;***	The equitable distribution of costs and benefits take into consideration the role of stakeholders in relation to the land category. Benefit sharing to communities under the CAMPFIRE programme is determined through an approved ratio that

		channels 55% of all income from hunting to the Ward level. This institution is monitored at the local level by the Rural District Councils that guide Ward Wildlife Committees with respect to community projects and services. At national level this is monitored by Ministry of Rural Development, Preservation and Promotion of Culture and Heritage Safari operators contribute substantially and voluntarily, over and above the prescribed fixed contribution, especially where this involves anti-poaching efforts and community developments. They provide funding, equipment and the technical expertise for repairs, transportation, and other social services (schools, boreholes). In addition, hunting companies collaborate with both ZPWMA and District anti-poaching teams to remove snares, participate in serious wildlife crime investigations and arrest poachers.
3	***Takes all necessary steps to eliminate corruption;***	Anti-corruption efforts in Zimbabwe are governed by the following legislation: • The Prevention of Corruption Act (1983); • Public Service Act (1995); • The Ombudsperson Amendment Act (1997); • Anti-Corruption Commission Bill (2004); • The Criminal law (Codification and Reform) Act (2004); • Bank Use Promotion and Suppression of Money Laundering Act (2004); • Criminal Procedure and Evidence Amendment Act (2004); and • Criminal Law (Codification and Reform) Act of 2006 The Zimbabwean Anti-Corruption Commission (ACC) was established after the passing of the Anti-Corruption Commission Bill in June 2004. The Commission is a signatory to the Southern Africa Development Community (SADC) Protocol as well as the African Union (AU) and United Nations Convention on Anti-Corruption.
4	***Ensures compliance with all relevant national and international requirements and regulations by relevant bodies such as administrators, regulators and hunters.***	The CITES Management Authority of Zimbabwe, the ZPWMA, ensures compliance of safari hunting to CITES guidelines and provisions.

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12 APPENDICES

12.1 ANNEX I: SUMMARY OF NATIONAL PARKS ESTATE, FORESTRY, COMMUNAL AND PRIVATE LAND WHERE LION ARE KNOWN TO OCCUR

1. National Parks Estate

Type of Land	Name of Park	District	Area (hectares)	Presence of lion
NP	Chizarira	Binga	191,000	Yes
NP	Gonarezhou	Chiredzi	505,000	Yes
NP	Matusadonha	Nyaminyami	140,700	Yes
NP	Chimanimani	Chimanimani	17,110	No
NP	Mana Pools	Hurungwe	219,600	Yes
NP	Kazuma Pan	Hwange	31,300	Yes
NP	Hwange	Hwange	1,465,100	Yes
NP	Victoria Falls "A"	Hwange	1,904	No
NP	Victoria Falls "B"	Hwange	436	No
NP	Zambezi	Hwange	56,010	Yes
NP	Rhodes Nyanga	Nyanga	47,150	Migratory
NP	Rhodes Matopos	Matobo	42,400	No
Total Area National Parks (ha)			**2,717,710**	
Botanical Gardens	Pioneer Reserve	Beitbridge	38	No
Botanical Gardens	Tolo River Reserve	Beitbridge	44	No
Botanical Gardens	South Camp Reserve	Beitbridge	26	No
Botanical Gardens	Chisekera Hot Springs	Chiredzi	95	No
Botanical Gardens	Mawari Raphia Palm	Mt. Darwin	34	No
Botanical Gardens	Tingwa Raphia Pan	Mt. Darwin	290	No
Botanical Gardens	Haroni Forest	Chimanimani	20	No
Botanical Gardens	Rusitu Forest	Chimanimani	150	No
Botanical Gardens	Sebakwe Acacia Karoo	Kwekwe	60	No
Botanical Gardens	Sebakwe Great Dyke	Kwekwe	165	No
Botanical Gardens	Sebakwe Mountain Acacia	Kwekwe	53	No
Botanical Gardens	Mazowe "A"	Harare	43	No
Botanical Gardens	Mazowe "B"	Harare	3	No
Botanical Gardens	Bunga Forest	Mutare	495	No
Botanical Gardens	National Botanic Garden	Harare	67	No

Type of Land	Name of Park	District	Area (hectares)	Presence of lion
Botanical Gardens	Vumba Botanic Garden	Mutare	200	No
Botanical Gardens	Ewanrigg Botanic Garden	Goromonzi	286	No
Total Area of Botanical Gardens and Botanical Reserves:			**2,069**	
Sanctuary	Maninii Pan	Chiredzi	300	No
Sanctuary	Melsetter Eland	Chimanimani	1,800	No
Sanctuary	Mbaze Pan	Nkayi	40	No
Sanctuary	Nyamanyetsi (Nyamanechi)	Guruve	2,840	No
Sanctuary	Mushandike	Masvingo	12,900	No
Sanctuary	Rhodes - Bulawayo	Matobo	1,100	No
Total Area Sanctuaries			**18,980**	
Safari Area	Tuli	Beitbridge and Gwanda	41,600	Yes
Safari Area	Chete	Binga	108,100	Yes
Safari Area	Chipinga (Chipinge)	Chipinge	26,100	No
Safari Area	Malapati (Malipati)	Chiredzi	15,400	Yes
Safari Area	Chinsa	Gokwe	171,300	Yes
Safari Area	Hartley (Chegutu)	Chegutu	44,500	No
Safari Area	Charara	Kariba and Hurungwe	169,200	Yes
Safari Area	Hurungwe	Hurungwe	289,400	Yes
Safari Area	Doma	Makonde	94,500	Yes
Safari Area	Umfurudzi	Shamva	76,000	No
Safari Area	Dande	Guruve	52,300	Yes
Safari Area	Chelvore (Chewore)	Hurungwe	339,000	Yes
Safari Area	Sapi	Hurungwe	118,000	Yes
Safari Area	Deka	Hwange	51,000	Yes
Safari Area	Matetsi	Hwange	295,500	Yes
Total Area of Safari Areas:			**1,891,900**	
Recreational	Chibwatata	Binga	6	No
Recreational	Kavira	Binga	50	No
Recreational	Lake Kariba	Binga, Nyaminyami and Hwange	287,200	Yes

Type of Land	Name of Park	District	Area (hectares)	Presence of lion
Recreational	Ngezi	Kadoma	5,800	No
Recreational	Umfuli (Mfurudzi	Chegutu	12,700	No
Recreational	Lake Robertson (Manyame Lake)	Chegutu, Makonde and Harare	11,200	No
Recreational	Lake Cunningham	Insiza	4,172	No
Recreational	Chinhoyi Caves	Makonde	120	No
Recreational	Manjirenji	Zaka	3,400	No
Recreational	Bangala	Zaka and Masvingo	2,700	No
Recreational	Sebakwe	Kwekwe	2,600	No
Recreational	Robert McIlwaine (Chivero)	Harare	6,180	No
Recreational	Umzingwane	Umzingwane	1,233	No
Recreational	Kyle (Mutirikwi)	Masvingo	16,900	No
Recreational	Lake Matopos	Matobo	2,900	No
Total Area of Recreational Parks, Lakes and Dams			**357,161**	

Total Area National Parks (ha)	2,717,710
Total Area of Botanical Gardens and Botanical Reserves:	2,069
Total Area Sanctuaries	18,980
Total Area of Safari Areas:	1,891,900
Total Area of Recreational Parks, Lakes and Dams	357,161
Total Ha	**4,987,820**

2. Forestry Land

Land	Name	District	Area (ha)	Presence of lion
Forestry Areas	Fuller	Hwange	23,300	Yes
Forestry Areas	Panda Masuie	Hwange	33,500	Yes
Forestry Areas	Kazuma	Hwange	24,000	Yes
Forestry Areas	Mvutu	Hwange	2,100	No
Forestry Areas	Sikumi	Hwange	54,400	Yes
Forestry Areas	Gwayi	Lupane	144,265	Yes
Forestry Areas	Lake Alice	Lupane	39,000	No
Forestry Areas	Ngamo	Lupane	102,900	Yes

Land	Name	District	Area (ha)	Presence of lion
Forestry Areas	Chisengu	Lupane	4,006	No
Forestry Areas	Glencoe	Lupane	2,050	No
Forestry Areas	Lionhills	Lupane	2,747	No
Forestry Areas	Martin (i)		400	No
Forestry Areas	Martin (ii)		4,400	No
Forestry Areas	Mudima		6,355	No
Forestry Areas	Nyambewa		5,484	No
Forestry Areas	Tandai		5,450	No
Forestry Areas	Tarka		4,343	No
Forestry Areas	Gwampa	Nkayi	47,000	No
Forestry Areas	Chesa	Nkayi	14,250	No
Forestry Areas	Inseze	Nkayi	35,200	No
Forestry Areas	Inseze Extension	Nkayi	8,400	No
Forestry Areas	Umgusa	Nkayi	32,200	No
Forestry Areas	Umzibani	Nkayi	2,471	No
Forestry Areas	Kavira	Binga	28,200	Yes
Forestry Areas	Mzolo	Binga	67,200	No
Forestry Areas	Sijarira	Binga	25,600	Yes
Forestry Areas	Bembesi	Binga	55,100	No
Forestry Areas	Molo	Binga	2,900	No
Forestry Areas	Mtao	Chirumanzu	8,170	No
Forestry Areas	Chirindu	Chirumanzu	950	No
Forestry Areas	Gungunyana	Chirumanzu	1,650	No
Forestry Areas	Mafungabusi	Chirumanzu	82,100	No
Forestry Areas	Mudzongwe	Chirumanzu	1,420	No
Forestry Areas	Ungwe	Chirumanzu	567	No
Forestry Areas	Nyangu	Chirumanzu	16,600	No
Forestry Areas	York	Chirumanzu	1,455	No
Forestry Areas	Banti	Mutare	2,219	No
Forestry Areas	Stapleford	Mutare	24,600	No
Rhodes Estate	Erin	Nyanga	10,700	No
Rhodes Estate	Sauerdale North	Nyanga	214	No

Land	Name	District	Area (ha)	Presence of lion
Total Forest Areas (ha)			**927,866**	

3. CAMPFIRE Districts

District	Natural Region	Total Area (km^2)	Area of CF Wards (km^2)	Number of Wards	CF Wards	District Pop (persons)	Presence of lion
Beitbridge	5	12,935	4,595	21	6	80,946	Migratory
Binga	3,4&5	12,308	7,930	27	21	87,802	Migratory
Bubi	4	5,547	88	12	2	36,614	Migratory
Bulilimamangwe	4&5	12,574	1,530	33	10	156,641	Migratory
Chaminuka	2a,2b,3,4&5	2,752	380	26	2	94,047	No
Chimanimani	1,2a,3,4&5	3,419		28		110,836	No
Chipinge(Gazaland)	1,2a,3,4&5	5,223	408	33	2	336,893	Migratory
Chiredzi(Gaza Khomanani)	5	17,748	3,633	32	9	183,228	Yes
Chiweshe(Mazowe)	2a	4,482	375	29	5	198,319	No
Gokwe North	3,4&5	7,359	2,523	25	4	164,558	Migratory
Gokwe South	3&4	11,138	1,308	28	6	238,581	Migratory
Goromonzi	2a	2,504		26		147,126	**No**
Mbire (Guruve)	2a,3&4	7,810	4,215	28	14	135,637	Yes
Gwanda	4&5	10,792	2,283	23	6	112,984	No
Hurungwe	2a,3,4&5	19,895	2,793	40	9	246,902	Yes
Hwange	4&5	29,934	4,021	27	15	71,707	Yes
Hwedza	2b&3	998				69,981	No
Kusile(Lupane)	3&4	7,780	2,885	24	11	94,469	Migratory
Marondera	2a&2b	3,554		24		104,601	No
Matobo	4&5	7,278	1,233	26	4	89,281	No
Mudzi	4	4,222	1,009	18	2	109423	No
Mutoko	2b,3&4	4,052		29		122,941	No
Muzarabani	2a,3&4	4,322	2,540	17	9	69,851	Migratory
Mwenezi	4&5	12,933		31		101,354	Migratory
Nkayi	4	5,333	2,628	23	6	113,302	Migratory
Nyaminyami(Kariba)	4&5	6,327	3,532	16	11	27,717	Yes
Nyanga	1,2b,3&4	5,738	253	37	1	128,439	Migratory
Pfura(Mt. Darwin)	2a,2b,3&4	1,771				164,362	No
Rushinga	3&4	2,408		17		75,332	No
Tsholotsho	4	7,823	5,354	20	8	111,828	Yes
UMP Zvataida	2b,3&4	2,682	619	15	2	86,302	No
Umzingwane	4	1,074				62,954	No

District	Natural Region	Total Area (km²)	Area of CF Wards (km²)	Number of Wards	CF Wards	District Pop (persons)	Presence of lion
Zivagwe	4	2,363				65,752	No
TOTAL/AVERAGE		247,078	56,135	735	165	4,000,710	

4. Conservancies

	Name of Conservancy	District	Area (hectares)	Presence of lion
Conservancies	Malilangwe	Chiredzi	40,000	Yes
Conservancies	Save	Chiredzi	344,200	Yes
Conservancies	Chiredzi River	Chiredzi	28,500	No
Conservancies	Bubye Valley	Matabeland South	374,000	Yes
Conservancies	Bubiana	Matabeland South	130,000	No
Conservancies	Gwayi	Hwange	150,897	Migratory
Conservancies	Midlands Black Rhino	Midlands	85,000	No
Other	Matetsi Farms	Hwange	155,627	Migratory
Total Area of Conservancies			**1,308,224**	

12.2 ANNEX II: SUMMARY OF PRIMARY LEGISLATION AND REGULATIONS

12.2.1 The Policy for Wild Life of 1992

This policy provides for Government to maintain a protected area network known as the Parks and Wild Life Estate for the conservation of the nation's wild resources and biological diversity. According to the policy, government will use the Estate to promote a rurally based wild life industry and will harmonise the management of the Estate with the efforts of neighbouring communities that are developing wild life as a sustainable form of land use. The policy vests executive responsibility for the Parks and Wildlife Estate in the Department of National Parks and Wild Life Management (DNPWLM). It provides for the following categories of protected area: National Park; Safari Area; Sanctuary; Recreational Park, Botanic Reserve and Botanic Garden.

- The objectives of the Parks and Wild Life estate will be to:
- Preserve representative samples of Zimbabwe's aquatic and terrestrial flora and fauna and their physical environments;
- Protect areas of scenic beauty and special interest;
- Preserve rare, endangered and endemic species;
- Conserve water catchments;
- Provide opportunities for public education and the advancement of scientific knowledge;

and, without prejudice to any of the above:

- Encourage public use related to the enjoyment and appreciation of these areas; and
- Generate economic activity within the Estate and surrounding areas to enhance rural development.

The policy commits the DNPWLM to an adaptive management strategy in which research and monitoring are incorporated as integral components of management. It states that where sport

hunting is an objective in a protected area, quotas will be set to the maximum sustainable level at which trophy quality can be maintained and the hunting can be marketed. In terms of the policy the emphasis of tourism in parks should be low density and high quality tourism. An EIA must be carried out for major developments such as construction of roads, powerlines, buildings or dams.

With respect to Wildlife Conservation, the Policy states that the Government of Zimbabwe aims to encourage the conservation of wild animals and their habitats outside the Parks and Wild Life Estate recognising that this is only likely to be successful if wild life can be used profitably and the primary benefits accrue to people with wild life on their land. "*Recognising that much of Zimbabwe does not consist of good arable land, Government regards wild life management in all its diverse forms as a legitimate land use which may be the most appropriate or highest-valued form of development in many areas*". The policy also states that Government will take the necessary legal and enforcement measures to prevent the illegal use of wildlife.

Addressing community rights to natural resources the Policy states that government intends to "*transform land use in remote communal areas through its Communal Areas Management Programme for Indigenous Resources (CAMPFIRE), under which rural peoples have the authority to manage their wild life and other natural resources and benefit directly from so doing*". Further government will "*ensure that wildlife is not undervalued to the people living with it by permitting them to use it sustainably for their own gain as they are able to do with other natural resources and agricultural products*".

The policy states that the mechanism for communities to gain rights over wild life will be through the granting of Appropriate Authority to Rural District Councils (under the Parks and Wildlife Management Act of 1975). For this authority to be granted, the Minister will require:

1. An acceptable management plan from councils in which objectives for wild life are stated and preliminary intentions for achieving these objectives are outlined;
2. An acceptable institutional plan which outlines clearly the methods by which councils intend a) to involve wild life producer communities in district level management and b) to devolve the decision-taking process in local wild life management and the distribution of wild life benefits to producer communities;
3. The department to assist councils in managing their wild life and to coordinate the activities of NGOs who are assisting councils;
4. The approval by the department of all annual quotas of wild life killed or sold in communal lands during the interim period while councils develop their management capacity;
5. The presentation of annual reports from Councils to the Director and to their constituents detailing the year's performance in wild life management in their district.

The policy provides for the Minister to withdraw Appropriate Authority from a council not conforming to conditions and objectives under which it was granted.

12.2.2 Wildlife Based Land Reform Policy

In 2004 there was a move to revise the Policy for Wildlife to cater for the Land Reform programme. The revised policy, known as the Wildlife-Based Land Reform Policy, has not however been formally accepted by Government. Nonetheless, it is important to summarise what was envisioned at that time since this has influenced the way the management of wildlife outside of the Parks Estate has unfolded.

The vision of this reformed policy is to ensure profitable, equitable and sustainable use of wildlife resources, particularly in areas where agricultural potential is limited. It states that "*the policy has*

been developed in the context of Zimbabwe's Land Reform Programme and is underpinned by recognition that wildlife is a viable land-use option, that it can facilitate attainment of equity objectives and that it is feasible. This policy is complemented by existing natural resources legislation and the state protected area system."

The policy also states that the key issues that were taken into consideration were:

- The State will continue to make provision for wildlife management outside the protected area system, including setting aside certain core zones for wildlife production. Wildlife should be the only permitted primary land use option in these areas.
- Outside core zones, wildlife production, amongst other land use options, will be encouraged. The most profitable and ecologically sustainable land use option must be allowed to evolve in response to changing economic influences, notwithstanding the need to ensure food security in these areas.
- The scale of wildlife operations must be allowed to vary from intensive to extensive, depending on agro-ecological settings.
- All beneficiaries of wildlife operations, whether individually or jointly, must equitably share the costs of production.
- Wildlife management responsibility and authority must be devolved to the most appropriate level for efficient resource management and production incentives must be maximized for landholders.
- Security of tenure over resources is key to successful wildlife-based land reform. These core areas should be identified.

The aims of the Wildlife-Based Land Reform Policy are listed as:

1. To facilitate the indigenisation of the wildlife sector and to ensure more equitable access by most Zimbabweans to land and wildlife resources and to the business opportunities that stem from these resources.
2. To maintain a proportion of land outside state protected areas under wildlife production.
3. To enhance diversity of land uses through wildlife production.
4. To promote secure and equitable tenure.
5. To develop and implement appropriate institutional arrangements for wildlife-based land reform.

The policy recognized that wildlife production can be at different scales, which are dependent on several factors that include the type of wildlife, management regime and ecological conditions. Three categories are highlighted in the policy:

1. Intensive production systems with captive or semi-captive species such as crocodiles and ostriches (1 – 100 hectares).
2. Semi-intensive to semi-extensive production systems with free-ranging "plains game" populations (1,000 to 10,000 hectares).
3. Extensive production systems incorporating "big game" populations (over 10,000 hectares).

The Wildlife Based Land Reform Policy promotes two land redistribution models:

1. A state leasehold approach which is based on the reallocation of leasehold leases.
    a. This approach entails the acquisition of the entire land-holding with compensation for infrastructure, wildlife, etc.,

   b. The land will be reallocated to lessees under terms and conditions that will ensure sustainable wildlife management, on-going investment and capacity-building in that area.
2. A corporate equity model that involves transfer of shares within a land-owning company.
   a. The transfer of shares will be in accordance with the Indigenisation goals and sound business principles;
   b. Proposals from stakeholders must outline realistic ways in which new entrants can increase their shareholdings well beyond an initial level, over a reasonable time scale.
   c. The proposals must make provision for immediate allocation of shareholdings to new participants.

The Policy document also acknowledges that the two approaches can be applied in combination and shall be considered on a case by case basis, and that the State may from time to time consider other approaches that meet the objectives of the Wildlife Based Land Reform Policy.

12.2.3 Parks and Wild Life Act Chapter 20:14 of 1996 as amended in 2001:

This is the pivotal Act with respect to wildlife management in Zimbabwe. The Act includes the following sections:

1. Parks and Wildlife Board
2. Parks and Wildlife Estate and Parks and Wildlife Land
3. National Parks
4. Botanical Reserves and Botanical Gardens
5. Sanctuaries
6. Safari Areas
7. Recreational Parks
8. Specially Protected Animals
9. Specially Protected Indigenous Plants
10. Indigenous plants
11. Hunting, removal, viewing and sale of animal products
12. Protection of animals and Indigenous plants on alienated land
13. Fish Conservation
14. Evidence, prevention and detection of offences and additional penalties and forfeitures
15. Inspectors, Officers, employees and advisory committees
16. General

The Act also defines the different types of land (Alienated land):

a. “Private Land” means land the ownership of which is vested in any person other than the President.
b. “State Land” means land vested in the President other than Communal Land or trust land vested in the President.
c. “Trust land” means any land, other than Communal land held in trust by the President or a statutory body or by a person, whether solely or jointly with others, by virtue of his being the holder of some office in a statutory body.

The Parks and Wildlife Act of 1975 (as amended) states that the purposes of National Parks are:

1. To preserve and protect the natural landscape and scenery.
2. To preserve and protect wild life and plants and the natural ecological stability of wild life and plant communities for the enjoyment, education and inspiration of the public.

Establishment of Protected Areas: The Act enables the President to declare National Parks on State land or Trust Land if the trustees give their consent (Section 22). The Act enables the Minister acting on the authorisation of the President to acquire land for the Parks and Wild Life Estate either compulsorily or by agreement in terms of the procedures contained in the Communal Land Act and the Land Acquisition Act. The Act gives the Minister the power to manage National Parks, control entry and authorise or restrict certain activities and carry out various conservation measures. The Act provides for the provision of facilities and services for tourists in National Parks or to lease out such facilities or services. The Act allows the Minister to issue a permit for hunting in National Parks.

The Act makes provision for the establishment of Botanical Reserves and Botanical Gardens (Section 26) on State Land or Trust Land for the preservation and protection of rare or endangered indigenous plants or representative plant communities for the enjoyment, education and benefit of the public.

A third category of protected area is a Sanctuary which may be established by the President on State Land or Trust Land (Section 31) to afford special protection to all animals or a particular species of animal in the sanctuary for the enjoyment and benefit of the public. The Minister may provide tourism facilities and services in a Sanctuary or lease facilities or services. The Minister may also issue permits for hunting or the removal of game from a sanctuary for certain purposes.

In terms of the Act the President may establish Safari Areas on State Land or Trust Land as part of the Parks and Wild Life Estate (Section 36) for the preservation and protection of the natural habitat and the wild life in these areas in order that facilities and opportunities may be afforded to the public for camping, hunting, fishing, photography, viewing of animals, bird watching and similar activities. The Minister may lease sites in safari areas for various purposes and may grant hunting or other rights. Hunting or removal of wildlife in a safari area may only take place with a permit.

The fifth category of protected area provided for by the Act is a Recreational Park (Section 41), which may be established by the President for the purpose of preserving and protecting the natural features for the enjoyment, benefit and recreation of the public. The Minister may designate areas within Recreational Parks which can be alienated or leased for the provision of tourism facilities and services.

Prospecting and mining are prohibited in National Parks, Botanical Reserves, Botanical Gardens, Sanctuaries or Recreational Parks without a permit issued by the Minister and with the consent of the Minister of Mines (Section 119). The Environmental Management Act of 2002 also makes provision for land to be acquired by the State for conservation purposes. According to Section 109 the President may acquire land or set land aside for the improvement or proper management of the environment. In the absence of an agreement with the land owner the President may acquire the land in accordance with the procedures under the Land Acquisition Act. The President may set aside any area of Communal Land for the conservation or improvement of natural resources or for the protection of irrigation works or sources of water supplies provided that no such area shall be set aside until the Minister responsible for the administration of the Communal Land Act is satisfied that suitable provision has been made elsewhere for the inhabitants who will be affected by the setting aside of the area (Section 110).

Specially Protected Animals and Plants: The Act makes provision for the Minister to declare certain animals as specially protected (Section 44). In terms of the Act, no-one may hunt, have in their possession, or sell a live specially protected animal or the meat or trophy from such an animal without a permit. The trophy of any specially protected animal must be surrendered to the state if not obtained by a permit. The Act specifies the purposes for which the Minister may issue a permit for use of

specially protected animals (Section 46), but provides the Minister with some flexibility as he/she may issue a permit for any purpose which in the opinion of the Minister is in the interests of the conservation of animals.

The Act also makes provision for the declaration of specially protected indigenous plants (Section 49). No person may pick a specially protected plant without a permit, although the owners or occupiers of land or a person acting under their authority may pick a specially protected plant for cultivation, forestry, building construction or the construction of roads and other infrastructure. No person may sell a specially protected plant without a permit unless the person is a recognised dealer in specially protected indigenous plants or a member of a recognised horticultural society and the purchase is from a member of the same or other recognised society. The Act specifies the purposes for which the Minister may issues permits for the picking or sale of specially protected indigenous plants. The Act also stipulates that no person may pick or sell indigenous plants without a permit (Section 55) provided that the appropriate authority for any land may pick or sell or authorise others to pick or sell indigenous plants (Section 56). If the Minister deems it necessary for the conservation of an indigenous plant, the Minister may prohibit the picking or selling of that plant (Section 57).

Hunting and removal of animals: The Act prohibits hunting, removal of an animal or any part of an animal or the sale of an animal without a permit unless by an appropriate authority for the land (Section 59), which is the owner of freehold land, a Rural District Council on communal land, the Forestry Commission on state forests and the DNPWLM on the parks and Wildlife Estate. The appropriate authority for the land may issue permits to others to use the wild life (except for specially protected species). If the Minister deems it necessary for the conservation of a animal, he/she may prohibit the hunting or removal of such animals in a specific area (Section 60) and may serve a notice to prohibit a specific person from hunting, conducting photographic tourism, or being in the possession of a weapon used for hunting save for self-defence. The Minister does not have to give reasons for such prohibitions. The Act enables the killing of an animal without a permit for self-defence (Section 61).

The Act prohibits anyone from conducting of hunting or photographic safaris within the parks and wild life estate or on forest land without holding a professional hunter's licence or a professional guide's licence (Section 65). No person may manufacture an article from a trophy, process a trophy or sell or otherwise dispose of a trophy or an article manufactured from a trophy from an animal that has been hunted in contravention of the Act (Section 73).

If the Minister believes it in the interests of conservation, he/she may declare any animal that is not a specially protected animal as a protected animal and any indigenous plant that is not a specially protected plant as a protected plant (Section 77) on alienated land within the area of an environment committee established in terms of the Environmental Management Act of 2002 and the Rural District Councils Act of 1988. No person may, without a permit, hunt an animal or pick an indigenous plant that has been declared protected. The Minister may also restrict the extent of hunting animals or picking of indigenous plants on alienated (private freehold) land in the area of an environment committee if the Minister believes that the hunting of animals or picking of plants is unsustainable. The Minister may authorise an environment committee to reduce the numbers of problems animals on any alienated land within its area if the number of such animals is sufficient to cause excessive damage or nuisance. Section 79 gives environment committees the power to restrict hunting on alienated land if it believes that hunting is unsustainable.

The Minister may declare any person to be the appropriate authority for any waters (Section 83) and may declare controlled fishing waters (Section 84) for which the Minister may make regulations for

the control, regulation, restriction of prohibition of fishing. Unless the Minister designates areas of water where a permit is not required, no-one except the appropriate authority for that water may fish in any water without a permit. Section 87 regulates the means of fishing by prohibiting the use of explosives, firearms and poisons. Section 88 controls the introduction into any water of fish and plants that are not native to that water. No-one except the appropriate authority for a water may fish commercially and sell the fish without a permit (Section 90). The minister may ban fishing by specific persons in any area in the interests of conservation (Section 96).

Enforcement: The Act provides for the powers of conservation officials, and police officers in relation to enforcing the Act. It provides for penalties for various offences and for the Minister to make regulations on a wide range of issues and activities. The Act provides for the highest penalties to be awarded for the unlawful killing of a rhinoceros or other specially protected game specified by the Minister in an
official notice and for the unlawful possession or trade in rhino horn, ivory or the trophy of any other specially protected animal specified by the Minister in an official notice (Section 128).

The Environmental Management Act of 2002 provides the Minister responsible for the Environment to regulate the use of wetlands. In terms of Section 113 of the Act the Minister may declare any wetland to be an ecologically sensitive area and may impose limitations on development in or around such area. Further, no person may without authorisation in terms of the Act:

a. reclaim or drain any wetland;
b. disturb any wetland by drilling or tunnelling in a manner that has or is likely to have an adverse impact on any wetland or adversely affect any animal or plant life therein;
c. introduce any exotic animal or plant species into the wetland. Section 114 enables the Minister to serve an order on the owner, occupier or user of land under which they must take measures, construct such works or refrain from specific activities in order to protect the environment.

Biological Diversity: Further the Act enables the Minister to take such measures as may be necessary for the conservation of biological diversity and the implementation of Zimbabwe's obligations under the United Nations Convention on Biological Diversity adopted in 1992 and may, in so doing (Section 116):

a. identify the components of the biological diversity of Zimbabwe;
b. determine the components of biological diversity which are threatened with extinction;
c. prepare and maintain an inventory of the biological diversity of Zimbabwe;
d. determine actual and potential threats to the biological diversity and devise such measures as are necessary for preventing, removing or mitigating the effect of those threats;
e. devise measures for better protection and conservation of rare and endemic species of wild fauna and flora;
f. develop national strategies, plans and programmes for the conservation of the biological diversity of Zimbabwe;
g. promote the integration of conservation and sustainable use of biological diversity into relevant sectoral policies, plans and programmes;
h. require in writing any developer, including the government, to integrate the conservation and sustainable utilisation of the biological diversity in any project the implementation of which has or is likely to have detrimental effects to the biological diversity of Zimbabwe;
i. protect indigenous property rights of local communities in respect of biological diversity with scientific knowledge;

j. support the integration of traditional knowledge on conservation of biological diversity with scientific knowledge;
k. prohibit or restrict access by any person to or the exportation of any component of the biological diversity of Zimbabwe.

The Minister may also take such action or measures as may be necessary for the conservation of the biological diversity of a specific locality and may:

a. promote such land use methods as are compatible with the conservation of the biological diversity of that locality;
b. select and manage environmental protection areas for the conservation of the various terrestrial and aquatic ecological systems;
c. establish and manage buffer zones near environmental protection areas;
d. prohibit or control the importation of and introduction into the wild of exotic animal and plant species;
e. identify, promote and integrate traditional knowledge into the conservation and sustainable utilisation of the biological diversity of that locality; and
f. determine special measures for the protection of species, ecosystems and habitats faced with extinction.

Community rights to natural resources: The Act provides for land holders to acquire rights over wildlife through the granting of "appropriate authority" status. Thus, the owners of private freehold land are deemed to be the appropriate authority over wildlife on their land (Section 2). Communities acquire rights over wildlife through Rural District Councils (RDCs). A 1982 amendment to the Act provides for the Minister to appoint an RDC as the appropriate authority for wild life on the communal land within the jurisdiction of the RDC (Section 108). The Act states that no person may hunt any animal on any land or remove any animal or part of an animal except in term of a permit issued by the appropriate authority for that land [Section 59(2)]. The appropriate authority may hunt any animal on the land, remove any animal or part of an animal from the land and may issue permits to others to hunt or remove animals from the land. RDCs are then expected to apply the guidelines contained in the 1992 Wildlife Policy to devolve the decision-taking process in local wild life management and the distribution of wild life benefits to producer communities (i.e. smaller and more localised groups of people with wildlife on their land). Further policy guidelines state that RDCs
are expected to distribute a percentage of income derived from wildlife use to producer communities and to allow these communities to be responsible for several wildlife management activities. Because of the existing administrative system of local government, producer communities had to be represented by Ward Development Committees (WADCOs) and Village Development Committees (VIDCOs) which are advisory bodies to Councils.

In this way, various legal entities are granted authority over wildlife outside the Parks Estate. These authorities include private land-owners (where the land is held under an agreement of purchase or lease), forest land (such as Forestry Commission estates). For Communal Land, the Rural District Councils (RDC) may be appointed the Appropriate Authority. The Minister of Environment grants this authority, with input from the Zimbabwe Parks and Wildlife Management Authority. If appropriate authority is not granted, the authority remains vested in Central Government. This Appropriate Authority clause in the Act, paved the way for the implementation of the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE)[3].

Statutory Instruments: There are several statutory instruments (SI) that regulate the wildlife sector:

[3] Note that the CAMPFIRE programme is about to undergo a comprehensive review that will impact on future policies.

- SI 362 of 1990: This legislation provides in sections 66-75 for the Regulation of Manufacture, Processing and Dealing in trophies.
- SI 76 of 1998: Parks and Wild Life (Import and Export) (Wild Life) Regulations specifically deals with Import and Export of wildlife products. This legislation was enacted to ensure compliance with CITES requirements for export and import of wild flora and fauna. These provide for the following:
    - Section 3 deals with the Control of Import and Export of wild life and trophies and lays down a general prohibition on the import into or export from Zimbabwe of any "wild life" or trophy of "wild life" except in accordance with either a certificate issued in terms of section 5 by the Director or Director of Customs, or an open general permit:
    - Section 5 deals with Permits and Certificates and is consistent with CITES legislation.
    - Section 15 deals with Offences and Penalties. Any person who contravenes any of the provisions of subsection 1 shall be guilty of an offence, and liable to a fine or imprisonment. To effectively ensure compliance, the Zimbabwe Parks and Wildlife Management Authority deployed a permanent team of officers based at all ports of exit and entry to assist border control officials in monitoring and inspection of all wildlife exports.
- SI 26 of 1998: The regulation provides for the monitoring of all hunting activities in the country to ensure compliance by all Safari Operators and international clients and to ensure that the TR2 Form. (Tourism Hunting Return Form) is duly completed.
- Trapping of Animals (Control) Act Chapter 20:21: The Act provides for the control, restriction and regulation of the construction, possession and use of certain traps for the purpose of trapping animals; to control the sale and disposal of certain animals, to include lions and to provide for matters incidental to or connected with the foregoing.
- SI 92 of 1992: Parks and Wild Life (Payment for Hunting of Animals and Fish) Notice, 2009: This instrument provides for compensation values of various wildlife forms to include animals and fish. It acts as an additional deterrent measure in matters where poaching cases are being dealt with in accordance with the law. The compensation value for illegal hunting of lion is USD 5 000, 00.
- SI 93 of 2009: Parks and Wild Life (Payment for Trapping of Wild Animals) Notice, 2009. This instrument provides for the payment of compensation to the state or game owners in the event that one is convicted for illegally trapping wild animals on various land categories. The compensation value for illegal hunting of lion is USD 5 000, 00.
- SI 40 Of 1994: Parks and Wildlife (Appropriate Authorities for Communal Land) Notice, 1994. This SI facilitates the granting of Appropriate Authority status to various Rural District Councils. This legislation devolved authority to Rural District Councils and gave rights to local communities to sustainable utilize wildlife and other natural resources in their areas of jurisdiction.

12.2.4 The Rural District Councils Act Chapter [29:13] 2002

The Rural District Councils Act is important in the wildlife sector as it provides for a legal entity (in Communal Lands) responsible for wildlife resources. Since the land in Communal areas is not privately owned by the communities and given that most of the communities do not constitute a legal entity, the Appropriate Authority status is conferred to the Rural District Councils (RDCs). Thus the RDCs act as custodians of the wildlife resources on behalf of the communities.

Efforts are now underway in some areas to form Community Development Trusts. There is scope for these Community Development Trusts to be used as vehicles to further devolve authority from the District level to the sub-district level, which will provide more income at a community level and therefore increase conservation support from the community as they will have a true vested interest.

The feasibility of granting Appropriate Authority to these Trusts in Zimbabwe needs to be assessed and piloted. The major challenge with these Trusts is that of financial sustainability as they do not have adequate funds to cater for their activities. Capacity-building of all Trust members is also a key requirement to ensure institutional sustainability.

In the Rural District Councils Act, there are three key terms that will be described further: Ward, Ward Development Committee and Communal Land. According to the Act, a "Ward" (an administrative unit) means a ward into which a council area is divided or re-divided. Several villages make up a ward. In the Act, a "Ward Development Committee" means a village development committee established in terms of Section 58 of the Act. A Ward Committee is made up of members who are elected from the community to represent the community in discussions/meetings with the Rural District Council. The Act further defines three different types of Wards. These are, Commercial Ward, Communal Ward and Resettlement Ward. The Commercial Ward is a large-scale commercial ward or a small-scale commercial ward. A Communal Ward is a ward consisting wholly or mainly of Communal Land. A Resettlement Ward is a ward consisting wholly or mainly of Communal Land (as in the case of the Communal Ward). It is important to establish whether in practice, the RDCs make
this distinction of the wards or whether they are all considered simply just as wards.

The "Communal Land" is defined as any land that is Communal Land in terms of the Communal Land Act [Chapter 20:04]; and any other land that was within the area of a district council on the 19th August 1988.

12.2.5 The Forest Act of 1948

This Act establishes the Forestry Commission and places demarcated forests under its control. The commission is responsible for the control, management and exploitation of state forests including the leasing of timber harvesting rights. The Act also gives the Minister the power to regulate the commercial use of timber from indigenous trees on other land.

As the appropriate authority for the Forest Areas, the Commission is also responsible for the management and conservation

12.3 Annex III: Analysis of Total Revenue by Country of Destination

Destination	2014	2015	Total
United States	$14,485,835	$11,942,785	$26,428,620
Russian Federation	$1,444,729	$861,925	$2,306,654
China	$1,416,196	$441,759	$1,857,955
Germany	$1,100,534	$698,450	$1,798,984
Canada	$620,852	$474,935	$1,095,787
South Africa	$513,070	$576,035	$1,089,105
France	$825,975	$158,291	$984,266
Australia	$671,527	$259,136	$930,663
Spain	$488,616	$321,064	$809,680
Austria	$519,322	$201,073	$720,395
India	$302,653	$241,741	$544,394
United Kingdom	$357,317	$183,888	$541,205
Italy	$181,956	$343,197	$525,153
Hungary	$418,824	$104,262	$523,086
Mexico	$252,263	$266,543	$518,806

Destination	2014	2015	Total
Norway	$300,645	$119,831	$420,476
Denmark	$132,690	$194,435	$327,125
Switzerland	$171,991	$123,828	$295,819
Sweden	$196,575	$80,014	$276,589
Ukraine	$80,432	$163,604	$244,036
Czech Republic	$104,450	$137,456	$241,906
Neatherlands	$89,042	$105,227	$194,269
Nigeria	$171,830	$0	$171,830
Bulgaria	$21,865	$123,469	$145,334
Argentina	$106,529	$24,888	$131,417
Finland	$65,768	$63,223	$128,991
Brazil	$56,785	$59,886	$116,671
Honduras	$104,683	$0	$104,683
Poland	$38,911	$62,015	$100,926
New Zealand	$17,880	$81,127	$99,007
Mauritius	$56,225	$36,945	$93,170
Chile	$91,374	$0	$91,374
Belgium	$9,340	$80,355	$89,695
Portugal	$78,470	$0	$78,470
Columbia	$77,944	$0	$77,944
Slovakia	$69,420	$0	$69,420
Botswana	$59,401	$0	$59,401
Pakistan	$54,208	$0	$54,208
Namibia	$20,298	$18,862	$39,160
Latvia	$37,611	$0	$37,611
Estonia	$12,078	$23,586	$35,664
Slovenia	$20,620	$11,200	$31,820
Kenya	$14,302	$16,957	$31,259
Dominican Republic	$30,463	$0	$30,463
Belarus	$0	$29,430	$29,430
Kazakhstan	$0	$28,460	$28,460
Romania	$0	$20,112	$20,112
United Arab Emirates	$19,629	$0	$19,629
Lao Peoples Democratic Republic	$15,000	$0	$15,000
Bolivia	$0	$11,553	$11,553
Lithuania	$9,164	$0	$9,164
Costa Rica	$5,900	$0	$5,900
Qatar	$4,896	$0	$4,896
Grand Total	**$25,946,088**	**$18,691,547**	**$44,637,635**

12.4 ANNEX IV: ANALYSIS OF TOTAL REVENUE BY SPECIES

Species	$2,014	$2,015	Total	2015 Quota	Utilised	% Utilised
Buffalo	$2,528,559	$1,962,570	$4,491,129	1,635	482	29%
Elephant (Tusks)	$2,042,610	$1,447,090	$3,489,700	246	64	26%
Elephant (Tuskless)	$1,444,040	$229,860	$1,673,900	462	113	24%
Lion	$630,950	$753,000	$1,383,950	82	49	59%
Leopard	$714,100	$668,490	$1,382,590	530	151	28%
Zebra	$594,239	$555,744	$1,149,983	2,480	600	24%
Sable	$456,615	$309,260	$765,875	718	78	11%
Kudu	$341,092	$357,963	$699,055	2,503	289	12%
Waterbuck	$293,903	$256,133	$550,036	988	156	16%
Hippo	$310,321	$217,470	$527,791	303	83	27%
Impala	$277,198	$242,624	$519,822	8,594	1,261	15%
Crocodile	$284,650	$202,705	$487,355	211	70	33%
Eland	$179,470	$187,990	$367,460	1,659	132	8%
Wildebeest	$180,665	$170,350	$351,015	2,189	220	10%
Giraffe	$158,385	$157,410	$315,795	880	135	15%
Nyala	$130,840	$117,175	$248,015	174	38	22%
Bushbuck	$116,011	$94,936	$210,947	1,082	125	12%
Warthog	$98,975	$89,820	$188,795	3,060	208	7%
Hyeana	$75,648	$54,503	$130,151	1,702	118	7%
Klipspringer	$44,130	$40,441	$84,571	823	59	7%
Bush Pig	$18,226	$30,370	$48,596	1,972	69	3%
Tsessebe	$19,800	$19,500	$39,300	186	15	8%
Baboon	$24,909	$13,664	$38,573	8,017	264	3%
Reedbuck	$23,265	$12,731	$35,996	371	20	5%
Steenbok	$13,790	$15,070	$28,860	927	31	3%
Jackal	$9,656	$15,889	$25,545	2,179	105	5%
Civet	$8,850	$11,368	$20,218	1,034	29	3%
Grysbok	$9,435	$8,585	$18,020	632	31	5%
Eland	$16,750	$0	$16,750	1,659	132	8%
Genet	$6,020	$14,183	$20,203	1,136	38	3%
Duiker, Grey	$2,774	$12,523	$15,297	2,005	53	3%
Duiker, Blue	$7,991	$0	$7,991	-	-	-
Honey Badger	$3,681	$3,625	$7,306	622	15	2%
Wild Cat	$3,160	$4,180	$7,340	812	19	2%
Guinea Fowl	$5,496	$968	$6,464	29,174	121	0%
Porcupine	$4,123	$1,473	$5,596	857	9	1%
Serval	$2,670	$2,410	$5,080	536	6	1%
Egyptian Goose	$3,025	$60	$3,085	4	-	0%
Cheetah	$2,560	$0	$2,560	42	-	0%
Ant Bear	$900	$1,651	$2,551	39	6	15%
Francolin	$1,166	$609	$1,775	22,449	109	0.5%

Species	$2,014	$2,015	Total	2015 Quota	Utilised	% Utilised
Dove	$1,321	$418	$1,739	34,485	63	0.2%
Monkey, Vervet	$885	$800	$1,685	3,677	15	0.4%
Ostrich	$1,200	$0	$1,200	14	-	0%
Mongoose	$508	$690	$1,198	279	3	1%
Sandgrouse	$456	$688	$1,144	8,088	78	1%
Oribi	$500	$500	$1,000	82	2	2%
Duiker, Red	$950	$0	$950	-	-	-
Caracal	$900	$0	$900	351	-	0%
Bushbaby	$850	$0	$850	-	-	-
Bontebok	$700	$0	$700	-	-	-
Waterfowl	$0	$400	$400	40	2	5%
Springhare	$60	$120	$180	-	-	-
Gemsbok	$105	$0	$105	6	-	0%
Hyrax	$75	$20	$95	371	1	0.3%
Duck	$29	$20	$49	10,779	13	0.1%
Aardwolf	$0	$0	$0	-	-	-
Blesbok	$0	$0	$0	40		0%
Rabbit	$0	$0	$0	252	-	0%
Hare	$0	$0	$0	138	3	2%
Lichtenstein's Hartebeest	$0	$0	$0	5	-	0%
Red Hartebeest	$0	$0	$0	7	-	0%
Grand Total	**$11,099,187**	**$8,288,049**	**$19,387,236**			

Tapia, Brenda <brenda_tapia@fws.gov>

Fwd: Zimbabwe's Supplementary Elephant Management Plan (2015 - 2020)

1 message

Vannorman, Tim <tim_vannorman@fws.gov> Wed, Jan 25, 2017 at 12:25 PM
To: Brenda Tapia <brenda_tapia@fws.gov>

---------- Forwarded message ----------
From: **Liberty Nyaguse** <lnyaguse@zimparks.co.zw>
Date: Wed, Nov 9, 2016 at 2:06 AM
Subject: Zimbabwe's Supplementary Elephant Management Plan (2015 - 2020)
To: tim_vannorman@fws.gov

Dear Mr Timothy J Van Norman

Please find as attached documentation relating to the Supplementary Elephant Management Plan for Zimbabwe as requested by yourselves.

Best Regards

Liberty W Nyaguse

National Elephant Manager

Parks and Wildlife Management Authority

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--
Timothy J. Van Norman, Chief
Branch of Permits
Division of Management Authority
U.S. Fish and Wildlife Service
(703) 358-2350

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2 attachments

ZIMBABWE SUPPLEMENTARY NATIONAL ELEPHANT MANAGEMENT PLAN.pdf
1049K

Letter to USFWS - Zimbabwe Supplementary Elephant Management Pl.pdf
245K

THE ZIMBABWE NATIONAL ELEPHANT SUPPLEMENTARY MANAGEMENT PLAN (2015 – 2020)

Introduction and Background

The supplementary Elephant Management Plan (EMP) is a supplement that has been developed from the Zimbabwe National Elephant Management Plan (2015 – 2020). This supplementary plan looks at all the deliverables from this plan and highlights the priorities for the successful implementation of the plan. The supplement also highlights the progress that has been made towards the successful implementation of the EMP from the time it was adopted in 2015.

It was noted that the EMP was an ambitious plan and it required the cooperation of all internal and external stakeholders in order to achieve its obligations. The urgency that was placed upon well-equipped men on the ground to combat illegal killing of elephants, improved monitoring and research, and the provision of incentives to maintain and if possible increase the elephant range, requires huge resources.

This supplementary EMP recognises that the implementation of the Zimbabwe Elephant Management Plan (2015 – 2020) requires adequate and sustainable funding and provision of other resources to effectively protect the elephant and to curb illegal trade in elephant products. Thus there is need to fully resource all the components of this plan in order to successfully manage Zimbabwe's elephant population.

Resources are being mobilized from within ZPWMA, from its own business ventures, by the private sector, and by intergovernmental and nongovernmental organizations. Partnerships between ZPWMA and other stakeholders are also in place to secure some of the resources for elephant conservation. There is a need for the Government to provide additional support to the conservation of elephants given the present poaching crisis affecting the species continentally.

This supplementary elephant management plan recognises the work and the resource allocation that has made towards full implementation of the plan, and provides detail of the milestones achieved and work covered. It also prioritises the major areas of the EMP into immediate areas that are meant to arrest poaching and illegal trade in elephants. However, it details the impressive extent to which most of the structures have been set up and some of the innovations that have been put in place to attempt to bridge the funding gap.

Resources Available

An audit has been conducted of the implementation of the EMP to date and resources have thus far been channelled into the following areas.

Table 1: Financial resources deployed up to August 2016

BUDGET (USD)					
Item	**North West Matabeleland**	**Sebungwe**	**Mid Zambezi Valley**	**South East Lowveld**	**Total Current**
Law Enforcement	158,948	113,920	244,650	318,000	835,518
Monitoring	31,000	-	8,155	15,500	54,655

Investigations	-	-	16,500	8,000	24,500
Training	12,548	-	30,124	23,000	65,672
Community Relations	4,854	-	9,770	15,000	29,624
Total (USD)	205,350	113,920	309,199	379,500	1,009,969

Table 2: Other Non-Financial Resources

Item	**North West Matabeleland**	**Sebungwe**	**Mid Zambezi Valley**	**South East Lowveld**	**Total Current**
Summary Stats					
Area (Km^2)	24,989	15,529	16,014	8,835	**65,367**
Rangers	212	90	160	77	
Rangers/Km^2	0,01	0,01	0,01	0,01	**0,01**
Total Staff	271	123	181	142	**717**
NGO/Private Sector Anti-Poaching	Painted Dog Conservation, Bhejane Trust	Matusadonha Anti Poaching P	Zambezi Society, The Tashinga Initiative	-	
Vehicles					
4 WD Parks	12	4	8	10	**34**
4 WD Other	-	2	-	-	**2**
2 WD Parks	4	-	-	-	**4**
2 WD Other	1	-	-	-	**1**
5 Ton Trucks	1	6	2	2	**11**
Tractors	9	3	3	5	**20**
Graders	5	-	2	1	**8**
Boats	2	3	1	2	**8**
Motor Cycles	-	4	-	4	**8**
Micro light			1		**1**
2 Seater Helicopter	1		1		**2**
4 Seater Helicopter	1				**1**
Communications					
Repeater station	7	2	2	3	**14**
Mobile handsets	118	53	82	60	**313**
GPS	46	-	36	60	**142**
Operating Database	10	-	1	1	**12**

Progress towards Implementation of the Elephant Management Plan (2015 – 2020)

Several milestones stated in the Elephant Management Plan have already been achieved which include the following:

a. Appointment of the Elephant Manager as in section 4.5 of the Zimbabwe Elephant Management Plan (2015 – 2020).

b. Getting a basic agreement of implementation in the 4 relevant regions.
c. Some work towards Law Enforcement, Monitoring, Investigations, Training and Community Relations. As of August 2016, more than USD 1million had been spent on these activities. Table 1 above. More detailed breakdown of how this was spent see Annexes 1.0, 2.0, 3.0 and 4.0.

Constraints and Challenges

One of the major challenges regarding implementation of the EMP is with regards to the adoption of stricter domestic measures by the United States of America. This has had the net effect of further reducing the revenue from hunting into the Authority, which therefore affects the budget allocated to resource protection, in particular the elephant in this case.

One of the key impediments towards the full and comprehensive implementation of the Elephant Management Plan is the limited resources. However, Zimbabwe is at an advanced stage in the development of resource mobilisation strategies. These strategies include partnering with both local and international institutions in resourcing and financing aspects of the programme.

Priorities

Due to the fact that Zimbabwe is experiencing some funding constraints with respect to the full implementation of the Elephant Management Plan, which means therefore that it will not be possible to fully implement every aspect of the plan at the same time, we have developed a set of priorities (all drawn from the plan), that we feel are implementable and enable the work of conservation to proceed smoothly.

1. Law Enforcement
   Law enforcement continues to be one of the most critical aspects of this strategy. From the perspective of the EMP, it has also to date been allocated the biggest budget (Table 1). While strategic gaps still exist with respect to the law enforcement capacity (the numbers of rangers on the ground are still in need of improving to effectively cover that Parks Estate, more patrol kits and equipment are still required to improve enforcement capacity). In order to effectively combat poaching and illegal trade the Law enforcement capabilities are top priority.
2. Monitoring
   Biological monitoring and management, with respect to the priorities for this plan would come in as a second priority. This enables monitoring programmes and research to support science based adaptive management of elephants in this action plan. The resource allocation to this activity needs to be dramatically improved, although innovations have had to be put in place to manage that insufficient resource allocation. Rangers on patrol also carry out significant monitoring activities which feed into the biological monitoring and management of the elephants.
3. Investigations/Intelligence
   The investigations capacity (together with training) are critical components of this action plan. To date of the available resources, allocations to investigations have been minimal. Innovations have also been developed in this area, for support from various private players, institutions and state institutions in the investigative processes.

Assistance with areas like crime scene attendance have been improved through the assistance of the Zimbabwe Republic Police involvement.

4. Appointment of Elephant Manager
   While the appointment of the National Elephant Manager has been concluded (April 2016) to enhance implementation, monitoring and evaluation of the Action Plan, funding constraints still exists. Some funding for the activities of the Elephant Manager have been unlocked through cooperation with stakeholders in the monitoring and evaluation activities of the office. This includes setting up of the Regional Elephant Management Committees and funding their activities.

ANNEX 1.0 Northwest Matabeleland Action Plan – *Status and progress report Aug - 2016*

9.4.1. Protection and Law Enforcement (Northwest Matabeleland)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
1.1 Highly trained rapid response anti-poaching units established/ strengthened	- Assess / audit current law enforcement capacity, prioritise needs - Mobilise resources to meet shortfalls in personnel and equipment and new technology - Recruit rangers, train and retrain staff - Review / establish Standard Operating Procedures (SOPs) for all law enforcement operations	- Assessment of enforcement capacity completed - Fully staffed and trained anti-poaching units in place and operating - SOPs established and being implemented - Trends in illegal killing of elephants documented	- Collaborations with other stakeholders (e.g. WWF, Government of the People's republic of China) in law enforcement efforts was done were equipment such as camping tents, GPSs, vehicles, road maintenance equipment (graders, tipper trucks, lorries) were sourced - Training was done in Spatial Monitoring and Reporting Tool (SMART). 4 Officers and 40 Ranger were trained - New recruitment and recruitment drive for rangers initiated - Database on elephant illegally killed is maintained and updated
1.2 Informer network, investigation and intelligence system strengthened / established and operating	- Recruit informers and contacts - Recruit investigators and deploy strategically - Train investigators - Set up anonymous whistle-blowing system (through hotline) - Carry out awareness campaign within communities on value of conservation and how to report illegal activity (to stimulate social involvement) - Establish intelligence database	- Number of arrests based on information from intelligence system - Number of investigators recruited and trained - Number of calls to whistle blowing system that result in effective follow up - Number of incursions reported on by local communities and reacted to by ZPWMA/ZRP	- 5 cases based on information from intelligence were attended to. No recruitment of investigators and training done 6 calls to whistle blowing systems resulted in effective follow up 10 incursions reported on by local communities and reacted to by ZPWMA/ZRP under the joint operations initiative

9.4.1. Protection and Law Enforcement (Northwest Matabeleland)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
1.3 Investigation and prosecution of wildlife crimes improved	- Establish Standard Operating Procedures (to include guidelines in collaboration with ZRP, Prosecutors, Magistrates, EMA, etc., and evidence gathering - Identify gaps (e.g. ballistics and forensics) and solicit external expertise - Establish regular training and retraining schedule - Procure / hire specialized equipment that may be required	- Proportion of arrests leading to prosecution - Proportion of successful prosecutions	- The SOP for Joint Operations with ZRP and other law enforcement agencies not available - 100 % proportion of arrests leading to prosecution - 95 % proportion of successful prosecutions
1.4 Database that is compliant with national database established	- Set up databases at regional HQ and field stations that can feed compliant information through to regional and national databases - Train staff in appropriate data collection and data capture using standardised recording forms and procedures	- Databases bases established and operational - Recording protocols in place and being used	- Database is available at station levels feeding into the Regional and National levels. - Reporting protocols in place
1.5 Joint law enforcement operations within the NWM region	- Conduct joint operations - Convene joint meetings of law enforcement agencies - Conduct awareness campaigns for other law enforcement agencies - Agree on operational order / SOPs (including information sharing)	- Number of joint operations leading to arrests and successful prosecutions - Number of meetings held per year - Number of successes from shared wildlife crime information	5 joint operations leading to arrests and successful prosecution were done 16 meetings have been done to date Have been successful on all shared information wildlife crime
1.6 Full compliance with hunting and guiding regulations enforced	- Ensure all operators within the region are fully aware of regulations - Appropriate measures are taken to fine / apprehend / prosecute breaches of regulations	Implementation of revised quota setting models in the NWM	Enhanced data collection and collation of returns for quota setting implemented
1.7 Illegal settlement / human encroachment in designated wildlife areas reduced / reversed	- Liaise with RDCs, Traditional Leaders, ZRP and DA's office, and Lands Office - Conduct awareness, education, extension programmes in areas affected - Conduct regular satellite monitoring of areas likely to be affected	Percentage of designated wildlife area in the NWM that are settled has not increased, or has declined, from 2015 levels	There are no increases or decreases in settlements within protected areas. It should be noted however, that there is illegal grazing in Hwange National Park from the communities in the Tsholotsho area.

9.4.1. Protection and Law Enforcement (Northwest Matabeleland)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
1.8 Collaboration in law enforcement with neighbouring countries established	- Convene joint meetings of law enforcement agencies - Agree on standard operational procedures - Conduct joint cross border operations	- Agreed SOPs for cross border law enforcement operations - Number of joint operations leading to arrests and successful prosecutions	There are no agreed SOP for cross border law enforcement operations 5 cases of joint operations leading to arrests and successful prosecution

9.4.2. Biological Monitoring and Management (North West Matabeleland)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
2.1 Elephant population numbers, structure, mortality (using aerial, ground, and ranger based methods) regularly monitored	- Carry out regular surveys - Carry out aerial monitoring of wildlife and illegal activities - Adopt standardized databases for all stations, forest areas, and RDCs in NWM - Introduce ranger-based monitoring across all stations in NWM - Analyze the data and report on trends - Annual water hole count continued	- Information on trends in elephant numbers, structure and mortality analysed and available	Analysis data is based on the national survey of elephants and large herbivore done in 2014, road count data and from waterhole counts which are done yearly.
2.2 Impacts of elephants on selected habitats, selected indicator plant and animal species, and water use and supplies monitored and assessed	- Measure and monitor vegetation indicators, e.g. woodland cover and changes in specific species e.g. Baobabs - Measure and monitor functional biodiversity indicators, e.g. bird species richness and responses to structural changes in woodlands - Measure and assess water use and its sustainability	Elephant impacts on selected habitats monitored, analysed and reported Elephant impacts on indicator species measured analysed and reported Sustainability of water use completed	Permanent vegetation plots are monitored regularly for the effects of elephants and the data analysed. The effect of elephants on indicator plants species is monitored. Research is ongoing on their effects on major herbivores. A study on the effects of drawing on underground water to water elephants is about to be initiated
2.3 Upper and lower thresholds of potential concern (TPCs) related to spatial and temporal impacts (ecological, social, economic) of elephants established	- Compile and analyse historical trends in habitats, selected species, economic performance of consumptive and non-consumptive use, and HWC in the region - Consultations with experts and the public on acceptable limits to change - Propose TPCs for elephant impacts and densities	- Research reports completed - PCP consultation results analysed and reported - TPC recommendations submitted - Results of timely analyses and expert and public opinion being used in determining adaptive management measures	A study looking at changes in vegetation has recently been completed in collaboration with WWF, data is yet to be analysed Adaptive management is exercised through adopting results from research work within the park

9.4.2. Biological Monitoring and Management (North West Matabeleland)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
2.4 Appropriate adaptive management actions undertaken when TPCs approached or exceeded	- Regularly monitor levels and trends in TPC indicators that have been developed - Alert management when and if trends indicate that TPCs are likely to be exceeded - Decide on and implement appropriate management action	- Adaptive management actions taken in response to elephant impacts	More boreholes have been drilled to ensure there is enough water for other animals and to relieve pressure on some areas.
2.5 Age and quality of all elephant killed (trophies, PAC, rations, culls, poached) monitored and quotas to meet desired trophy quality adjusted	- Record age, sex and tusk size (length and weights) of all elephants killed each year - Set up and maintain database - Analyse trends and adjust quotas as necessary to meet desired trophy size - Introduce flexible and adaptable quota system (review fixed quota system) - Produce annual report	Age, sex and tusk sizes for all elephant killed recorded Elephant trophy quality is maintained or improved in relation to the stipulated desired age and trophy size.	A database with information on elephants killed is maintained Trophy quality is maintained through the policing of the hunting industry and record keeping and adaptive management of quotas.
2.6 Elephant range defined and managed to maintain (and/or recover) habitats and elephant populations, and connectivity between fragmented populations and buffer zone populations initiated	- Define elephant range use and existing buffer zones and potential connectivity - Identify priority corridors and land use barriers - Conduct spatial analyses to inform land use planning to facilitate connectivity and reduce human-wildlife conflict	- Elephant range maintained and lost habitats recovered - Corridors between fragmented elephant populations maintained/ established	13% of land in Zimbabwe is maintained for wildlife Corridors are being resuscitated such as the Hwange Sanyati Biological corridor which is being maintained in collaboration with WWF.
2.7 Reports to international monitoring systems prepared and submitted (e.g. AED, ETIS, MIKE, MIKES)	- Timely reports prepared and submitted as required to regional and national levels for transmission to international agencies	- Required reports submitted on time	Done at National level. However through our normal reporting system we feed in with the related information

9.4.3. Social, Economic and Cultural Framework (North West Matabeleland)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
3.1 Joint venture and sustainable use opportunities to strengthen elephant conservation and management explored	- Initiate policy formulation and /or protocols for the development of joint ventures involving public, private, community partnerships (PPCPs) - Involve all relevant stakeholders in identifying potential areas and in the planning / selection process for potential joint ventures / PPCPs - Implement identified and feasible joint ventures / PPCPs	- Policy framework and protocols for establishing Joint Ventures /PPCPs in NWM adopted - At least three Joint Ventures / PPCPs initiated and operating by 2018	HSBS, KAZA, CAMPFIRE, save Australia are some of the joint venture operations adopted and being implemented in NWM
3.2 Transparent distribution of the benefits and costs of elephant management and conservation facilitated	- Develop instruments / protocols to: o Increase elephant revenues at the ward level. o Provide for traditional leaders to be involved in the management and distribution of elephant related benefits. - Revise CAMPFIRE guidelines to increase the share of revenues at the ward level beyond 55%. - Develop a system to ensure accountability of the revenue sharing mechanism from District to ward level. - Periodically audit the revenue sharing system	- A greater proportion of revenues from wildlife utilisation accrue to communities - Traditional leaders involved in elephant management and revenue sharing - Revenues from wildlife accounted for and audited	There is need to review the benefit-sharing frameworks of CAMPFIRE and other schemes. There is little involvement of traditional leadership in revenue sharing There are no audits and accountability is minimum for revenue from wildlife
3.3 Effective techniques and land use strategies and protocols to mitigate human-wildlife conflict (HWC) implemented.	- Review current human-elephant conflict mitigation measures and potential incentives / policies to reduce conflict - Implement proposals / options emerging from review - Monitor levels of HWC, enter data in database, analyse trends	Land use strategies and protocols for mitigating HWC adopted and implemented Trends in HWC incidents show reduced levels of conflict	There are distinct land use regimes governed through government statutes and policies. Decline on human-wildlife conflicts is evident. For example data shows that lion conflicts have reduced by 50%
3.4 Recovery and use of all products from legally killed elephants improved	- Provide guidelines for the effective recovery, treatment, storage, and sale of elephant products -	Proportion of legally killed elephants from which products were effectively recovered Revenue earned	100%

9.4.3. Social, Economic and Cultural Framework (North West Matabeleland)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
3.5 Information on elephant conservation, management and benefits in communal areas neighbouring key elephant populations included in school curricula	- Liaise with Ministry of Primary and Secondary Education on the development, production, and inclusion of elephant conservation material in school curricula - Engage with specialists and communities to develop suitable educational material on elephant conservation and management for NWM - Distribute material developed and undertake awareness campaigns on elephant conservation in selected areas	- Number and quality of elephant information items developed and delivered to schools in NWM - Proportion of schools within or neighbouring elephant areas receiving and using information provided	There is little information distributed on elephants to communities. Distribution is largely done by private organisations such as painted dogs The proportion is low

9.4.4. Building Conservation Capacity (North West Matabeleland)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
4.1 Funding to initiate and sustain the implementation of this plan secured	- Develop and submit bankable project proposals to identified potential funders - Explore potential partnerships (NGOs, Private Sector) - Review fee structure for elephant hunting and the potential generation and distribution of revenues for conservation and communities from alternative models	- Value of funding and support in kind for conservation of elephants in NWM realised each year	There is high value in funding of elephant conservation (WWF HSBC, WEZ, Friends of Hwange and Other Stakeholders)…funding coming in in terms of drilling of boreholes, vehicles, camping equipment, solar panels, fuels radio communication, roads and fire guards
4.2 Current capacity and staff, training, and equipment needs identified	- Carry out full audit of current human and financial resources required to implement this plan and identify needs	Capacity needs assessment (audit) completed by June 2016	Was done and is being implemented through HSBC
4.3 Capacity for sustained research and monitoring strengthened and collaboration with research institutions enhanced [Linked to and informed by Components 2 and 3]	- Develop and implement a multi-disciplinary research and monitoring strategy for the NWM - Develop and implement a research programme based on that strategy - Provide appropriate tertiary level training for ZPWMA - Engage universities to establish in-service mentoring system - Identify and provide needed equipment - Identify and recruit community research/ monitoring personnel - Identify and train community monitors in the use and application of the Event Book System	- Explicit research strategy for NWM developed by June 2016 - Functional research programme in place by June 2017 - No of research proposals developed, submitted, funded, and equipped - 2 persons trained per annum - No of research personnel on the ground - Research publications - No of active community monitors using the Event Book system	Research strategy is under development 1 done by University of Zimbabwe Under review n/a 3 No publications have been done

9.4.4. Building Conservation Capacity (North West Matabeleland)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
			None
4.4 Training and in-service retraining of personnel in law enforcement, research and monitoring, education awareness community elephant management, etc., established & operating	- Use capacity training needs assessment (4.2) to develop training modules / curricula - Draw up training/retraining programme	- Training modules and curricula developed and being used - 50 to 100% increase in: a) No. of training days and programmes initiated b) No. of staff trained c) No. of communities trained and implementing elephant management programmes d) No. of elephant management campaigns conducted	No modules developed as yet - - - About 10 elephant management campaigns were conducted.
4.5 Infrastructure and housing to facilitate effective protection, conservation and management of elephant in the NWM developed	- Rebuild / refurbish all main access and internal roads within NWM wildlife areas - Maintain / establish necessary airstrips - Undertake a feasibility study for the strategic development of new bases and pickets to support effective law enforcement, research and monitoring - Review staff accommodation requirements for the NWM - Renovate existing buildings - As needed develop staff accommodation and associated infrastructure	- Roads, bridges, airstrips refurbished and maintained as planned - Feasibility study of required field stations completed by June 2016 - Identified infrastructure requirements prioritised and required developments undertaken and completed by 2018	2 airstrips were refurbished and 1650km of roads were graded The list has been produced and is included in the Hwange Management Plan

9.4.4. Building Conservation Capacity (North West Matabeleland)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
4.6 Effective, secure communications network across the region established	- Establish digital VHF and GPS communication and tracking systems across the NWM (repeater links, base sets, handhelds, mobile radio sets, computers for monitoring purposes	Fully operational secure communications system in place and being maintained	The communication system has been improved, however more is required in relation to the repeater links

9.4.5. Coordination, Collaboration and Programme Management (North West Matabeleland)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
5.1 Regional elephant management committee with membership from key stakeholders established and operating	- Appoint committee members - Hold meetings twice each year - Circulate minutes and actionable points within one month of each meeting	- Timely minutes of each bi-annual meeting produced and circulated - Number of committee resolutions and actionable points initiated and acted upon	N/A N/A
5.2 Technical support team to assist in implementation of the plan established and operational	- Convene technical support team of volunteers - Establish Terms of Reference for the team with ZPWMA & FC	- Functional team established - Technical support provided in keeping with TORs and planned activities implemented	N/A N/A
5.3 Effective communication and collaboration between Private sector, NGOs, State Agencies, and neighbouring communities (via a Forum) established	- Establish a formal forum for private sector agencies to interact with ZPWMA and FC - Establish terms of reference and recognition as a formal entity - Establish effective engagement with RDCs, and Traditional Leaders in NWM and neighbouring communities	- Formal recognition by ZPWMA / FC achieved - Meetings held - Effective engagement with neighbours	Quarterly stakeholder meetings There is effective engagement with neighbours…working with RDCs, KAZA, communities in law enforcement, human wildlife conflicts
5.4 Links with neighbouring Botswana, Namibia and Zambia to confer on the management of shared elephant populations established / strengthened	- Establish links with Botswana, Namibia and Zambia to confer on cross border elephant management issues	- Links established and operating	The KAZA forum allows for the mentioned countries to tackle cross border management issues

9.4.5. Coordination, Collaboration and Programme Management (North West Matabeleland)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
5.5 Information dissemination strategy developed and implemented	- Undertake an awareness campaign to promote and market the plan locally and internationally - Produce and disseminate regular progress reports on the implementation of the plan	- At least one awareness campaign conducted each year - Annual progress reports produced - Number of briefs / news releases on major developments or progress released - Funds raised to support elephant conservation	This is yet to be done

ANNEX 2.0 **Sebungwe Action Plan -** *Status and progress report Aug - 2016*

9.5.1 Protection and Law Enforcement (Sebungwe)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
1. Joint operation reaction team established and existing base renovated at Bumi Hills old ZRP Camp as primary base. Followed by 3 others (Binga, Siabuwa, Old Chizarira Lodge/ Sengwa Wildlife Research Institute) *Manpower* *Vehicles* *Aircrafts* *Communication – eg radios* *Equipment eg firearms, boats* *Training* *Central database* *Intelligence networks*	**Manpower** – Draw up 20 man reaction team from law enforcement agencies and other stakeholders from the whole Sebungwe sub-region. (Prioritise Bumi, Sengwa) **Refurbish main base** **Training** – Initial database training Refresher course **Transport and Equipment** Procurement of 3 vehicles (land cruisers) Procurement of 3 boats (speedboats – 1 mothership and 2 patrol boats) **Communications** – establish an independent inter-agency communication network	- Number of arrests - Number of cases detected - Number of recoveries made (eg ivory, firearms etc) - Number of patrols conducted - Number cases finalized (convictions) - Number of carcasses detected - Number of joint operations carried out - Number of refresher courses carried out - Number of failed cases	The Sebungwe Region whose greater part is under the jurisdiction of Central has stations which include Sengwa Wildlife Research Area, Chirisa Safari Area, Chizarira National Park, Chete Safari Area and Matusadona National Park. During the reporting period of August 2016 we had a total of 22 incursions with the highest incursions happening in Chirisa Safari Area while the least was in Chete Safari Area. We had a total of 5 visual contacts with poachers but all were unarmed contacts. No ivory was recovered, no fire arms were recovered. 203 wire snares were removed. 8 people were arrested however all the arrests were not ivory cantered. No refresher course was conducted in the Region. Joint operations were conducted by our investigations section with MBCU, the police and MAPP. A total of 6 elephant carcasses were discovered of which 2 were natural mortalities in Matusadona, 1 was poached in Matusadona, 2 were poached in Chete and 1 was poached in Chizarira.
1.2 Informer network, Investigation and intelligence system strengthened	- Recruit informers and contacts - Maintain hotline for whistle-blowers - Procurement of 2 vehicles and 2 motorbikes - Recruit investigators (6) and deploy strategically - Train investigators - Constant liaison with informers - Rewards to informers standardized	- Number arrests and successful convictions based on information from intelligence system - Number of incursions reported on/reacted to by local communities - Number of informer reports per informer leading to arrests and convictions	From the month of August to date 2016,based on information given through informer network assisted in arresting two persons found in possession of a pangolin in Sengwa,Gokwe Davison Goredema and Batau Murambiwa Both were sentenced to 9 years effective each.On the 14th of September 2016 One suspect was arrested for possessing approximately 5kgs of ivory.The case is still pending in court.Approximately 8 ivory deals have been reported through informer network and are still being worked on for reaction.10 deposit fine tickets were also issued for separate offences .

9.5.1 Protection and Law Enforcement (Sebungwe)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
1.3 Zambezi Valley deployment tactics revisited and implemented	- ZV deployment tactics revised - Identification of OP sites, crossing points etc - Identification and procurement of specialized equipment (eg night vision) - Provision of dry rations for operations - Introduction of aerial surveillance flights	- Resource books - Number of successes on detections - Number of contacts - Number of recoveries - Patrol effort (surveillance)	MAPP assisted in deployments for Matusadona both in the Lake with a boat and in the land with a vehicle. MAPP also assisted in joint operations and following up information from informers within the Gokwe and Nyaminyami districts. Recoveries and surveillances were made by our Investigations team together with the informers, MBCU and sometimes with the duty uniform ZRP
1.4 Ranger patrols strengthened	- Establish effective patrolling force of deployable rangers - Establish (or review) standard operating procedures (SOP) - Establish well-equipped reaction teams - Honorary Officer system re-established to support ranger patrols - Increase support for establishing/ improving dedicated APU for every concession.	- Number of deployable rangers at any one time - Total man-days spent on patrol - SOPs in place - Area patrolled each month - Reaction time to incidents - Number of APUs established	A total of 90 rangers were deployable and a total of 1099 man-days were spent on patrol during the month of August 2016
1.5 Training of staff enhanced	• Establish regular training and retraining schedule (includes training on weaponry, bushcraft, tracking, information gathering, crime scene management, Judiciary procedures etc • Training on standard operation procedures (harmonization)	• Number of training and retraining sessions carried out	8 rangers went for a refresher course at Head Office with the Army training them in drilling movements during the month.
1.6 Conviction rates improved	• Judiciary sensitization (incl. workshops) • Formulation of proper charges, indictment and summons • Gathering all evidence available using legal means • Completion of dockets timeously, submission and concluding cases in a reasonable time • Creation of a district sub-committee on elephant and wildlife issues • Hold workshops to share information on wildlife issues	• Number of successful prosecutions • Decrease in number of crimes committed • Number of workshops or meetings held	From August 2016 to date one case of ivory possession was successfully finalized and one for ivory is still pending trial.Generally poaching seem to have decreased as compared to the other years due to deterrent sentences being given by the courts,Conviction of ring leaders,changing of area of operation and current economic challenges which are also hitting the market on acquiring the us dollar.One workshop was held at Midlands black Rhino Concervancy with the judiciary to address challenges being faced .

9.5.2 Biological Monitoring and Management (Sebungwe)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
2.1 Viable population, geographical distribution, and habitat connectivity targets established.	- Establish TPC for all areas to set viable population target. - Collect spatial data (livestock densities, human population densities, forest cover, and agricultural cover) to map potential geographic distribution of elephants - Identify potential connectivity areas and promote wildlife-based land uses in those areas.	- Viable population target of minimum 5,000 for the region with minimum and maximum thresholds in different land categories - Updated geographical distribution map and spatial datasets - Number of conservancies approved/ green-lighted by communities	There are no private conservancies in the Sebungwe Region, however the 4 Rural District Councils within the Region are very active in conservation and also CAMPFIRE is active. The 4 RDCs are Gokwe North, Gokwe South, Nyaminyami and Binga RDC.
2.2 Monitoring system for population trends, habitat, and impacts designed and implemented.	- Establish regional database for data on population, habitat, HEC, patrolling, poaching, and trophies (for trophies, see also Output 5). - Design and adopt standardized reporting formats. (i.e. MOMS) - Report to the regional management committee to review data and decide on management actions. - Conduct annual aerial surveys for the "core area" (to be defined).	- Regional database operational - Number of reporting formats designed and distributed - Number of persons, patrols, and sectors submitting data - Quarterly reports - Quarterly reviews	We have formats for different reports which start from Incidental reports, Daily reports, Weekly reports, Monthly reports, Quarterly reports and Annual reports. The reports come from the stations and are consolidated at the Regional Office before they are sent to HQ.
2.3 Direct and indirect causes of decline (2006-2014) researched.	- Causes of mortality quantified using the regional database. - Gather information from local communities and experts. - Examine potential socio-economic factors related to decline - Research habitat changes. - Publish research in scientific publication.	Data and analyses	For the month of August 2016, the Sebungwe Region lost a total of 6 elephants, 2 of them died of natural causes in Matusadona National Park, 1 was poached in Matusadona, 2 were poached in Chete Safari Area and 1 was poached in Chizarira National Park. A long term elephant research programme to be launched in Matusadona National Park in conjunction with a private partner

9.5.2 Biological Monitoring and Management (Sebungwe)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
2.4 Viable population, geographical distribution, and habitat connectivity achieved and maintained.	- Establish wildlife-based land-use system (not a land use plan) with community conservancies acting as corridors between protected areas - Reduce human-elephant conflict to acceptable levels. - Implement responsible habitat management (with regard to fires, REDD+, mining, illegal and legal settlement) - Conduct integrated land-use planning. - Support extension of REDD initiative	- Number of operational conservancies/ corridors - Elephant Population data - Number of elephants and people involved in "serious HEC incidents" - Effective, non-lethal elephant deterrents in place - Regional land-use plan - Number of stakeholders, meetings in planning process - Utilization of corridors by elephants	The Authority is supporting efforts to establish conservancies in the Region and we have approved the setting up of a conservancy in the Gatshe Gatshe Area. The Chirisa-Sengwa excision area is also planned to be established as a community conservancy
2.5 Sustainable offtakes established through participatory quota setting and monitored through adaptive management.	- Establish a database of offtakes, trophy qualities, and age classes (See Output 2, Activity 1). - Using participatory quota setting following best practices, set optional quotas based on scientific survey data, with no more than 0.5% of the estimate as the elephant quota for the region. - Revisit quota system and establish optional quotas as opposed to fixed quotas - Set minimum trophy size and a variable trophy fee with large increments based on size - Identify and enforce best hunting practices through a code of conduct incorporated in lease agreements and hunting permits.	- Trophy quality improving - Record of hunting practice transgressions	Quotas for the Nyaminyami District and the Sebungwe Region as a whole have been greatly reduced and all elephant hunts are now being monitored by Parks

9.5.2 Biological Monitoring and Management (Sebungwe)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
2.6 Robust and comprehensive research program enhanced and maintained.	- Research the impact of decline on population dynamics. - Investigate migration hypothesis. - Develop applied research projects, especially interdisciplinary and multidisciplinary research. - Establish research oversight body, building on existing approval processes.	Publications, particularly with management guidance	A long term elephant research programme to be launched in Matusadona National Park in conjunction with a private partner

9.5.3 Social, Economic and Cultural Framework (Sebungwe)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
3.1 Transparent and equitable distribution of benefits established	- Develop an instrument to increase elephant revenues at the ward level. - Instrument to provide for traditional leaders to be involved in management and distribution of elephant related benefits. - Revise CAMPFIRE guide lines to increase the share of revenues at the ward level beyond 55%. - Develop a system to ensure accountability of the revenue sharing mechanism from District to ward level. - Periodic auditing of the revenue sharing system.	- Instrument approved. - CAMPFIRE guidelines revised and approved - Revenue accountability system established - Number of audits	The Zimbabwe Elephant Nursery to establish a community outreach program that will provide community educational and developmental projects and activities in the region
3.2 Economic management of consumptive and non-consumptive tourism of elephants in Sebungwe improved.	- Preventing human settlement in protected areas - Review length of concession leases to encourage greater investment. - Rehabilitate the depleted Safari areas - Promote PPCPs	- Number of eviction notices issued. - Number of reviewed leases - Number of safari areas under proper management/concessions - Record of PPCPs established.	Mokore safaris is currently operating in Sengwa Wildlife Research Area and the lease is under proper management, Statunga Safaris has also got the Chirisa hunting lease and will start operating in the year 2017. Chete Safri Area is currently still open however there are applicants who may take it at anytime.
3.3 Land use strategies to mitigate human elephant conflicts (HEC) established	- Review of human elephant conflict measures (consultancy) - Increase sense of ownership of wildlife as a mitigation measure to HEC (review) - Traditional leaders to set up a compensation scheme for land holders directly affected by HEC. - Support review and development of land –use plans to optimize agricultural livestock and farming activities	- Reports - Link with activity 1 and 2 output1(benefits) - Compensation scheme functioning and record of HEC in place. - Land use plans supported	Established a Problem Animal Control Committee in Nyaminyami and Gokwe that includes all stakeholders to assist in the effective coordination of all PAC issues

9.5.3 Social, Economic and Cultural Framework (Sebungwe)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
3.4 Investment of wildlife revenue in income generating community products established	- Revitalize technical support services to communities/ community initiatives - Participatory business plan at community level. - Explore micro financing opportunities - Explore markets for community projects related to elephant conservation	- Technical support services established through proper instrument. - Participatory business plan adopted.	There is a strong move to promote the development of aquaculture projects to enhance food security
3.5 Relationship and communication mechanism established	- Sebungwe WG to include Traditional leaders and RDCs - Methodologies for regular communication with communities and their leaders established	- Traditional leaders and RDC included in the WG - Communication strategy developed	
3.6 Education on elephant conservation in the community increased	- Information campaign explaining reasons for quota decrease (see Biological Component for cross check) - Explain what trophy hunting means and how it links to benefits - Share census results and explain implications - Extend conservation education to Sebungwe wards (NGOs?)	- Number of Outreach meetings with Traditional leaders / Wards/ RDC including the 4 key activities	The Zimbabwe Elephant Nursery to establish a community outreach program that will provide educational and developmental projects and activities in the region

9.5.4 Building Conservation Capacity Component (Sebungwe)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
4.1 Capacity needs for elephant management in Parks and CAMPFIRE areas analysed and identified	- Draw up TOR - Appoint consultant	Report produced	Still outstanding
4.2 Training provided	- Analyse training needs - Prioritise and develop training curricula if not already available - Implement in-service training and re-training	Numbers of people trained and certified	Still outstanding
4.3 Best practice standards for elephant management in place	- Standards defined by and through National Elephant Policy and CAMPFIRE Principles and Guidelines - Define clear objectives for elephant management in the Sebungwe - Support CITES MIKES site(s) and application of SMART and RBM	- MIKES PIKE database - SMART database	Nyaminyami RDC is a MIKE site and efforts are needed to adopt the SMART database system in th region
4.4 Research and monitoring capacity strengthened	- Provide appropriate tertiary level training for ZPWMA - Engage universities to establish in-service mentoring systems - Identify equipment needs, source and provide - Identify and recruit community research/ monitoring personnel - Identify and train community monitors in the use and application of the Event Book System	- 2 persons trained per annum - 5+ people in mentoring system each year - Equipment procured and in place - Active community research programme underway - Event Book System functional and operationalised	Still outstanding
4.5 Funding secured	- Complete Sebungwe Elephant Management Plan and disseminate for funding purposes - Development of funding proposals for each of the components, if necessary - Identify donors (e.g. bilateral, WB GEF, NGO, other) - Submit proposals - Develop Sebungwe branding and marketing campaign	Number of successfully funded proposals	Still outstanding
4.6 Infrastructure refurbished and functioning	- Roads rehabilitation: Parks and CL - Karoi-Binga road - Airstrips	- 2,000 km repaired to standard - Airstrips registered and functioning	Still outstanding

9.5.4 Building Conservation Capacity Component (Sebungwe)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
4.7 Communications	- Procure and install radio communications systems	System installed and operational	Still outstanding

9.5.5 Coordination and Programme Management (Sebungwe)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
5.1. Sebungwe Management Committee with an Elephant Working Task Force and Project Coordinator established	-Identify committee members, select WTF and appoint Coordinator -ToR for each institution (from national plan)	Committee meeting twice yearly; WTF meets quarterly, identifies priority activities and oversees implementation by Coordinator	Still outstanding
5.2. Coordination and communication between Traditional Authorities, their communities and the elephant management programme and plan strengthened	-Address the community through CAMPFIRE and traditional leadership -Introduce elephant management plan in easily understandable format – maps and graphs – and disseminate through all levels/actors in Sebungwe	• Management plan documents for dissemination	Still outstanding
5.3. Coordination between Sebungwe safari operators and implementation of the elephant management plan strengthened	-SOAZ, ZPHGA appoint liaison officer for Sebungwe elephant management plan -Encourage non-members of associations to participate in plan implementation	Liaison officer appointed and operating and non-members of associating participating in implementation of the action plan	Still outstanding
5.4. Links with neighbouring states established – shared elephant management	-Establish relationship with KAZA Secretariat -Establish links and synergies with transboundary natural resource mgmt -Bilateral JOC to focus on illegal wildlife trade and trade routes -Establish links with TRAFFIC	• KAZA Secretariat aware of Sebungwe elephant management plan • TBNRM established and functional • Reduced illegal trade	Still outstanding

ANNEX 3.0 Lower Zambezi Valley Action Plan - *Status and progress report Aug - 2016*

9.6.1. Protection and Law Enforcement (Lower Zambezi Valley)			
Output	**Activities**	**KPIs**	**Narrative Report on Progress in Implementation**
1.1 Highly trained rapid response anti-poaching units established/ strengthened	- Assess / audit current law enforcement capacity, prioritise needs - Mobilise resources to meet shortfalls in personnel and equipment and new technology - Recruit rangers, train and retrain staff - Review / establish Standard Operating Procedures (SOPs) for all law enforcement operations	- Assessment of enforcement capacity completed - Fully staffed and trained anti-poaching units in place and operating - SOPs established and being implemented - Trends in illegal killing of elephants	-
1.2 Informer network, investigation and intelligence system established	- Recruit informers and contacts - Recruit investigators and deploy strategically - Train investigators - Set up anonymous whistle-blowing system (through hotline) - Carry out awareness campaign within communities on value of conservation and how to report illegal activity (to stimulate social involvement) - Establish intelligence database	- Number of arrests based on information from intelligence system - Number of investigators recruited and trained - Number of calls to whistle blowing system that result in effective follow up - Number of incursions reported on by local communities and reacted to by ZPWMA/ZRP	5 informers were recruited, one more investigator was recruited. 10 calls were received indicating poachers coming in from the local community and 3 calls indicating foreign poachers coming in. Since January 2016, 4 foreigners have been arrested from tip offs and one local person. A total of 32 incursions were recorded whereby the majority of them were recorded during the first quarter of the year.
1.3 Investigation and prosecution of wildlife crimes improved	- Establish Standard Operating Procedures (to include guidelines on collaboration with ZRP, Prosecutors, Magistrates, EMA, etc., and evidence gathering) - Identify gaps (e.g. ballistics and forensics) and solicit external expertise - Establish regular training and retraining schedule - Procure / hire specialized equipment that may be required	- Proportion of arrests leading to prosecution - Proportion of successful prosecutions	Of all the five arrested poachers, all were sent for prosecution and were all convicted and sentenced

9.6.1. Protection and Law Enforcement (Lower Zambezi Valley)			
Output	**Activities**	**KPIs**	**Narrative Report on Progress in Implementation**
1.4 Database that is compliant with national database established	- Set up databases at regional HQ and field stations that can feed compliant information through to regional and national databases - Train staff in appropriate data collection and data capture using standardised recording forms and procedures	- Databases bases established and operational - Recording protocols in place and being used	The current data base in place is the MIKE data base system where one Senior Ranger and two rangers were trained to manage the input of information into that system. Recording starts from the time the callsign are deployed using patrol briefing form, patrol details will then record information of their findings onto the ground patrol data form whilst out on patrol; on return, a report is then reproduced which will be used together with the ground data form to then enter the information onto the MIKE system data base.
1.5 Joint law enforcement operations within the LZV	- Convene joint meetings of law enforcement agencies - Conduct awareness campaigns for other law enforcement agencies - Agree on operational order / SOPs (including information sharing) - Conduct joint operations	- Number of meetings held per year - Number of successes from shared wildlife crime information - Number of joint operations leading to arrests and successful prosecutions	One liaison meeting conducted with our Zambian counter parts, 3 community outreach programs with the Nyamakate and Chundu community. -
1.6 Full compliance with hunting and guiding regulations enforced	- Ensure all operators within the region are fully aware of regulations - Appropriate measures are taken to fine / apprehend / prosecute breaches of regulations	Implementation of revised quota setting models in the LZV	Implementation of the LZV Action plan is in progress with
1.7 Illegal settlement / human encroachment in designated wildlife areas reduced / reversed	- Liaise with RDCs, Traditional Leaders, ZRP and DA's office, and Lands Office - Conduct awareness, education, extension programmes in areas affected - Conduct regular satellite monitoring of areas likely to be affected	Percentage of designated wildlife area in the LZV settled has not increased, or has declined, from 2015 levels	
1.8 Collaboration in law enforcement with neighbouring countries established	- Convene joint meetings of law enforcement agencies - Agree on standard operational procedures - Conduct joint cross border operations	- Agreed SOPs for cross border law enforcement operations - Number of joint operations leading to arrests and successful prosecutions	

9.6.2. Biological Monitoring and Management (Lower Zambezi Valley)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
2.1 Elephant population numbers, structure, mortality (using aerial, ground, and ranger based methods) regularly monitored	- Carry out regular surveys - Carry out aerial monitoring of wildlife and illegal activities - Adopt standardized databases for all stations and RDCs in LZV - Introduce ranger-based monitoring (SMART, MIKE, ETIS) across all stations in LZV - Analyze the data and report on trends	- Information on trends in elephant numbers, structure and mortality analysed and available	-According to the 2014 Aerial Survey report, Mana Pools has 2984 elephants. From 2009 to 2016, Mana Pools has lost 95 elephants to poaching of which 16 were recorded this year. The report states that there was 40% reduction in elephant populations from the 2001 survey. Causes of reduction include natural deaths, migration and poaching.
2.2 Impacts of elephants on selected habitats and selected indicator plant and animal species monitored and assessed	- Measure and monitor vegetation indicators, e.g. woodland cover and changes in specific species e.g. Baobabs - Measure and monitor functional biodiversity indicators, e.g. bird species richness and responses to structural changes in woodlands	Elephant impacts on selected habitats monitored, analysed and reported Elephant impacts on indicator species measured analysed and reported	-Elephant damage has been observed and recorded on woody species on the flood plain where they are greatly concentrated. Impacts shown were ring barking and uprooting of woody species such as *Combretum spp* and, *Fidherbia albida.* The impacts have resulted in weakening of the tree species, making them susceptible to diseases and mistletoes. -These species also do not have recruitment due to impacts of elephants. -Introduction of enclosures are at initial stages to monitor the impacts and enhance recruitment.
2.3 Upper and lower thresholds of potential concern (TPCs) related to spatial and temporal impacts (ecological, social, economic) of elephants established	- Compile and analyse historical trends in habitats, selected species, economic performance of consumptive and non-consumptive use, HWC, in the LZV - Consultations with experts and the public on acceptable limits to change - Propose TPCs for elephant impacts and densities	- Research report completed - Survey results analysed and reported - TPC recommendations submitted - Results of timely analyses and expert and public opinion being used in determining adaptive management measures	-Recommendations have been submitted to release pressure on the Mana Pools national park through stopping hunting on the Sapi Safari Area flood plain.
2.4 Appropriate adaptive management actions undertaken when TPCs approached or exceeded	- Regularly monitor levels and trends in TPC indicators that have been developed - Alert management when and if trends indicate that TPCs are l kely to be exceeded - Decide on and implement appropriate management action	- Adaptive management actions taken in response to elephant impacts	-Sapi Safari Area turned hunting in the process of being stopped, and the area to promote photographic safaris instead of hunting.

9.6.2. Biological Monitoring and Management (Lower Zambezi Valley)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
2.5 Age and quality of all elephant killed (trophies, PAC, rations, culls, poached) monitored and quotas to meet desired trophy quality adjusted	- Record age, sex and tusk size (length and weights) of all elephants killed each year - Set up and maintain database - Analyse trends and adjust quotas as necessary to meet desired trophy size - Introduce flexible and adaptable quota system (review fixed quota system) - Produce annual report	Elephant trophy quality is maintained or improved in relation to the stipulated desired trophy size.	Non-trophy hunting area. Mana Pools being a non-hunting areas, the sizes of trophies hunted from management quota and those picked from natural deaths, trophy sizes are more constant.
2.6 Current elephant range defined and management to recover habitats and elephant populations and maintain connectivity between fragmented populations and buffer zone populations initiated	- Define elephant range use and existing buffer zones and potential connectivity - Identify priority corridors and land use barriers - Conduct spatial analyses to inform land use planning to facilitate connectivity and reduce human-wildlife conflict	- Elephant range and maintained and lost habitats recovered - Corridors between fragmented elephant populations maintained/ established	Elephants aggregation on the flood plain during the dry season has resulted in a lot of pressure being exerted on the area. Changing of management system of Sapi's flood plain could contribute to recovery of the habitat on the floodplain once animals disperse.
2.7 Reports to international monitoring systems prepared and submitted (e.g. AED, ETIS, MIKE, MIKES)	- Timely reports prepared and submitted as required to regional and national levels for transmission to international agencies	- Required reports submitted on time	Situational reports involving poaching of elephants have been submitted in time. MIKE Data Base is also being maintained. A record of recovered of all ivory obtained is kept and the recovered tusks are constantly submitted to Head Office where they are again reweighed and recorded as well.

9.6.3 Social, Economic and Cultural Framework (Lower Zambezi Valley)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
3.1 Joint venture and sustainable use opportunities to strengthen elephant conservation and management explored	- Initiate policy formulation and /or protocols for the development of joint ventures involving public, private, community partnerships (PPCPs) - Involve all relevant stakeholders in identifying potential areas and in the planning / selection process for potential joint ventures / PPCPs - Implement identified and feasible joint ventures / PPCPs	- Policy framework and protocols for establishing Joint Ventures /PPCPs in the LZV adopted - At least three Joint Ventures / PPCPs initiated and operating by 2018	A number of organisations have come aboard in support of conservation through Joint Ventures and Memorandum of Agreements such organisations like: Zambezi Society, Tashinga Initiative, Animal Wildlife Fund Foundation, Sino Zimbabwe Wildlife Foundation Fund, and Kariba Animal Wildlife Fund Foundation, these have formalised they assistance to Mana Pools which vary from Anti-Poaching assistance to treatment of injured animals.
3.2 Transparent distribution of the benefits and costs of elephant management and conservation facilitated	- Develop instruments / protocols to: o Increase elephant revenues at the ward level. o Provide for traditional leaders to be involved in the management and distribution of elephant related benefits. - Revise CAMPFIRE guidelines to increase the share of revenues at the ward level beyond 55%. - Develop a system to ensure accountability of the revenue sharing mechanism from District to ward level. - Periodically audit the revenue sharing system	- A greater proportion of revenues from wildlife utilisation accrue to communities - Traditional leaders involved in elephant management and revenue sharing - Revenues from wildlife accounted for and audited	Benefits from wildlife utilisation are channelled through CAMPFIRE program through the local Rural District Council.
3.3 Effective techniques and land use strategies and protocols to mitigate human-wildlife conflict (HWC) implemented.	- Review current human-elephant conflict mitigation measures and potential incentives / policies to reduce conflict - Implement proposals / options emerging from review - Monitor levels of HWC, enter data in database, analyse trends	Land use strategies and protocols for mitigating HWC adopted and implemented Trends in HWC incidents show reduced levels of conflict	Only one case of Human Wildlife Conflict has been recorded since January where one person was attacked by a hippo but survived the attack. Cases of Wildlife encroachment onto the communities on the southern boundary are dealt with by the CAMPFIRE because of the buffer zone between the southern boundary of the park and the community.
3.4 Recovery and use of all products from legally killed elephants improved	- Provide guidelines for the effective recovery, treatment, storage, and sale of elephant products -	Proportion of legally killed elephants from which products were effectively recovered Revenue earned	Of the 16 located elephant carcass, six elephant carcasses were recovered from two contacts. Note that 22 other elephant carcass were recovered in Chirundu again from a contact but we cannot directly link them to the elephants poached in mana Pools though there is a very high possibility of having the elephants poached in Mana Pools as well or in Marongora or Sapi..

9.6.3 Social, Economic and Cultural Framework (Lower Zambezi Valley)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
3.5 Information on elephant conservation, management and benefits in communal areas neighbouring key elephant populations included in school curricula	- Liaise with Ministry of Primary and Secondary Education on the development, production, and inclusion of elephant conservation material in school curricula - Engage with specialists and communities to develop suitable educational material on elephant conservation and management for the LZV - Distribute material developed and undertake awareness campaigns on elephant conservation in selected areas	- Number and quality of elephant information items developed and delivered to schools in the LZV - Proportion of schools within or neighbouring elephant areas receiving and using information provided	2014 Elephant Survey Report

9.6.4 Building Conservation Capacity (Lower Zambezi Valley)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
4.1 Funding to initiate and sustain the implementation of this plan secured	- Develop and submit bankable project proposals to identified potential funders - Explore potential partnerships (NGOs, Private Sector) - Review fee structure for elephant hunting and the potential generation and distribution of revenues for conservation and communities from alternative models	- No of project proposals developed, submitted and funded - Value of funding and support in kind for conservation of elephants in LZV realised each year	A proposal was submitted by Tishinga Initiative for the establishment of the Nyakasikana Anti-poaching Base and has been funded and near completion. See section 9.6.3.1
4.2 Current capacity and staff, training, and equipment needs identified	- Carry out full audit of current human and financial resources required to implement this plan and identify needs	Capacity needs assessment (audit) completed by June 2016	
4.3 Capacity for sustained research and monitoring strengthened and collaboration with research institutions enhanced [Linked to and informed by Components 2 and 3]	- Develop and implement a multi-disciplinary research and monitoring strategy for the LZV - Develop and implement a research programme based on that strategy - Provide appropriate tertiary level training for ZPWMA - Engage universities to establish in-service mentoring system - Identify equipment needs and provide - Identify and recruit community research/ monitoring personnel - Identify and train community monitors in the use and application of the Event Book System	- Explicit research strategy for the LZV developed by June 2016 - Functional research programme in place by June 2017 - No of research proposals developed, submitted, funded, and equipped - 2 persons trained per annum - No of research personnel on the ground - Research publications - No of active community monitors using the Event Book system	Mana Pools has one Ecologist

9.6.4 Building Conservation Capacity (Lower Zambezi Valley)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
4.4 Training and in-service retraining of personnel in law enforcement, research and monitoring, education awareness community elephant management, etc., established & operating	- Use capacity training needs assessment (4.2) to develop training modules / curricula - Draw up training/retraining programme	- Training modules and curricula developed and being used - 50 to 100% increase in: a) No. of training days and programmes initiated b) No. of staff trained c) No. communities trained and implementing elephant management programmes	Training modules are guided as per the Mushandike College of Wildlife Management at the organisation training institute. The station has 8 staff members who have undergone training at Mushandike College of Wildlife Management in various fields from Accounting, Certificate in Wildlife Management, Diploma in Wildlife Management, and IT courses
4.5 Infrastructure and housing to facilitate effective protection, conservation and management of elephant in the LZV developed	- Rebuild / refurbish all main access roads to the LZV (c.150 km) - Repair, clear, grade where necessary some 600 km of internal roads and several bridges - Maintain / establish necessary airstrips - Undertake a feasibility study for the strategic development of new bases and pickets to support effective law enforcement, research and monitoring - Review staff accommodation requirements for the LZV - Renovate existing buildings - As needed develop staff accommodation and associated infrastructure	Roads, bridges, airstrips refurbished and maintained as planned Feasibility study of required field stations completed by June 2016 Identified infrastructure requirements prioritised and required developments undertaken and completed	New operational roads are in the process of being opened, existed roads were maintained, the Mana Main Airstrip was renovated this year 2016 Of priority was to establish an anti-poaching base at Nyakasikana which I now near completion
4.6 Effective, secure communications network across the region established	- Establish digital VHF and GPS communication and tracking systems across the LZV (repeater links, base sets, handhelds, mobile radio sets, computers for monitoring purposes	Fully operational communications system in place and being maintained	New operational radios, repeater links and potable GPS systems have been secured.

9.6.5 Coordination, Collaboration and Programme Management (Lower Zambezi Valley)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
5.1 Regional elephant management committee with membership from key stakeholders established and operating	- Appoint committee members - Hold meetings twice each year - Circulate minutes and actionable points within one month of each meeting	Timely minutes of each meeting produced and circulated Committee resolutions and actionable points initiated and acted upon	
5.2 Technical support team to assist in implementation of the plan established and operational	- Convene technical support team of volunteers - Establish Terms of Reference for the team with ZPWMA	Functional team established Technical support provided in keeping with TORs and planned activities implemented	A technical person has been seconded to Mana Pools by AWF to assist in Anti-poaching
5.3 Effective communication and collaboration between Private sector, NGOs, State Agencies, and neighbouring communities (via a Forum) established	- Establish a formal forum for private sector agencies to interact with ZPWMA - Establish terms of reference and recognition as formal entity - Establish effective engagement with RDCs, and Traditional Leaders in the LZV and neighbouring communities	Formal recognition by ZPWMA achieved Meetings held Effective engagement with neighbours	In 2016, 1 Meeting has been held between ZIMPARKS officers and the Chief (Chief Chundu) together with his village heads. Another meeting has also been held between Mana Pools Officers and Safari Operators to discuss their support in conservation.
5.4 Links with neighbouring Zambia and Mozambique to confer on the management of shared elephant populations established / strengthened	- Establish links with Zambia and Mozambique to confer on cross border elephant management issues	Links established and operating	There is cordial communication with ZAWA counterparts.
5.5 Information dissemination strategy developed and implemented	- Undertake an awareness campaign to promote and market the plan locally and internationally - Produce and disseminate regular progress reports on the implementation of the plan	At least one awareness campaign conducted each year Annual progress reports produced Briefs / news releases on major developments or progress released Funds raised to support elephant conservation	Funds have been raised by Non-Governmental organisations through provision of camping equipment, availing vehicles for use in Anti-poaching, assisting in opening up of roads, developing of base camp for rangers and training

ANNEX 4.0 South East Lowveld Action Plan - *Status and progress report Aug – 2016*

9.7.1 Protection and Law Enforcement (South East Lowveld)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
1.1 Highly trained rapid response anti-poaching units strengthened	– Appoint anti-poaching coordinator (for region and/or separate areas) – Recruit staff – Train staff – Procure vehicles and equipment – Deploy unit – Support existing units	Trained and fully equipped units established and operating with relevant security agency by June 2016	Five units were established in Gonarezhou National Park, trained and fully equipped. Three new Lancruiser vehicles were procured to augment the existing patrol fleet. -Two candidates identified with one to be elected for the post of antipoaching coordinator for the Region. - 35 Cadet rangers recruited by the Gonarezhou Conservation Project to boost the existing staff compliment. Cadet Rangers trained in basic paramillitary skills by the Gonarezhou Conservation Project -A Gonarezhou Antipoaching Reaction Unit established and operating throughout the Gonarezhou Nationa Park. -Out of the 20 properties in Save Valley Conservancy, 8 properties have 2X call signs of 3 rangers each who are highly trained and able to carry out combined operations with security agencies in addition to the15scouts also highly trained with AggressiveTracking Specialist a security private company assisting in the protection of rhinos and elephants in SEL.
1.2 Informer and intelligence systems established and/or strengthened	– Identify and recruit informers – Establish and implement incentive protocols – Set up, implement hotline for anonymous reports and communicate it to the public – Analyse and use information – Ensure information is included in database outlined in Output 1.6	An active informer system/network operating within the SEL by Jan. 2016 Hotline widely advertised and operational by Jan 2016	-Informer network is being established and had a number of informer lead success. Awareness of the hotlines began in September 2016 by Regional team. -Informers recruited by the Gonarezhou Conservation Project. -A hotline set up for Gonarezhou and Save Valley Conservancy. -Data being analysed and a data base in place and being mantained at the Regional Office. -Hotline facility fully advertised through the Parks Investigations Branch.
1.3 Investigation of wildlife crime improved	– Implement training programmes for investigation personnel – Ensure collaboration between Parks, ZRP and intelligence officers	At least two law enforcement staff trained in scene of crime collection and preservation of	-3 Investigations officers trained in scene of crime collection and preservation of exhiits course

9.7.1 Protection and Law Enforcement (South East Lowveld)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
	– Recruit more investigators – Put in place Investigator incentive system – Collaborate with forensic scientists and ballistic experts, as well as agencies such as EMA and approved universities (e.g. Chinhoyi University of Technology, University of Zimbabwe, National University of Science and Technology)	evidence, ballistics evidence, etc. in SEL. Percentage of investigations resulting in successful prosecutions in SEL greater than in 2014	-1 investigations officer trained in Wildlife, Pestcide and Forensic Crime Scene Investigation Course. -Collaboration with other law enforcement agencies satisfactorily yielding results. -Collaboration with other agencies strengthened -plans are underway to recruit more investigators and to open an investigations office in Chiredzi. -Some stakeholders have pledged to assist the investigators with some incentives. -In Save Valley Conservancy one trained personnel is dealing with wildlife crimes and is based at Humani Ranch. - The % of successfulness on investigated cases is now higher than 2014, and the current % is estimated to be 60% after lobbying with the Judiciary Services
1.4 Prosecution of wildlife crimes improved	– Train prosecutors on legislation and processes available to deal with wildlife crimes – Conduct awareness / outreach programs with Prosecution, Judiciary – Utilize ancillary laws, such as those dealing with economic crime, organized crime, money laundering, – Communicate status of prosecutions to the public via ZPWMA website – Clear backlog of wildlife cases – Explore the possibility of appointing dedicated wildlife crime prosecutors at Regional and National level	Monthly liaison sessions on wildlife crime and law enforcement held with members of the judiciary Relevant legislation available and being used Wildlife crime prosecutors available and being used in SEL	-Liaison with the Judiciary, Courts and the Prosecuting Authority on wildlife crimes conducted. -Relevant legislation available and referred to in dealing with wildlife crimes -Wildlife Crime Prosecutors not available from the Wildlife Authorities but Public Prosecutors being used to deal with wildlife crimes to which they may not be well versed with certain technical wildlife issues. -No wildlife crime prosecutors appointed. - Inadequate resources of transport and fuels to fully implement monthly liaison.

9.7.1 Protection and Law Enforcement (South East Lowveld)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
1.5 Law enforcement in collaboration with communities enhanced [Links to Component 3]	– Engage and collaborate on curbing wildlife crimes (ZRP & Communities) – Establish anti-poaching clubs/ community natural resource monitors that collaborate with ZPWMA and ZRP – Lobby support from Chiefs to deal with local poachers – Hold workshops with Chiefs and communities about wildlife and wildlife crimes – Establish incentives for communities to provide information	Incentive schemes that encourage the public and members of rural communities to contribute to law enforcement (e.g. through informer hotline) established in SEL Increasing number of incidents of community contribution to law enforcement (e.g. whistle blowers) by Dec. 2017	Trained community rangers from Sengwe area, four passed and ready to carry out ant poaching operations within the Sengwe area. Several meetings on wildlife issues were held with Chief Sengwe. - Collaboration with ZRP and Communities strengthened and yielding results. -We have opened a hotline and fliers facility that we distributed through the Save Valley Conservancy, Gonarezhou and surrounding areas and information is coming in. -All stakeholders workshop on wildlife issues is planned soon -Some stakeholders have pledged to incentivize the whistle blowers -In Save Valley Conservancyseveral education awareness campaigns have been carried out in all areas bordering wildlife protected areas. -meetings with chiefs have been maintained regarding protection of wildlife. - Resource monitors have been selected by the communites. -The surrounding communities are benefitting from meat obtained from problem animal control and trophy hunting.
1.6 Local wildlife law enforcement database established	– Set up database, as per national database – Ensure inclusion of prosecution status in database – Implement national data recording protocols – Train data entry staff and crime analysts	Local database established and operating Illegal activities recorded and analyzed	Spatial Monitoring And Reporting Tool is being used in Gonarezhou and all captured data can be easily analysed.The SMART approachaims at improving conservation effectiveness and tracking of wildife crimes. -No SMART use in Save Valley Conservancy - A poaching database from when the crime is committed up to the final court outcome is in place. -A database of poachers and their modus operandi in place -Crime Registers being mantained.
1.7 Illegal settlements / grazing in wildlife areas reduced	– Liaise with RDC, Traditional Leaders and ZRP, DA's Office – Conducted Education programmes – Regular updated satellite mapping	Illegal settlements reduced to less than 5% of wildlife areas by 2020 (i.e. state protected areas, conservancies and community wildlife areas)	Illegal settlement in the park is still very low no other settlement after 2000 (Chitsa communities). Grazing of cattle in the park is under control in the GonarezhouT National Park. -The Southern part of the Save Valley Conservancy 85 % settled.An inter ministerial committee set up to look at the possibilities of fencing out the settlers and also there

9.7.1 Protection and Law Enforcement (South East Lowveld)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
[Links to activities on land use mapping and planning in Component 2 – Output 2.2 and incentivization / alternative livelihood activities in Component 3]			are proposals to remove some of the settlers from some of the properties to pave way for a game corridor and allow free movement of game within. -Local authority currently working out on orderly settlement in the Save Valley Conservancy. - Fencing of the Save Valley Conservancy is also expected to assist in reduced human and domestic animal movements.

9.7.2 Biological Monitoring and Management (South East Lowveld)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
2.1Research programme to understand temporal and spatial drivers of elephants established [Links to Component 4]	– Create enabling opportunities and environment for research – Prioritise research needs – Conduct localised case studies and research projects – Monitor and evaluate poaching and other drivers - hunting, water, food, human disturbance – Explore possibility of GLTFCA flagship research programme for elephants [linked to Component 5] – Carry out ground surveys to monitor distribution and density	Research programme that enables local and international researchers, and links with the GLTFCA research programme, in place and producing reports	-Ten elephants were collared to monitor elephant movement in Gonarezhou.
2.2Current elephant range defined and options for extending range and maintaining connectivity between fragmented populations explored	– Define elephant range use, and existing and potential connectivity – Identify priority corridors and human land use barriers – Conduct spatial analyses to inform land use planning – Advocate land use planning to facilitate connectivity and reduce human wildlife conflict – Explore options for translocating elephants to under-stocked areas	Identified priority corridors for elephant connectivity within SEL, between SEL and other areas in Zimbabwe, and with neighbouring countries	-Research is in progress in the Gonarezhou National Park - Elephant corridors are known in Save Valley Conservancy but because of illegal settlements the problem of understanding this is still far from reality.

9.7.2 Biological Monitoring and Management (South East Lowveld)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
2.3Elephant population numbers, structure, mortality and trends monitored, quotas adjusted, and desired levels of trophy quality maintained	– Undertake standardised, regular, aerial and ground surveys of the elephant range – Explore methods to monitor elephant presence and abundance in Mozambique (to Zinave) and up to the Chimanimani range – Undertake trend analysis – Define elephant age and sex structures and extract birth and death rates – Establish annual monitoring plans – Record and analyse elephant mortalities (all causes e.g. poaching, PAC, natural, hunting, etc.) – Monitor trophy quality and age – Develop and implement an age-based and size-based trophy quota	Elephant range surveyed at regular intervals Demographic data available and analysed Annual monitoring plans implemented Evidence-based and research-based information and recommendations (consumptive, non-consumptive) provided to managers and used in quota setting	-Biannual aerial survey carried in Gonarezhou and surrounding. Last survey in September 2016. Could not get authority to survey in Mozambique. Elephant's mortalities recorded in park security registers -Elephant survey in Save Valley Conservancy done 2013 -Quota setting being a wild life management tool is implemented annually - taking cognisance of research data -PAC , hunting etc information is kept
2.4Elephant impacts on their habitats and selected indicator species of biodiversity monitored	– Establish annual monitoring plans – Measure vegetation indicators such as woodland cover – Measure other functional biodiversity indicators e.g. bird responses to structural changes to woodlands – Measure ecosystem functions – Relate desired impact to measures of elephant abundance and spatial use – Research other drivers of ecological impact (climate change, change in land use, water provision, and fencing, amongst others) – Use research findings, expert opinion and informed public opinion to establish thresholds of potential concern (TPC or limits to change) to initiate management action in respect of elephant impacts in protected areas and effects in communal land – Identify areas with key vegetation communities that are utilized by elephants	Annual monitoring plans defined and implemented for selected indicator species of biodiversity TPC's established Evidence-based and research-based information and recommendations (consumptive, non-consumptive) provided to managers	-Annual monitoring through sightings when conducting hunts and patrol is in place.

9.7.2 Biological Monitoring and Management (South East Lowveld)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
2.5Costs and benefits of elephants to local and national economy monitored and costs of elephants to local communities reduced	– Monitor and evaluate extent and costs of human-wildlife conflict incidents – Relate human-wildlife conflict to elephant abundance and spatial use – Understand drivers and social and economic consequences of human-wildlife conflict – Evaluate the direct and indirect contribution (financial, economic and social) and the direct and indirect costs of elephants to the well-being of people and to conservation, through both consumptive and non-consumptive uses – Implement ongoing and new mitigation for human-wildlife conflict	Annual monitoring plans implemented Evidence-based and research-based information and recommendations (consumptive, non-consumptive) provided to managers	-PAC programmes are conducted, meat shared among the communities affected, skins and ivory may be sold and money ploughed back in to the affected communities.
2.6Adaptive elephant management framework adopted and implemented [Links to Component 4]	– Ensure collaboration between Regional Elephant Management Committee and regional and local resource management committees (e.g. LOCAL Forum) – Implement annual process of adaptive planning, implementation and monitoring in line with elephant management objectives and TPCs within the SEL – Develop and implement localised management plans (e.g. SVC plan) – Ensure alignment and harmonisation with other Zimbabwean, regional and international plans	Annual elephant management plans developed, adopted and implemented	-Annual elephant management plans have only been confined to hunting and PAC and cropping to a large extent has not been done. -Huge costs of this exercise are a major impediment as evidenced by the number of elephants taken off so far this year under such local arrangements.

9.7.2 Biological Monitoring and Management (South East Lowveld)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
2.7Alternative outcomes modelled	– Develop framework for examining and modelling potential linked impacts between biodiversity issues, elephant issues, and societal issues, including any 'surprises', such as disease or extreme weather events. – Implement the modelling framework to define the outcomes of various management scenarios	Established modelling framework being used to guide adaptive management Scenario outcome recommendations and being used in management	Nothing to report
2.8SEL reporting to meet national / international standards achieved	– Advocate key summary set of elephant KPIs/outcomes for national reporting (e.g. potential population sizes against actual population sizes) – Comply with national and international legal obligations – Explore the designation of GNP as a MIKE site	CITES reporting requirements met National reporting compliance requirements	-Gonarezhou National Park meeting CITES requirements. Park not yet a MIKE site. -No information on Save Valley Conservancy and the area is still not a MIKE site

9.7.3 Social, Economic and Cultural Framework (South East Lowveld)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
3.1 Community partnerships and joint venture oportunities are incentivised and facilitated	– Establish protocols, policies and models for development of joint ventures (PPCPs) – Identify potential areas – Facilitate development of new, and strengthen existing, institutional frameworks and legal entities for beneficiaries at sub-district level – Develop concepts, business plans and prospectuses for different areas through consultative processes with Communities – Develop a SEL Tourism plan and review potential concessions within the framework of this Plan – Develop mechanisms for inclusive and transparent engagement and selection of operators and JV partners. – Facilitate communication, endorsement and support of JVs – Explore potential incentives and avenues of material and technical support that can be provided by Local Government and Authorities to promote establishment and sustainability of Community JVs – Promote access to affordable capital funding – Enhance capacity of community members to engage in wildlife and tourism management through training and employment	Models and protocols for joint ventures established Community institutions to engage in joint ventures established Joint ventures established and operating, resulting in financial benefit to communities SEL tourism developed and potential concessions identified Mechanisms of support and incentivisation to JVs established	- Save Valley Conservancy has a Joint Venture model and community share ownership trust with the local communities -PPCPs envisaged with the Gonarezhou Conservation Trust.
3.2 Elephant management in community wildlife areas improved	– Promote improved and professionalized elephant management and security in community wildlife areas through establishment and maintenance of improved capacity, infrastructure, security and management systems – Develop and implement a transparent Performance Based Quota system which incentivises improved management and security systems for elephant in community hunting areas and which promotes effective buffering of source populations – Update terms of lease agreements in community wildlife areas to confer a broader range of roles and responsibilities on operators including resource management and protection; re-investment and	Infrastructure, equipment and systems for elephant management in community wildlife areas established and operational Reduced human-elephant conflict Community capacity for wildlife management improved	**-WILD project** working on two community wildlife areas that is Naivasha in Chiredzi district and Jamanda in Chipinge district.WILD(Wildlife In Livelihood Development Programme is an intiative of SAT (Sustainable Agriculture Technology) and ZWVT (Zimbabwe Wild Vet Trust) funded by the European Union and is aimed at improving socio-economic and ecological resilience in semi arid communal areas through incorporation of robust wildlife based land use enterprise into the mainstream of communal areas. -Nyangambe in Save Valley Conservancy is part of the elephant managemnt in the community.

9.7.3 Social, Economic and Cultural Framework (South East Lowveld)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
	infrastructure development; employment targets; local sourcing; etc. – Review key cooperation opportunities across different land uses and countries within GLTFCA, e.g. Sengwe-Tshipise Wilderness Corridor	Opportunities for cooperation within GLTFCA identified	
3.3 3.3 Additional elephant-based tourism and sustainable utilisation oportunities explored	– Promote awareness and marketing of iconic tuskers – Explore opportunities for expansion of community wildlife areas in viable wildlife corridors to enable establishment of additional sustainable utilisation areas and enterprises. [Links to Output 2.2 – identification of corridors]	Corridors identified and Agreements concluded Tourism and awareness campaigns undertaken	- No corridors agreed and concluded as as yet.
3.4 Transparent distribution of the benefits and costs of elephant management and conservation facilitated [Links to Output 2.5]	– Conduct regular and comprehensive Community Awareness campaigns regarding quotas, revenues and distribution within Communities – Capacitate and incorporate direct community involvement in management of Community Wildlife Areas, enterprises and JVs. – Diversify downstream natural resources enterprises to multiply the revenues from CBNRM, e.g. NTFPs	Awareness campaigns conducted Community structures have improved capacity to manage NRs and wildlife areas CBNRM revenues are invested in establishment of natural-resource based enterprises Community realises greater employment and financial benefit from CBNRM revenues	Awaerness campaigns are being conducted in areas arround Gonarezhou National Park and Save Valley Conservancy focusing on natural resources management not rvenue management. -The community share ownership trust is a clear testimony of improved capacity to manage NRs and Wildlife areas.These programmes bring about financial benefits to the communities.
3.5 Effective techniques and land use strategies to mitigate human-elephant conflict are implemented	– Review land use zonation through consultative processes [link to Output 2.2] – Promote awareness and adoption of effective HEC mitigation measures – Promote improved rangeland rehabilitation and grazing management to reduce competition between livestock and wildlife. – Promote improved and rationalised crop production and alternative mechanisms to promote food security to reduce habitat destruction for inefficient dry land cropping (e.g. irrigation development; carbon sequestration credits to generate income & purchase of staple grains).	HEC is effectively reduced Availability and application of HEC mitigation measures improved There is participation in effective grazing management schemes Grazing is better managed and rangeland health is improved	-Proposed irrigation schemes in fenced areas will help reduce human/wildlife conflict -Grazing areas for domestic animals are to be separated from wildlife areas again to reduce human wildlife conflict

9.7.3 Social, Economic and Cultural Framework (South East Lowveld)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
		There is increased uptake of improved cropping techniques Crop yields are improved Alternative land uses evaluated	
3.6 Information on elephants and their conservation is included in school curriculae and environmental education adjacent to key elephant populations in the SEL is promoted	– Promote awareness of elephant conservation (and other issues) through cultural events, art, plays, sport, etc. – Participate in syllabus review of national environmental science curriculum approved by the Ministry of Education – Develop approved environmental training and extension material and promote dissemination to different stakeholder groups within the community – Promote the formation of environmental science clubs at schools – Coordinate various education, training and extension campaigns operating within the district	School children and communities have greater appreciation of elephant conservation issues Greater participation in environmental clubs at schools with greater understanding of environmental issues More social events linked to environmental and conservation awareness are held Elephant conservation messages are conveyed through art and cultural events & competitions Parallel education programmes are coordinated through stakeholder planning sessions at district level	Education extension programe established that is Chilojo club focusing on all schools close to Gonarezhou. Environmental books distributed to above schools. -Education extension programme in place in save Valley Conservancy and being conducted and funded by the Painted Dog Conservation and the Gonarezhou Conservation Project targeting schools surrrrounding the Save Valley Conservancy. -Education awawreness campaigns regulary conducted in schools by our Extension and Interpretation Unit. --Essay competions with prize giving are regularly done in schools to effectively disseminate information on wildlife conservation.
3.7 Cultural tourism is developed and marketed as a centre-piece of SEL attractions and linked explicitly to conservation of flagship species including elephant	– Promote existing cultural tourism events and attractions and promote incorporation of messages of elephant conservation within these – e.g. Machangana Cultural Festival; GL-Cultural Festival – Explore and develop additional cultural tourism opportunities – including development of interpretive centres, craft centres, museums, monuments, events, etc. and market these – Document and communicate the specific cultural importance of elephant to communities in the SEL and incorporate this into education, marketing, event and cultural messages and interpretative centres.	Community participation and tourist attendance of cultural events is increased Messages relating to elephant conservation and environmental issues are key themes	-GonarezhouNational Park actively involved in cultural festivals. Supported the Muhlanguleni cultural festival this year(2016). -

9.7.3 Social, Economic and Cultural Framework (South East Lowveld)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
		The number of cultural tourism developments and enterprises is increased Anecdotes, artifacts and oral tradition regarding cultural importance of elephants are recorded and insinuated into marketing strategies and event messages	
3.8 Regional tourism is promoted	– Promote the development of infrastructure critical to accessibility of the region: e.g. border crossing at Pafuri; road development and maintenance; scheduled flights to Chiredzi; etc. – Promote diversification, branding and marketing of SEL-specific tourism products linked within the region and with other attractions in Zimbabwe and neighbouring countries. – Focus special attention on development of community-led tourism initiatives that contribute to the sustainability of the STWC as a movement corridor for elephant – Clear mines from STWC	Increased tourism traffic and arrivals Infrastructure upgrades Scheduled flights established Pafuri border crossing operational Tourism products are diversified Marketing and branding consultants engaged to develop branding and strategy Scoping, feasiblilty studies are undertaken Increased number of CB enterprises are operational	-The current global economic challenges faced are still a draw back to marketing efforts , however some individuals within the are putting much effort on consumptive tourism.
3.9 Policy framework for conservation and CBNRM is well understood by communities and other stakeholders in SEL	– Compile factsheets on policy framework for conservation and CBNRM and disseminate to communities and other stakeholders	Communities have access to existing CBNRM and Policy frameworks	- The awareness campaigns which are frequently conducted through out the year also attempts to explain about the existence of these policies as well as on traditional gatherings, village and council meetings.
	– Consider innovative mechanisms for trans boundary resource sharing and expanding “space for elephants”	Workshops conducted	- Still a challenge as the conept has not been fully embraced by the affected communities.

9.7.4 Building Conservation Capacity(South East Lowveld)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
4.1 Funding to implement the plan secured	– Implement variable / graduated trophy fee structure based on trophy size – Review levy / fee structure for elephant hunting and the distribution of these revenues for conservation and communities – Develop and submit bankable project proposals to potential funders – Explore potential business partnerships – Increase capacity and law enforcement coverage by ensuring that all key stakeholders contribute to and are engaged in law enforcement activities: hunting operators, tour operators, and community anti-poaching teams [Links to Output 1.1] – Explore the potential for a dedicated elephant fund for SEL.	Revised trophy fee structure developed, resulting in increased funds available or secured for elephant conservation Number of project proposals developed submitted and funded Number of developed and functional partnerships contributing to improved elephant management	Gonarezhou Conservation Trust's establishment could secure funding for improved elephant management. - Funding not yet secured for the entire Save Valley Conservancy, but expecting the EU to come in with an aid once the fencing boundaries have been established.
4.2 Current capacity analysed and needs identified	– Analysed current capacity – Carry out a needs assessment across the full range of human resources – Carry out a needs assessment for equipment and infrastructure – Develop a strategy to address the identified needs	Needs assessment report	
4.3 Capacity for research and monitoring strengthened and collaboration with research institutions enhanced [Linked to and informed by Components 2 and 3]	– Develop and implement a multi-disciplinary research and monitoring strategy – Develop and implement a research programme based on that strategy, including graduate studies, post graduate and external researchers as well as ZPWMA researchers – Undertake periodic research meetings / conferences – Recruit and meet demands and requirements for research personnel in Parks and surrounding areas – Collaborate with external research institutions – Develop and implement a mentoring programme for researchers – Procure relevant research equipment	Functional research programme in place Research meetings held Publications Number of research projects developed and implemented Number of research personnel on the ground Number of collaborative projects Mentoring plan / number of days spent with experienced researchers Inventory of equipment for research procured	-Nothing to report for Gonarezhou National Park -No Parks Resident Ecologist in Save Valley Conservancy.

9.7.4 Building Conservation Capacity(South East Lowveld)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
4.4 Training and retraining programmes established	– Carry out a training needs assessment for law enforcement, resource and wildlife management, research and monitoring, education and awareness, community elephant management, etc. – Develop and implement strategies based on the needs assessment – Standardise and harmonize training in law enforcement	Training needs assessment report Training programmes established	-Training needs for law enforcement and research staff known.

9.7.5 Coordination, Collaboration and Programme Management (South East Lowveld)			
Output	**Activities**	**Key Performance Indicators**	**Narrative Report on Progress in Implementation**
5.1 SEL Regional elephant conservation and management steering committee of 8 established (ZPWMA, SVC, MT, Bubi Conservancy, Chiefs' rep, GCP, ZRP, RDC) This committee should include a core set of competencies (and can co-opt expertise if needed).	– Develop TOR for the steering committee – Identify members – Oversee the implementation of the regional elephant strategy as per national mandate – Meet biannually – Attend national elephant management meetings	Functional committee meetings held biannually with adequate attendance	- Steering committee members identified - Logistics for first meeting have been concluded in collaboration with stakeholders
5.2 Links with neighbouring states to confer on the management of shared elephant populations strengthened	– GLTFCA coordinator to identify relevant stakeholders to participate in the implementation of the regional elephant action plan – Sustain collaboration with regional partners+(one committee member for the regional committee meetings) – Share knowledge / data of all 5 key components of the plan with the regional partners	Number of consultative meetings held Tangible regional collaboration and participation	-Relevant stakeholders known.
5.3 Coordination between the tourism industry (consumptive and non-consumptive) and the elephant management programme strengthened	– Identify consumptive and non-consumptive operators in SEL – Liaise with SOAZ, ZPHGA, ZATSO, ZHA, etc. – Encourage non-members to be affiliated to relevant associations – Hold quarterly meetings with operators – Consider scale of operations in non-consumptive tourism	Regular meetings and workshops convened with the operators	
5.4 Effective information dissemination and communication strategy implemented	– Ensure clear communication of progress against action plan to all relevant stakeholders – Identify target groups, i.e. traditional leaders, school groups, amongst others – Develop a communications strategy, making use of relevant media (print, social, road shows) – Implement communication strategy – Monitor and evaluate	Outreach programmes conducted	Outreach programmes conducted by the Gonarezhou Conservation Project's Liaison Officer and the Parks' Extension and Interpretation staff.



Tapia, Brenda <brenda_tapia@fws.gov>

Fwd: [African-elephant] Zimbabwe: Elephant Hunting Dispute Slows Football Stadium Construction

2 messages

Vannorman, Tim <tim_vannorman@fws.gov> Wed, Jan 25, 2017 at 12:31 PM
To: Brenda Tapia <brenda_tapia@fws.gov>

---------- Forwarded message ----------
From: **Simukai Nyasha** <snyasha@zimparks.co.zw>
Date: Fri, Jul 8, 2016 at 6:26 AM
Subject: RE: [African-elephant] Zimbabwe: Elephant Hunting Dispute Slows Football Stadium Construction
To: "Vannorman, Tim" <tim_vannorman@fws.gov>

I thought you had already received the priorities from the Director General. Let me verify with him and then I update you.

Regards

Simukai Nyasha

International Conventions Manager

Cell: +263-772 678 351

From: Vannorman, Tim [mailto:tim_vannorman@fws.gov]
Sent: Wednesday, July 06, 2016 8:47 PM
To: Simukai Nyasha <snyasha@zimparks.co.zw>
Subject: Fwd: [African-elephant] Zimbabwe: Elephant Hunting Dispute Slows Football Stadium Construction

Simukai,

I hope all is well with you. I wanted to follow up on my message below regarding priorities for implementing the elephant management plan. I am anxious to finalize my review and updated finding but am at a loss in how to rectify the Director General's statement without more information. Any additional clarification that you could provide would be greatly appreciated.

Sincerely,

Tim

---------- Forwarded message ----------
From: **Vannorman, Tim** <tim_vannorman@fws.gov>
Date: Tue, May 24, 2016 at 1:13 PM
Subject: Re: [African-elephant] Zimbabwe: Elephant Hunting Dispute Slows Football Stadium Construction
To: Simukai Nyasha <snyasha@zimparks.co.zw>, Edson Chidziya <wsithole@zimparks.co.zw>, Edson Chidziya
(b) (6)

Dear Director General,

Thank you for your May 9, 2016, letter providing more information on the football stadium. Based on your statement, I take it that the proceeds generated from only 10 elephant hunts was being allocated for the construction of the stadium. This would be more in line with our perception that the hunting revenue received by CAMPFIRE are for smaller community projects, as oppose to larger construction or capital gains projects.

I fully recognize that the limitations that have occurred due to the suspension of elephant trophy imports has affected your budget and ability to fully implement the 2015-2020 Management Strategy. However, has your department prioritized the activities identified in the strategy to fully utilize the albeit budget allocated to elephant management? I ask this not to require additional work from your staff, but to better quantify the statement made in the strategy and, if possible, strengthen my enhancement finding to authorize imports of trophies.

I look forward to your response,

Sincerely,

Tim

On Mon, May 9, 2016 at 9:01 AM, Simukai Nyasha <snyasha@zimparks.co.zw> wrote:

> My apologies for responding late to your email. Herewith attached please find a response letter to the issues raised in your email.
>
> It's true Olivia is no longer with Zim Parks and we had not seen the correspondence that you emailed on 4th April. For all future correspondences, please communicate through my email and copying the Director General also if need be.
>
> **Regards**
>
> **Simukai Nyasha**

International Conventions Manager

Cell: +263-772 678 351

From: Vannorman, Tim [mailto:tim_vannorman@fws.gov]
Sent: Monday, April 25, 2016 4:18 PM
To: snyasha@zimparks.co.zw; Edson Chidziya <wsithole@zimparks.co.zw>; Edson Chidziya
(b) (6)
Subject: Fwd: [African-elephant] Zimbabwe: Elephant Hunting Dispute Slows Football Stadium Construction

Dear Edson,

I was informed last week by John Jackson that Olivia is no longer with ZPWMA. If this is the case, I am concerned that the e-mail I sent her on April 4th may not have been seen. I am hoping that this additional information can allow me to finalize the USFWS position for imports of 2016 elephant trophies.

If you have any questions, please let me know.

Sincerely,

Tim

---------- Forwarded message ----------
From: **Vannorman, Tim** <tim_vannorman@fws.gov>
Date: Mon, Apr 4, 2016 at 1:06 PM
Subject: Fwd: [African-elephant] Zimbabwe: Elephant Hunting Dispute Slows Football Stadium Construction
To: Olivia Mufute <omufute@zimparks.co.zw>

Dear Olivia,

I hope all is well with you. I am trying to finalize our finding for 2016 for Zimbabwe elephant trophies and a question arose.

An article in Newsweek (below) raised questions about how funds are used by RDC. It is my understanding the funds generated from trophy hunts goes back to the community for activities to benefit the communities, such as clinics, schools, and salaries for game scouts. I have some doubts about what the article identifies, but could you or someone on your staff elaborate on the article?

In addition, in reviewing the 2015-2020 Management Strategy, it states that the plan, if fully implemented, would require a greater amount of money than is currently available. I would assume that part of the reason for this statement is because for the last two years, US hunters have declined to hunt in Zimbabwe and therefore less money has been generated than in previous years. Fully recognizing the financial situation that your department is in, what aspects of the management plan is do you anticipate could not be carried out at this time? Also, is it anticipated that if the US again allowed imports of elephant trophies in 2016, sufficient revenue would be generated to facilitate full implementation of the plan in 2017?

Thank you for assistance in this matter.

Sincerely,

Tim

---------- Forwarded message ----------
From: **Save The Elephants News Service** <stenews@elephantnews.org>
Date: Tue, Mar 22, 2016 at 5:03 PM
Subject: [African-elephant] Zimbabwe: Elephant Hunting Dispute Slows Football Stadium Construction
To: african-elephant@elephantnews.org

Zimbabwe: Elephant Hunting Dispute Slows Football Stadium Construction

Conor Gaffey, Newsweek

March 22, 2016

The construction of a football stadium in rural western Zimbabwe is being stalled by a dispute over its unusual source of funding—elephant hunting.

Zimbabwe's environment minister Oppah Muchinguri has been forced to deny claims that she is blocking pre-sanctioned elephant hunts, the funds from which would be used to start building the stadium in Tsholotsho.

Under Muchinguri's predecessor Saviour Kasukuwere, the Tsholotsho Rural District Council (RDC) was issued with hunting permits for some 70 elephants, with the funds raised from the hunt to be put towards building the stadium, Zimbabwe's state-owned Chronicle newspaper reported.

The chairperson of Tsholotsho RDC, Cde Alois Ndebele, accused Muchinguri of holding up the process on Sunday, according to the Chronicle. "We have all the documents in the office but after the new minister was appointed, things just started stalling, there has not been any movement," said Ndebele, referring to Muchinguri's replacement of Kasukuwere as environment minister in July 2015 in a cabinet reshuffle by President Robert Mugabe.

But Muchinguri dismissed the criticism on Monday, saying that the hunts had been suspended after elephants were killed in the area by poachers laying cyanide. "The country suffered bad publicity from the cyanide poisoning and it was felt that the hunts be stopped while the poaching issue was being handled," said Muchinguri, according to the Chronicle.

Tsholotsho borders Hwange National Park, where scores of elephants were killed by poachers using the poison in 2015, with most of the elephants having their tusks removed. Hwange is overpopulated with elephants, currently hosting twice its carrying capacity with 53,000 of the creatures, and hunting is often cited as a means of generating funds for local communities impacted by elephant populations. Elephant hunting packages sell for around $30,000 online.

http://www.newsweek.com/zimbabwe-elephant-hunting-dispute-slows-football-stadium-construction-439504

This news service is provided by Save the Elephants.

For further information on elephants please see Save the Elephants' web site
at http://www.savetheelephants.org

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Michelle Gadd, Ph.D.

Program Officer, African Elephant and African Rhino Programs

Division of International Conservation

U.S. Fish and Wildlife Service

5275 Leesburg Pike, MS: IA

Falls Church, VA 22041-3803

michelle_gadd@fws.gov

--

Timothy J. Van Norman, Chief

Branch of Permits

Division of Management Authority

U.S. Fish and Wildlife Service

(703) 358-2350

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--

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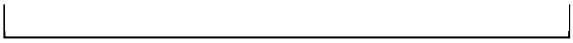

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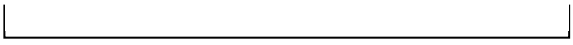

--
Timothy J. Van Norman, Chief
Branch of Permits

Division of Management Authority
U.S. Fish and Wildlife Service
(703) 358-2350

***Sign up** for our e-newsletter to learn how we're working around the globe to protect species and their habitats!*

Vannorman, Tim <tim_vannorman@fws.gov> Wed, Jan 25, 2017 at 12:40 PM
To: Brenda Tapia <brenda_tapia@fws.gov>

this one may be outside the time frame. If so, make sure we did not have an earlier FOIA that this should have gone with

Tim

---------- Forwarded message ----------
From: **Simukai Nyasha** <snyasha@zimparks.co.zw>
Date: Mon, May 9, 2016 at 9:01 AM
Subject: RE: [African-elephant] Zimbabwe: Elephant Hunting Dispute Slows Football Stadium Construction
To: "Vannorman, Tim" <tim_vannorman@fws.gov>

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ZimParks Response.pdf
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ZIMBABWE PARKS AND WILDLIFE MANAGEMENT AUTHORITY

Telephone : 263-4-792786-9
: 707624-9

Fax : 263-4-708180
: 793867, 250658

Email : info@zimparks.co.zw

All correspondence to be directed to ***Director General***

Head Office

Botanical Gardens
Cnr Borrowdale Rd/Sandringham Dr
P.O.Box CY 140
Causeway
Harare

www.zimparks.org

Ref: B/3/15

09 May 2016

Chief Branch of Permits
U.S Fish and Wildlife Service
Division of Management Authority
Washington D.C 20240
USA

Attention: Mr Timothy J. Van Norman

Dear Sir

I make reference to your email of 25 April 2016.

As you may be aware Zimbabwe subscribes to the sustainable utilisation principle and this has been the practice in Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) areas where proceeds from wildlife utilisation have been used to develop rural communities. The Tsholotsho case is one such initiative where proceeds from the sustainable utilisation of natural resources in the area has had a positive impact on the Tsholotsho community.

With reference to the article which appeared in the Newsweek of March 22, 2016, alleging that hunting permits for 70 elephants were issued, the correct position is that a hunting permit was issued for only 10 elephants with only one elephant having been utilized to date. It is true that the funds generated from trophy hunting go back to the community for activities that benefit communities such as schools, clinics etc. However, it is not the prerogative of the Parks Authority at any time to determine the priority list of community development projects which can be funded from CAMPFIRE proceeds.

It is important to note that Tsholotsho has been one of the communal areas linked to cases of elephant poisoning in Hwange National Park and it is critical that such communities are assisted in seeing the positive benefits of wildlife conservation in general, and sustainable utilisation of elephants in particular.

It goes without saying that before the ban on imports of sport hunted elephant trophies into USA, the US market contributed approximately 60% of all big game hunters coming to Zimbabwe.Equally, it is true that full implementation of the Elephant Management Plan would require a greater amount of money than is currently available. It was clear from the outset that additional resources would be mobilized externally as usual, and as is the case with many other countries with similar plans.

With regards to your question as to which aspects of the Elephant Management Plan will be negatively impacted by the US ban, every aspect of the plan requires funding and any decline in income will ultimately affect it. However, in our case, while we are diversifying our markets, this was exacerbated by the lack of prior communication and/or engagement on the part of the US, prior to the ban, as this was done abruptly.

We hope that the above will suffice regarding your enquiry.

E. Chidziya
DIRECTOR GENERAL

INFORMATION/BRIEFING MEMORANDUM FOR THE DEPUTY SECRETARY

DATE: August 3, 2017~~July 10, 2017~~

FROM: Greg Sheehan, Acting Director, U.S. Fish and Wildlife Service

SUBJECT: Lion and Elephant ESA listings and the permitting process

The purpose of this memorandum is to provide background on lion and elephant listings under the Endangered Species Act (ESA), the process for obtaining authorization under the ESA to import sport-hunted trophies, and the status of ESA findings for certain African countries.

BACKGROUND

In December 2015, The U.S. Fish and Wildlife Service (Service) listed the lion subspecies *Panthera leo leo*, located in India and west and central Africa, as endangered and listed *Panthera leo melanochaita*, located in eastern and southern Africa, as threatened. The Service also finalized a 4(d) rule for *Panthera leo melanochaita* that included the requirement that an import permit would need to be obtained prior to the import of any lion specimen.

The African elephant is listed as threatened (throughout its range) under the ESA and trade in African elephant specimens is regulated by a Section 4(d) rule of the Act (50 CFR 17.40(e)). On June 6, 2016, the Service published a final rule amending the Section 4(d) rule to, among other things, require the issuance of an ESA permit for all imports of African elephant trophies and ivory.

The Service's International Affairs Program (IA) is responsible for making the required findings for both species prior to issuing an import permit. IA issued a total of 10,700 permits in the first half of last year for all activities for which it has permit issuance responsibility. In the half of this year, IA has issued approximately 21,000 permits.

Secretary Zinke hosted a meeting with several sport-hunting stakeholder groups on July 11, where import of sport-hunted lions and elephants were discussed. As an outcome of that meeting, the Service is evaluating the recommendations of these groups and intends to hold follow-up discussions to determine how we can more effectively work together to ensure that hunting is contributing to conservation of these species.

DISCUSSION

In accordance with Service regulations for the implementation of the ESA (50 CFR 17.33), in order to issue an import permit for a personally hunted lion trophy, the applicant must demonstrate that the import of a sport-hunted lion trophy would enhance the propagation or survival of the species in the wild. However, for most sport-hunted trophy imports, the hunter

typically does not have access to all of the information the Service needs to make a positive "enhancement finding." To address this issue, the Service undertakes direct efforts to gather the information necessary to determine whether an "enhancement finding" can be made. To do so, the Service contacts the wildlife authority within the country where the trophy was taken to obtain information on the status of the species within the country, the management program for the species and how sport hunting is integrated into that management plan, how funds generated through hunting contribute to the conservation of the species, how local communities benefit from hunting operations, and other relevant information. Likewise, sport-hunted trophies of African elephants may only be authorized if the Service is able to find that the killing of the trophy animal will enhance the survival of the species, as called for in the 4(d) rule (50 CFR 17.40(e).

Historically, more than 90% of sport-hunted lion trophies (approximately 400 per year) have been imported to the United States from South Africa. Therefore, the Service prioritized making an enhancement determination for South Africa. In October 2016, we completed a positive enhancement finding for "wild" and "wild-managed" lions from South Africa and a negative finding for "captive" lions. To date, the Service has authorized the import of nine wild/wild-managed lion trophies from South Africa taken in 2016. We have also denied five applications for the importation of captive-bred lions taken in South Africa in 2016. ~~(See attachment 2 and 3).~~

Although initial findings for lions have taken more time than anticipated, in part due to the lack of information from the countries involved, once these findings are in place and baseline information has been obtained, we expect that additional country-level findings will require far less time.

As of August 3~~July 10~~, 2017, we have the following pending applications for lions:

Mozambique –	3 applications for lions taken in 2016 or 2017
Namibia –	1~~2~~ application~~s~~ for lion to be taken in ~~2016 and~~ 2017
Tanzania –	17 applications for lions taken in 2016 or 2017
South Africa –	11 applications for wild/wild-managed or captive-bred lions taken in 2017
Zambia –	17~~6~~ applications for lions taken in 2016 or 2017
Zimbabwe –	17 applications for lions taken in 2016 or 2017

As of ~~July 10~~August 3, 2017, we have the following pending applications for elephants:

Namibia –	8~~6~~ applications for elephants taken in 2014 (2 renewals), 2016 and 2017
Tanzania –	2 applications for elephants taken in 2016
South Africa –	7~~11~~ applications for elephants taken in 2016 and 2017
Zambia –	1~~4~~ applications for elephants taken in 2017
Zimbabwe –	37 applications for elephants taken in 2014 (3), 2016 or 2017

With regard to sport-hunted elephants, we currently have positive findings for the import of trophies from South Africa and Namibia. In 2014 and 2015, we completed negative findings for Tanzania and Zimbabwe, countries for which we previously had positive findings. We have not authorized the import of sport-hunted elephant trophies for any other countries that currently allow sport hunting. We are currently under litigation for our negative findings for both

Tanzania and Zimbabwe.

NEXT STEPS

Status of lion and elephant enhancement findings:

Mozambique – The Service has received information from Mozambique for both elephants and lions, and we are currently reviewing the material regarding the status of lions within the country and the management program that is currently in place for the species. Draft findings are underway.

Namibia – The Service has a positive finding for elephants. The Service has requested information regarding lions from Namibia on several occasions, but has not received any information regarding status of the lions in the country or the management regime for the species. Namibia has promised to provide that information as soon as possible, and we will undertake a review of that information when it is received.

Tanzania – The Service has received information from Tanzania regarding the status of lions and elephants and their management programs. The material has been reviewed and we anticipate completing these findings by the end of August~~July~~.

South Africa – The Service has a positive finding for elephants. Based on information received from South Africa and other sources, the Service made a positive finding for wild/wild-managed lions taken in 2016 and a negative finding for captive-bred lions taken in 2016. We are currently revising the finding for wild/wild-managed lions taken between 2017 and 2019 (South Africa's lion management plan for wild/wild-managed lions is valid until the end of 2019). We have received no new information for captive-bred lions that would change our current negative finding. The new finding will be completed this week and we will proceed to issue or deny applications immediately~~by mid-July~~.

Zambia – The Service has received information from the Zambia Wildlife Authority on the status of lions in Zambia and their hunting programs for both lions and elephants. We have reviewed this information and have a draft finding that is currently being reviewed. We anticipate completing the finding by ~~the end of July~~mid-August.

Zimbabwe – The Service has received and reviewed the information provided by Zimbabwe for both elephants and lions. We ~~anticipate completing a new elephant finding in July~~have completed a new elephant finding and are developing a communications plan and *Federal Register* notice to announce this finding in August. A~~, and a~~ draft finding for lions is underway.

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ATTACHMENTS

None

066293 3742

The Honorable Ryan Zinke
Secretary, Department of the Interior
1849 C Street NW
Washington, DC 20240

009012

RECEIVED
2017 JUL 10
OFFICE OF THE
EXECUTIVE SECRETARIAT

July 4, 2017

Dear Secretary Zinke:

The below organizations represent a large share of the American tourist hunting community. Our organizations and members annually contribute tens of millions of dollars to the conservation of wildlife and protection of habitat across the globe.

We write to highlight important issues that we hope the new Administration will address at the earliest opportunity because they are time-sensitive, as explained below.

- ***The FWS should immediately issue the 35+ pending import permits for African lion trophies.*** Trophy import permit applications have been pending for as much as 18 months. The range states responded to FWS questionnaires. We submitted extensive information proving the enhancement standard is met. Most lion habitat, lion prey, and lion depend upon the hunting and hunter-based funding that is being delayed.

- ***The FWS should immediately lift the suspension of elephant trophy imports from Tanzania and Zimbabwe and issue import permits for African elephant trophies from these countries and Zambia.*** The FWS closed elephant trophy imports from Tanzania and Zimbabwe in April 2014. Since then, Tanzania has invested extensively in anti-poaching and enforcement (including tens of millions of dollars from USAID). Zimbabwe completely updated its elephant management action plan and has provided unprecedented financial data to the FWS. We submitted thousands of pages documenting the benefits of elephant hunting in these countries and in Zambia, yet import permit applications have not been processed for a year.

- ***The FWS should reject the petition to list all African leopard as endangered and further restrictions on lawful trophy imports.*** The leopard is already protected by a CITES Appendix I and ESA threatened listing in Southern and Eastern Africa. It is better protected today than when it was first down-listed to threatened. Its population is most secure and faring best in the countries where it is given its most important value by lawful hunting. Without these incentives, leopard will be treated as vermin and subject to increased conflicts with humans and livestock.

- ***The ESA's application to foreign species should be reformed.*** Listing can have net negative consequences and conflict with CITES and with foreign programs. The FWS should consult with range states rather than imposing listings or stricter domestic measures with which range states disagree. The FWS should consider both the opposition of foreign nations and the negative consequences to the species that may arise from the listing.

- ***The FWS should revise seizure and forfeiture practices that will discourage lawful tourist hunting and return to the previous Service Manual provisions.*** Proposed revisions to seizure and forfeiture practices will impose draconian penalties when applied to non-commercial trophy trade.[1] FWS law enforcement agents have already begun to seize lawful trophies for typos and clerical errors by range state authorities or shipping agents. The seizures are disproportionate to the innocent errors. The FWS should reincorporate the thirty-day grace period for non-commercial importers to correct

[1] 81 Fed. Reg. 39848 (June 17, 2016).

Please provide A response To This STATEMENT.

harmless errors, revise the definition of "contraband" that includes lawful property, and remove the requirement for hunters to file claims in federal courts for the port of entry.

What is at risk if these urgent recommendations are not implemented? Two-and-a-half to five times the habitat secured in national parks.[2] Thirty percent to seventy-five percent of wildlife authority operating budgets used for law enforcement, monitoring, and implementation of species management plans.[3] Fifty percent to one hundred percent of fee-sharing with rural communities.[4] Thousands of jobs including anti-poaching "boots on the ground."[5] Hundreds of thousands of kilograms of lawfully harvested game meat, which dis-incentivizes subsistence poaching.[6] The contributions of individual hunting operators over-and-above government mandated fees, providing many millions of additional dollars and support for anti-poaching and more.

Delay threatens all these benefits. It has shut down the flow of American hunters to these countries. The best, most committed operators are losing their concessions. They do not have revenue to keep up expensive anti-poaching and community programs without support from their dedicated U.S. clientele. In Tanzania alone, over 70,000 km^2 has been returned to the wildlife authority, whose funding has fallen by over $10 million last year. Community wildlife management areas are collapsing. And lion, elephant, leopard, and other wildlife will suffer most, as their former habitat will be quickly converted to agriculture and grazing land and subject to uncontrolled snaring. The prior administration's delays obstruct the very "enhancement" desired. And this must be corrected before any more damage is done.

Sincerely,

CONSERVATION FORCE

President, Conservation Force

President, Dallas Safari Club

President, Dallas Safari Club Foundation

HOUSTON SAFARI • CLUB

Executive Director, Houston Safari Club

[2] E.g., Hunting areas provide over 300,000 km^2 of habitat in Tanzania, over 179,000 km^2 in Zambia, and over 66,000 km^2 in Zimbabwe compared to ~58,000 km^2, ~60,000 km^2, and ~28,000 km^2 in national parks respectively.

[3] E.g., Over 30% of the wildlife authorities' operating budgets in Zambia and Zimbabwe derives from hunting. Three-quarters of the Tanzania Wildlife Division's revenue came from hunting. Almost every dollar spent on protection of black rhino in Namibia comes from hunting and concession fees.

[4] E.g., 50% of animal fees in Zambia, 65-75% of fees in Tanzania, 100% of fees in Namibia and Zimbabwe.

[5] E.g., A 2014 sample of 14 operators in Zimbabwe employed 245 scouts.

[6] E.g., A 2015 study estimated ~130 tons of game meat were distributed annually by hunting operators in Zambia.

George W. Wilkes Gilbert, President
African Safari Club of Florida

President, Wild Sheep Foundation

Executive Director, Grand Slam Club/Ovis

Chancellor International Wildlife Fund, Inc.

CC: Acting FWS Director Greg Sheehan

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
International Affairs
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In Reply Refer To:
FWS/AIA/DMA

NOV 16 2017

Memorandum

To: The File

From: Chief, Branch of Permits

Date:

Subject: Enhancement Finding for African Elephants Taken as Sport-hunted Trophies in Zimbabwe On or After January 21, 2016 and On or Before December 31, 2018.

The African elephant (*Loxodonta africana*) is listed as threatened under the Endangered Species Act (ESA) and is regulated under an ESA section 4(d) special rule [50 CFR 17.40(e)]. The 4(d) special rule gives the requirements for the import of sport-hunted trophies. Under paragraph 17.40(e)(6)(i)(B), in order for the U.S. Fish and Wildlife Service (Service) to issue a threatened species permit under 50 CFR 17.32 authorizing the import of a sport-hunted elephant trophy, the Service must make a determination that the killing of the trophy animal will enhance the survival of the species. After evaluating the available data as of the date of this finding on elephant hunting in Zimbabwe in 2016, 2017, and 2018, including information provided by the Government of Zimbabwe, current applications to import sport-hunted elephant trophies, interested individuals and organizations, and other information available to the Service, under the regulatory requirements provided by 17.40(e)(6)(i)(B), the Service is able to make a determination that the killing of the trophy animal in Zimbabwe, on or after January 21, 2016 and on or before December 31, 2018, will enhance the survival of the African elephant. Applications to import trophies hunted during this time period will be considered to have met the enhancement requirement unless we issue a new finding based on available information. The Service may replace this finding at any time this finding no longer reflects the available information consistent with the regulatory requirements. The Service reviews each application received for import of such specimens and evaluates the information provided in the application as well as other information available to the Service on the status of the elephant population and

the total management program for elephants in the country to ensure that the program is promoting the conservation of the species. Each application to import sport-hunted elephant trophies must also meet all other applicable permitting requirements before it may be authorized, including the issuance criteria in 50 CFR 13.21.

General Considerations:

In evaluating whether the killing of the trophy animal will enhance the survival of African elephants in accordance with 50 CFR 17.40(e)(6)(i)(B), the Service considers the permit issuance criteria outlined in 50 CFR 17.32(a)(2). These include, in addition to the general permitting criteria in 50 CFR 13.21(b):

(i) Whether the purpose for which the permit is required is adequate to justify removing from the wild or otherwise changing the status of the wildlife sought to be covered by the permit;

(ii) The probable direct and indirect effect that issuing the permit would have on the wild populations of the wildlife sought to be covered by the permit;

(iii) Whether the permit, if issued, would in any way, directly or indirectly, conflict with any known program intended to enhance the survival probabilities of the population from which the wildlife sought to be covered by the permit was or would be removed;

(iv) Whether the purpose for which the permit is required would be likely to reduce the threat of extinction facing the species of wildlife sought to be covered by the permit;

(v) The opinions or views of scientists or other persons or organizations having expertise concerning the wildlife or other matters germane to the application; and

(vi) Whether the expertise, facilities, or other resources available to the applicant appear adequate to successfully accomplish the objectives stated in the application.

As with all permit applications submitted under 50 CFR 17.32(a), the individual requesting authorization to import a sport-hunted elephant trophy bears the burden of providing information in their application showing that the activity meets the requirements for issuance criteria under 50 CFR 17.32(a). In some cases, such as for import of sport-hunted trophies, it is not always possible for the applicant to provide all of the necessary information needed by the Service to make a positive determination under the ESA to authorize the activity. In such cases, the Service may consult with the range country and other interested parties to the extent practicable to obtain necessary information. The Service has the discretion to make the required findings on sport-hunted elephant trophy imports on a country-wide basis, although individual import permits will be evaluated and issued or denied for each applicant. While the Service may make enhancement findings for sport-hunted elephant trophy imports on a country-wide basis, the Service encourages the submission of information from individual applicants. We

rely on the information available to the Service and may rely on information from sources other than the applicant when making a permitting decision.

Neither the African elephant 4(d) rule nor 50 CFR 17.32(a)(2) specify what would constitute the enhancement of survival of a species regarding the authorization for the importation of an African elephant sport-hunted trophy. Therefore, when making a determination of whether the killing of the trophy animal will enhance the survival of African elephants, the Service examines the overall conservation and management of the species in the country where the specimen originated and whether that management addresses the threats to the species (*i.e.*, that it is based on sound scientific principles and that the management program is actively addressing the current and longer term threats to the species). In that review, we evaluate whether the import contributes to the overall conservation of the species by considering whether the biological, social, and economic aspects of a program from which the specimen was obtained provide a net benefit to the species and its ecosystem.

As stated in previous findings, in evaluating whether the killing of the trophy animal will enhance the survival of African elephants within a country, the Service looks at a number of factors. We evaluate whether a country has a valid national or regional management plan and if the country has the resources and political will to enact the plan. If there is a plan, what government entities implement the plan and how often is it reviewed and updated? Does the plan have clear, achievable objectives? Are the objectives measurable and are they being achieved? Is there an adaptive management approach within the plan so that enacting agencies can quickly respond to changing environmental or social issues?

The Service also evaluates the status of the elephant population within a country and trends over time. Particularly, we are interested in population numbers, sex and age-class distribution, and mortality rates (both natural and human-induced). Are standardized surveys being conducted and, if so, what are the timing, census methodology, and coverage? Since elephant populations can move across international borders, what level of cooperation is there between neighboring countries in management and surveying efforts for shared populations? How is poaching accounted for within survey efforts?

The Service takes into account all forms of offtake when evaluating population viability and sustainability, including human-elephant conflicts, problem animal control, poaching, and sport-hunting. While recognizing that there may be limited resources available for elephant management, the Service considers what national policies are in place to address human-elephant conflicts and problem elephant control. Is there a policy on culling surplus animals and removal of nuisance animals? Does domestic harvesting of elephants occur for local consumption or use? The amount of protected area either set aside for elephants or managed for elephant populations and the level of protection provided are also important in the Service's evaluation of whether imports of trophies could be authorized.

Finally, the Service considers the country's sport-hunting program and whether it contributes to the conservation and management of the species. Is the hunting program scientifically based and

has it been incorporated into national/regional management strategies, particularly in light of data on population numbers and trends and levels of utilization (both legal and illegal)? Are the funds generated by hunters going directly to in-situ conservation and management efforts or deposited into a general treasury fund? How are hunting quotas distributed? If there are concession areas, how are they managed and allocated? Do U.S. hunters, through their participation in the hunting program, contribute funds used to help address management needs of the species, and are those funds utilized in a meaningful manner?

In short, the Service is looking to determine if a country has sufficient numbers of elephants to support a hunting program, if the country has a management plan and adequate laws and regulations to effectively implement a hunting program, and if the participation of U.S. hunters in the program provides a clear benefit to the species to meet the requirements for the import of sport-hunted trophies under paragraph 17.40(e)(6)(i)(B).

The Service's approach to enhancement findings for the importation of sport-hunted trophies of African elephants is consistent with the purpose and intent of the ESA. Well-managed trophy hunting can benefit conservation by generating funds to be used for conservation, including for habitat protection, population monitoring, wildlife management programs, and law enforcement efforts. We are, of course, aware that not all trophy hunting is part of a well-managed, well-run program, and we evaluate import of sport-hunted trophies carefully to ensure that all legal requirements are met before allowing import.

We note that our approach is also consistent with the approach provided in the *IUCN Species Survival Commission (SSC) Guiding Principles on Trophy Hunting as a Tool for Creating Conservation Incentives, Ver. 1.0* (IUCN SSC 2012). The SSC document provides useful principles and sets out guidance from international experts in the field on the use of trophy hunting as a tool for "creating incentives for the conservation of species and their habitats and for the equitable sharing of the benefits of use of natural resources" (IUCN SSC 2012, p. 2) and recognizes that recreational hunting, particularly trophy hunting, can contribute to biodiversity conservation and more specifically, the conservation of the hunted species. The SSC document lays out the following five guiding principles:

(a) *Biological sustainability:* The hunting program cannot contribute to the long-term decline of the hunted species. It should not alter natural selection and ecological function of the hunted species or any other species that share the habitat. The program should not inadvertently facilitate poaching or illegal trade in wildlife by acting as a cover for such illegal activities. The hunting program should also not manipulate the ecosystem or its component elements in a way that alters the native biodiversity.

(b) *Net Conservation Benefit:* The biologically sustainable hunting program should be based on laws, regulations, and scientifically based quotas, established with local input, that are transparent and periodically reviewed. The program should produce income, employment, and other benefits to create incentives for reducing the pressure on the target species. The program should create benefits for local residents to co-exist with the target species and

other species. It is also imperative that the program is part of a legally recognized governance system that supports conservation.

(c) *Socio-Economic-Cultural Benefit:* A well-managed hunting program can serve as a conservation tool when it respects the local cultural values and practices. It should be accepted by most members of the community, involving and benefiting local residents in an equitable manner. The program should also adopt business practices that promote long-term economic sustainability.

(d) *Adaptive Management: Planning, Monitoring, and Reporting:* Hunting can enhance the species when it is based on appropriate resource assessments and monitoring (*e.g.*, population counts, trend data), upon which specific science-based quotas and hunting programs can be established. Resource assessments should be objective, well documented, and use the best science available. Adaptive management of quotas and programs based on the results of resource assessments and monitoring is essential. The program should monitor hunting activities to ensure that quotas and sex/age restrictions of harvested animals are met. The program should also generate reliable documentation of its biological sustainability and conservation benefits.

(e) *Accountable and Effective Governance:* A biologically sustainable trophy-hunting program should be subject to a governance structure that clearly allocates management responsibilities. The program should account for revenues in a transparent manner and distribute net revenues to conservation and community beneficiaries according to properly agreed decisions. All necessary steps to eliminate corruption should be taken and to ensure compliance with all relevant national and international requirements and regulations by relevant bodies such as administrators, regulators and hunters.

We explained in our final rule revising the 4(d) Rule for the African elephant, 81 FR 36388, 36394 (June 6, 2016) that, "[w]hen a trophy hunting program incorporates the following Guiding Principles, IUCN considers that trophy hunting can serve as a conservation tool: Biological sustainability; net conservation benefit; socio-economic-cultural benefit; adaptive management—planning, monitoring, and reporting; and accountable and effective governance. We support this approach."

Summary of 2014 and 2015 Findings for Zimbabwe:

On April 4, 2014, the Service announced an interim suspension of imports of sport-hunted elephant trophies taken in Zimbabwe during the 2014 season. This finding was revised on April 17, 2014, primarily to clarify that the suspension applied only to elephants hunted on or after April 4, 2014. The decision to establish an interim suspension of imports of elephant trophies from Zimbabwe was due to the Service having insufficient information on the status of elephants in Zimbabwe and on Zimbabwe's current elephant management program to make an enhancement finding. On July 17, 2014, the Service found that the import of elephant trophies

taken in Zimbabwe in 2014 on or after April 4, 2014, would be suspended; this finding was revised on July 22 to make non-substantive corrections. The decision to uphold the suspension on July 17, 2014, was due to the Service being unable to make an enhancement finding even after receiving additional materials from Zimbabwe's Parks and Wildlife Management Authority (ZPWMA) and others. The Service decided on March 26, 2015, to continue the July 2014 suspension until such time as the Service can determine that the importation of sport-hunted elephant trophies from Zimbabwe meet the criteria under the regulations at 50 CFR 17.40(e)(3)(iii)(C). [The criteria are now found at 50 CFR 17.40(e)(6)(i)(B), following the Service's final rule revising the 4(d) Rule for the African elephant, 81 FR 36388, 36394 (June 6, 2016). The requirement for an enhancement finding has remained the same.] The Service's March 26, 2015, decision was again due to the Service being unable to make an enhancement finding even after receiving additional materials from Zimbabwe's Parks and Wildlife Management Authority (ZPWMA) and others.

Prior to April 4, 2014, the Service had limited information regarding the elephant population in Zimbabwe, its management, and how U.S. hunters were contributing to the enhancement of the species within Zimbabwe. Due to this limited information, the Service determined that it did not have sufficient information to make the required determination under paragraph 17.40(e)(3)(iii)(C), and therefore announced an interim suspension on April 4, 2015 (revised on April 17), until such time as sufficient information was obtained that would allow the Service to make the required finding. On April 4, 2014, the Service also sent a letter to Zimbabwe requesting information regarding the status of elephants in Zimbabwe and the hunting program. On April 17, 2014, the Director-General of ZPWMA sent a response to the Service inquiry. Several weeks later, the Service received a number of documents, copies of Zimbabwean laws, and other supporting documentation that was referenced in the ZPWMA response. In addition, since that time, the Service has received additional supporting information from individuals and associations connected to the hunting industry in Zimbabwe or southern Africa and U.S.-based conservation and hunting nongovernmental organizations (NGOs). The Service also delivered a second letter, dated October 31, 2014, to ZPWMA while attending the 13th Annual African Wildlife Consultative Forum in Ethiopia. This letter requested clarification of information submitted to the Service, and also requested additional information to address questions that were raised from our review of available information. The Service received a response to this inquiry on December 10, 2014.

Based on the information provided, the Service determined in 2014 and 2015 Zimbabwe's national elephant management plan consisted primarily of two documents: *The Policy and Plan for Elephant Management in Zimbabwe* (1997) and *Elephant Management in Zimbabwe, third edition* (July 1996). Although the documents provided a well-developed list of goals and objectives, there was no information in these documents on how to achieve or fulfill these goals and objectives, nor did there appear to be any subsequent updates of the documents or reports that provided any indication of progress on fulfilling these management goals and objectives. Without management plans with specific goals and actions that are measurable and reports on the progress of meeting these goals, the Service could not determine if ZPWMA was implementing the general goals and objectives that appear in *Elephant Management in Zimbabwe* and *The*

Policy and Plan for Elephant Management in Zimbabwe. In December 2014, a workshop, hosted by ZPWMA, was held at the Hwange Safari Lodge, Zimbabwe, to discuss revisions to the management plans, particularly to establish clearer goals and measurable outcomes. It appeared that the participants of the workshop agreed on a framework for a revised management plan that maintained the original 1997 long-term vision and the three target goals (i.e., maintain at least four demographically and genetically viable populations; maintain or increase elephant range; maintain numbers/densities of elephants at levels that do not adversely impact biodiversity conservation goals while contributing to economically viable and sustainable wildlife-based land uses). The participants also began work on identifying strategic objectives and outputs, as well as recognizing some key activities, and starting to identify key performance indicators. Additional work was required to finalize the revised management plan. Once this work was completed, the Service explained that it would have an opportunity to evaluate the revised plan to determine if, in conjunction with other management actions, the criteria under 50 CFR 17.40(e)(3)(iii)(C) have been met. However, based on the information available to the Service in March 2015, there was not any information indicating that Zimbabwe was implementing, on a national scale, appropriate management measures for its elephant populations.

One concern expressed in the April 2014 and July 2014 findings was whether management of elephants in Zimbabwe was based on accurate population estimates. According to the *IUCN SSC African Elephant Database report 2013 Africa*, the elephant population in Zimbabwe in 2007 was estimated to be 99,107, and in 2012, it was estimated at 100,291. However, these estimates were primarily based on older surveys, some of which dated back to 2001. In 2014, a nationwide survey was conducted in Zimbabwe as part of the Pan African Elephant Aerial Survey. Preliminary results from the survey indicated that the overall estimated population of elephants in Zimbabwe was 82,000 to 83,000, approximately 20 percent lower than the 2012 estimate. There was an increase in two of the subpopulations within Zimbabwe (North West Matabeleland Region - 2001 estimate of 49,312 elephants, and 2014 estimate of 53,949; Gonarezhou National Park – 2013 estimate of 10,151 elephants, and 2014 estimate of 10,722), but a decline in the other two subpopulations (Mid Zambezi Valley – 2014 estimate of 12,211 elephants, down from 19,297 in 2001; Sebungwe Region – 2014 estimate of 3,634, compared to 13,988 in 2001). With the recent survey, we explained in 2015 that ZPWMA should have more accurate population estimates for each subpopulation to establish appropriate off-take levels to maintain a healthy population of elephants.

According to information provided to the Service for its 2015 finding, Zimbabwe had a methodology, including participation from a number of stakeholders, for establishing annual hunting quotas for all areas of the country. However, while the described methodology appeared to be based on sound wildlife management principles, the Service continued to have fundamental questions regarding how quotas were specifically established and how overall off-take, such as poaching and problem animal control, were taken into account, or to what degree biological factors were taken into consideration (as opposed to economic and societal considerations). As the Service explained, the quota setting process utilized by ZPWMA may take into consideration the issues raised in the Service's finding; however, without documentation of the system providing an explanation of the system used and describing the calculations, the Service was

unable to determine if sport-hunting quotas were reasonable or beneficial to elephant populations and, therefore, whether sport-hunting was enhancing the survival of the species.

The Zimbabwean Parks and Wild Life Act has established the regulatory mechanism for the ZPWMA and its programs, and also provides for substantial penalties for the unlawful possession of or trading in ivory. In addition, the General Laws Amendment Act (No. 5) of 2010 provides for mandatory imprisonment of not less than 9 years for poaching. If properly enforced, it appears these penalties would be a sufficient deterrent for poachers. However, based on the information available to the Service in 2015, we did not have a good understanding of the ZPWMA's annual operational budget, how much money is generated by elephant hunting, or how these funding levels impact the ability of ZPWMA to adequately implement the Parks and Wild Life Act or to carry out day-to-day management activities or anti-poaching efforts. In January 1996, the Government of Zimbabwe approved the establishment of the Parks and Wild Life Conservation Fund, a statutory fund responsible for financing operations directly from wildlife revenues. However, revenues generated through sport-hunting conducted on State and private lands are primarily used to finance ZPWMA, and only limited additional funding is available from appropriated funds from the Zimbabwe government or outside funding from NGOs. While the Service did receive additional information from ZPWMA and other sources on the revenue generated through hunting (in general) and other sources (in general), we still lacked sufficient information on revenue generated through elephant hunting, particularly from U.S. hunters. The Service explained that it was possible that additional documentation could be provided to substantiate claims that revenue from U.S. hunters generated through elephant hunting provides a significant benefit to elephants in the wild, but until such time, we were unable to determine if these claims are accurate.

In 1989, Zimbabwe established the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) to encourage reduction in human-elephant conflicts through conservation-based community development and to provide an economic incentive to improve community tolerance of wildlife, including elephants. At the time, the CAMPFIRE program was the model for community-based conservation efforts in several other African countries and was identified as an innovative program. Under a community-based conservation program, like CAMPFIRE, rural communities should benefit from revenue generated by sport-hunting. With increased human-elephant conflicts on Communal lands, sport-hunting may be an important tool that gives these communities a stake in sustainable management of the elephant as a natural and economic resource and provides the enhancement that would meet the U.S. criteria for authorizing imports of trophies. Much of the information provided to the Service in advance of our 2015 finding focused on the benefits U.S. hunters provided to CAMPFIRE activities and community-based wildlife management. However, the information did not provide a clear connection between hunting revenues coming from U.S. hunters (e.g., how much is generated for communities), and indicated that over time, the management of wildlife and benefits provided through CAMPFIRE may have declined. The Service noted that it appeared that these concerns were expressed during the November 2014 CAMPFIRE Stakeholder's Workshop held in Zimbabwe. The discussions and recommendations touched on the effectiveness of the CAMPFIRE concept and its relationship to tourist hunting. Participants at the workshop

appeared to have made a good start at addressing issues raised by representatives of Rural Development Councils (RDCs), as well as the need for CAMPFIRE to face challenges with limited resources and capacity. It was recognized that there needed to be strong involvement with ZPWMA and safari operators since CAMPFIRE is in areas where there have been both elephant population declines and increased poaching. While we noted that the Service's concerns expressed in our earlier 2014 findings regarding community-based wildlife management had not been sufficiently addressed in the information provided to the Service for our 2015 finding, there did appear to be movement in better defining the role that CAMPFIRE and community-based wildlife management can play in elephant management, particularly in association with U.S. hunters.

As was stated in the July 2014 and March 2015, findings, there are clearly "bright spots" of elephant conservation efforts being carried out by non-governmental entities and individuals in Zimbabwe that are providing a benefit to elephants. Individual safari outfitters and landowners have established their own management efforts, including anti-poaching activities, on areas under their control, either through ownership of the land or leases. These entities have made significant strides to ensure the long-term survival of elephants on their lands. These efforts, however, had been adversely affected by unilateral or seemingly arbitrary actions taken by the central government or RDCs, such as land redistribution activities, which minimize conservation efforts, and reduced lease durations. These "bright spots" were not numerous enough, in and of themselves, to overcome the problems facing Zimbabwe elephant populations or to support a finding that sport hunting throughout Zimbabwe would enhance the survival of the species. While additional information was provided since for our 2015 finding, much of this information only expanded on areas already identified in previous submissions. The Service noted, however, that two workshops involving multiple safari outfitters and leaseholders were scheduled for the beginning of 2015 to identify and address outstanding issues faced by the safari outfitters. It was the stated hope of the Service that these workshops would be successful and act as a springboard for similar workshops throughout Zimbabwe.

Based on the information available to the Service in 2015 on government efforts to manage elephant populations, efforts to address human-elephant conflicts and poaching, and the state of the hunting program within the country, and without current data on population numbers and trends being incorporated into a national management strategy or plan, the Service was unable to make a finding that sport-hunting in Zimbabwe is enhancing the survival of the species and that imports of trophies would meet the criteria established under the Act for African elephants.

Basis for 2016, 2017, and 2018 Finding for Zimbabwe:

Following the Service's March 26, 2015 finding, on May 12, 2015, Service Assistant Director for International Affairs Bryan Arroyo sent a letter to the Honorable Saviour Kasukuwere, (formerly) Zimbabwe's Minister of Environment, Water and Climate, outlining the concerns the Service still had regarding elephant trophy imports from Zimbabwe. The letter identified six areas of concern: the lack of a current management plan; the current population status of elephants in Zimbabwe; poaching levels and prevention; regulations and enforcement concerns;

the sustainable utilization of elephants in Zimbabwe; and the utilization of hunting revenues.

On July 20, 2015, the ZPWMA sent a letter responding to the May 12 letter. The letter addresses each of the questions outlined in the May 12 letter and included a draft version of the Action Plan for Elephant Conservation and Management in Zimbabwe (2015-2020). In January 2016, the Service received the final version of the Action Plan that had been approved and signed by the Director-General of ZPWMA Edson Chidziya, on January 20, 2016, and the Honorable Oppah Muchinguri-Kashiri, Minister of Environment, Water and Climate on January 21, 2016.

On April 4, 2016, the Service sent an e-mail to ZPWMA requesting clarification of the funding priorities for the 2015-2020 management plan. We received a response on May 9, 2016, but it did not clarify what ZPWMA's funding priorities were in 2016 or beyond. In September 2016, during the 17th Meeting of the Conference of the Parties to CITES, the Service met with representatives from Zimbabwe to further discuss the current status of the Service's evaluation of importation of elephant trophies. As a result of those conversations, the Service received a letter dated November 8, 2016, with supplemental information regarding Zimbabwe's elephant management plan priorities. Further, on January 27, 2017, the Service received a letter from ZPWMA containing a report, "The Role of Trophy Hunting of Elephants in Support of the Zimbabwe CAMPFIRE Program: December 2016" that more fully discussed the source and amount of revenue generated between 2010 and 2015 through the CAMPFIRE program, the current role of CAMPFIRE, and how revenue generated by elephant hunting has been utilized within communal areas over this 6 year period and into the future.

This finding is the result of an analysis of information available to the Service as of the date of this finding, having considered all of the information that has been obtained by the Service since 2014, including information on Zimbabwe's current management plan; the current population status of elephants in Zimbabwe, including poaching levels; regulations and enforcement concerns, such as anti-poaching efforts; the sustainable utilization of elephants in Zimbabwe; and the utilization of hunting revenues.

Management Plans: In its April 4, 2014, letter, the Service asked whether Zimbabwe had a current national management plan for elephants. In the ZPWMA response, Zimbabwe responded that the "management plan" consisted primarily of The Policy and Plan for Elephant Management in Zimbabwe (1997) and Elephant Management in Zimbabwe, third edition (July 1996). In addition, ZPWMA stated that they also implement other plans: "The African Elephant Action Plan" (CoP15 Inf. 68), SADC Protocol on Wildlife, and Elephant and Rhino Security Plan. In the ZPWMA response, ZPWMA stated that all of the protected areas in Zimbabwe have "specific aspects of elephant monitoring programs that are implemented and reviewed on an annual basis." ZPWMA stated that information on the status of the elephant is derived from aerial surveys, water hole counts, walking transects, visitor observation, and ranger-based monitoring. In addition, ZPWMA stated that they are regularly monitoring the status of the elephant population, including poaching, at two sites through the CITES "Monitoring the Illegal Killing of Elephants" (MIKE) program.

While Elephant Management in Zimbabwe provides a historical review of elephant status in Zimbabwe prior to 1996, it primarily focuses on intentional reduction of elephant populations through culling rather than on maintenance or increase of populations under threat. Although the Service recognizes the potential role of culling as part of a management program, Elephant Management in Zimbabwe is largely irrelevant as a management plan given its age and because it does not establish specific measurables or management actions that need to be taken. The document does state that when managing elephant males for sport hunting, it is essential to account for all adult males removed from a population, including animals taken through problem animal control and poaching.

The Policy and Plan for Elephant Management in Zimbabwe was the outcome of a "Zimbabwe Elephant Management Framework" workshop held on January 13, 1997, in Harare. The document summarizes the issues that were affecting elephant populations in Zimbabwe at the time, and recommends policy statements on elephant management. While the document states a clear goal and establishes ten objectives with management actions identified, it does not provide a methodology to meet the objectives or complete management actions. Without a plan to take specific actions to meet the objectives, or at least a clear framework on how adaptive management efforts would be monitored to ensure that they are meeting the stated objectives, it is not clear to the Service how the document would serve as a "management plan." Other documents provided by ZPWMA in response to our inquiries, e.g. "The African Elephant Action Plan" (CoP15 Inf. 68), SADC Protocol on Wildlife, and Elephant and Rhino Security Plan also establish broad policy goals and objectives, but provide very little with regard to specific management actions or measurables.

Either as an outcome of our 2014 negative finding or internal discussions, ZPWMA recognized that The Policy and Plan for Elephant Management in Zimbabwe was out of date and did not address key elements that had changed since 1997. To address this, ZPWMA held a three-day workshop at Hwange Safari Lodge (December 2-4, 2014) to review Zimbabwe's elephant management regime. The workshop was attended by the ZPWMA Director General, the Permanent Secretary for Environment, Water and Climate, members of the Zimbabwe Parks and Wildlife Board, Executive Directors of Rural District Councils, and various NGOs. Both the Permanent Secretary and the Director General acknowledged at the workshop that the 1997 management plan was outdated and had been overtaken by events at the global, regional, and local levels and cannot address current challenges.

The workshop participants agreed on a framework for an upcoming management plan. The proposed revised management plan had the same long-term vision of the 1997 plan and basically the same target goals (i.e., maintain at least 4 demographically and genetically viable populations; maintain or increase elephant range; maintain numbers/densities of elephants at levels that do not adversely impact biodiversity conservation goals while contributing to economically viable and sustainable wildlife-based land uses). The workshop participants identified the beginnings of strategic objectives and outputs, as well as some key activities. The outcome of the workshop was the starting point for reevaluating Zimbabwe's management program. However, according to the Proceedings, there was insufficient time at the workshop to complete the section on means of verifying the key performance indicators. A schedule was agreed upon: by Dec. 15, 2014,

ZPWMA would appoint a drafting team to write up the management plan; the 1st draft of the plan would be ready by Jan. 30, 2015; the Elephant Management Plan Coordinating Committee would be convened by ZPWMA by Feb. 28, 2015; Final draft of management plan by April 30, 2015; and Operational annual management plans for 4 sub-regions by May 30, 2015.

While this schedule was not followed closely, since the December 2014 workshop, significant work has been done to develop a revised elephant management plan. As an outcome of this workshop, the participants identified that each of the four primary elephant ranges needed a regional plan to address specific challenges in each area. A workshop was held at the end of April 2015, to discuss an anti-poaching strategy for Mana Pools National Park, the results of which was later expanded to cover the mid-Zambezi Valley region. Likewise, in May and September 2015, workshops were held in Sebungwe and the South East Lowveld, respectively, to develop action plans for each region. An anti-poaching workshop for Hwange National Park was held in June 2015 and, according to ZPWMA, was combined with the management plan for the park to develop the basis for an action plan for Northwest Matabeleland.

As a result of these various workshops, and other efforts ZPWMA and their collaborators put into developing a revised national management plan, the Zimbabwe National Elephant Management Plan (2015-2020) (EMP) was approved for implementation by the Director-General of ZPWMA and the Minister, Ministry of Environment, Water and Climate, on January 20, 2016, and January 21, 2016, respectively. The revised elephant management plan addresses the challenges identified by the 2014 workshop participants and concerns identified by the Service about the failure of Zimbabwe's former management plan to identify specific action items, deliverables, and deadlines. The revised EMP incorporates an adaptive management framework with higher-level targets, with key components, strategic objectives, and outputs. Each key component has management actions that can be measured and verified through "Key Performance Indicators." A set deadline for each action was identified. These measurables allow ZPWMA to monitor the success of the new management plan and, through an adaptive management approach, address newly emerging concerns and long-term management needs.

The EMP focuses on five major components: Protection and Law Enforcement; Biological Monitoring and Management; Social, Economic, and Cultural Framework; Building Conservation Capacity; and Coordination, Collaboration, and Program Management. While addressing elephants on a national basis, the plan also contains annexes with regional management plans for each of the four main elephant populations in Zimbabwe. Differences in management requirements and regional challenges were addressed in the actions and indicators of each regional plan. The intent of the EMP, and its regional components, is to provide for accountability, transparency, and effective implementation. The EMP calls for the establishment of a national elephant manager position tasked with directing elephant management in Zimbabwe. The plan calls for the creation of a National Elephant Management Committee and four range-specific committees to review progress and oversee implementation.

The EMP (page 31) states that the plan "is an ambitious plan" and that the implementation would "require more human and financial resources than are currently available for the conservation and management of elephants in Zimbabwe." Recognizing that ZPWMA may not currently have

adequate resources to implement the Plan as drafted, and that well-prioritized implementation of the plan in a manner to enable elephant sport hunting that benefits the survival of African elephants in Zimbabwe could still help serve as the basis for a finding of enhancement, the Service requested on April 4, 2016, that ZPWMA identify its priorities for implementation and progress in implementation. On May 9, 2016, the Service received a response from (former) Director-General Chidziya. Unfortunately, Mr. Chidziya's response did not identify any priorities. It was not until the Service was able to meet with representatives of the Zimbabwe government and ZPWMA in South Africa in September 2016 that we were able to discuss the issue further. As a result, the Service received a letter dated November 8, 2016, that contained a document, apparently drafted between August 2016 and the end of October 2016, titled "The Zimbabwe National Elephant Supplementary Management Plan (2015-2020)" (the Supplement). This document identified four priority areas: Law Enforcement, Biological monitoring and management, Investigations/Intelligence, and the appointment of an Elephant Manager. The document identified that a national Elephant Manager has been hired (but did not identify how long the manager had been in place) and is currently working with ZPWMA personnel, regional intergovernmental agencies, private sector, and nongovernmental organizations to begin implementing the EMP. The Supplement also emphasized law enforcement and training to combat poaching and ivory trafficking. According to the document, as of August 2016, more than $1 million had been spent on priority activities. In addition, the document contained a summary on the status and progress, as of August 2016, of action items identified in the EMP for each of the four regions. While the summary does indicate that there are clearly areas where additional actions should be carried out, it does reflect a concerted effort on the part of ZPWMA and its partners since the EMP was signed into effect January 21, 2016, to implement the EMP in a manner to enable elephant sport hunting that benefits the survival of African elephants in Zimbabwe now and to make progress toward full implementation that achieves further benefits for elephants from sport hunting going forward.

Population Status: To manage any population to ensure an appropriate population level and determine whether sport-hunting is having a positive effect on the survival of African elephants, it is vital to have sufficient data on population numbers and population trends to base management decisions. Without current population data, it is not clear how one can calculate the number to offtake. Without information on population demography and mortality, it is not possible to determine accurately what impact hunting, in conjunction with other offtakes, including problem animal control and poaching, is having on Zimbabwe's elephant population. At the time the Service made its April and July 2014 findings, there did not appear to be sufficient data on the population status of elephants within Zimbabwe. According to the IUCN SSC African Elephant Database report "2013 Africa", the elephant population in Zimbabwe in 2007 was estimated to be 99,107, of which 85% (84,416) was classified as "definite", although less than 1% of these animals were identified by aerial or direct counts, and only 0.3% (291) was classified as "speculative". While the total population in 2012 was estimated at 100,291, only 47% (47,366) was classified as "definite" and 45% (45,375) was classified as "speculative." Only 304 "definite" animals were counted by aerial or ground counts (less than 1% of the definite animals), while 41,840 of these animals were counted through sample counts or dung counts, a less accurate methodology than properly conducted aerial surveys, and the remaining 5,222 were estimated through "other guesses." In a November 3, 2014, letter to the Service, the IUCN/SSC African

Elephant Special Group (AfESG) stated that data had been inadvertently left out of the 2013 provisional report. Specifically, a 2007 survey of Hwange National Park which added an additional 30,000 elephants to the "definite" category (from the "speculative" category), while not changing the overall population estimate. In addition, according to information provided by ZPWMA, two surveys were conducted in 2012-2013 in Save Valley Conservancy and in Gonarezhou National Park (and surrounding areas). In Aerial Survey of the Larger Herbivores, Save Valley Conservancy, Zimbabwe, a report compiled in September 2013 by the Technical Advisory Committee of the Save Valley Conservancy, 1,538 elephants were counted. Based on nine years of aerial surveys (2004-2010 and 2012-2013), not all of which covered all of the Save Valley Conservancy, there appears to have been a short-term increase in elephant population density of 9.5%.

In 2014, the Pan African Aerial Elephant Survey (http://www.greatelephantcensus.com/), or the Great Elephant Census (GEC), was carried out over a significant portion of the savanna elephant's range in Africa. The GEC developed standardized survey methodology to establish a consistent continent-wide population basis line. However, it is important to emphasize that Zimbabwe did not modernize its elephant survey method nor did it conduct surveys comparable to the rest of the continent during the GEC. The surveys, approved by the organizers of the GEC, that were conducted used the same methodology, coverage, and transects that have been used since the 1960s in Zimbabwe. The results of this approach is that, while the surveys did not calculate a new baseline, or a more accurate population value, Zimbabwe was able to replicate past surveys that is comparable to past iterations to determine relative population trends over time. In 2015, confirmed results from the GEC reported an estimate for elephant abundance in Zimbabwe to be 82,304 individuals (73,715-90,893), with a total carcass ratio of 7.8%. This was a 6% decrease from the 2001 population estimate. It should be noted, however, that a carcass ratio of greater than 8% generally indicates a declining population.

In African Elephant Status Report – 2016, the AfESG estimated Zimbabwe's elephant population at 82,630 ± 8,589 across a range of 81,228 km^2. According to this report, Zimbabwe maintains the second-largest elephant population in Africa. The population is most concentrated in the North West Matabeleland and South East Lowveld ranges. There was an estimated increase in population for Northwest Matabeleland from 49,310 ±7,051 in 2001 to 53,991 ±7,711 in 2014. There were no significant differences in totals, but the carcass ratio in 2014 was 7% compared to 3% in 2001. According to the report, the 2014 estimate for Sebungwe (northern Zimbabwe) was 3,407 ±1,215 compared to 15,024 ± 2,133 in 2006. The observed carcass ratio of 30% indicated an unsustainably high offtake with almost no elephants left in the communal areas, with the main surviving sub-population in Matusadona and Chizarira National Parks and the Chirisa Safari Area. There was also a decrease in estimates for the Lower Zambezi Valley from 11,656 ± 2,259 in 2014, compared to 19,297 ±2,527 in 2003. However, the report stated that the observed carcass ratio of 6% is not as high as one would expect given the rate of population reduction and might suggest that the level of poaching has reduced in recent years.

Although Zimbabwe chooses not to use the same survey methodology that other countries used during the 2014 GEC, the results of the GEC, and subsequent survey data reported in the 2016 AfESG report, provided more reliable data and a better basis for establishing management

priorities than previous surveys and guesses. Prior to the GEC survey, ZPWMA had stated that the national elephant population was approximately 100,000 animals. This determination was based on guesses and old population estimates, many of which were over 10 years old, and was used to establish quotas or to facilitate management decisions. While establishing the EMP was paramount to improving Zimbabwe's elephant management regime, it was only by incorporating the current population estimates into the framework of the EMP that more effective management would be possible. The targets and goals of the EMP have taken these more reliable population estimates into consideration when establishing hunting offtakes to implement the EMP.

Regulations and Enforcement: The regulatory mechanisms for ZPWMA and its programs were established primarily under the Parks and Wild Life Act 1996 (amended), but also include a number of other laws and regulations. The Parks and Wild Life Act include sections on virtually every aspect of ZPWMA, including requirements for annual financial audits and reporting to the central government. The law also provides for substantial penalties for the unlawful possession of or trading in ivory. The first offense carries a minimum of 5 years and a maximum of 15 years in prison. The second offense carries a minimum prison term of 7 years and a maximum of 15 years. However, according to the response from ZPWMA to our April 4, 2014, inquiry, the General Laws Amendment Act (No. 5) of 2010 provides for a mandatory imprisonment of not less than nine years for poaching.

In January 1996, the Government of Zimbabwe approved the establishment of the Parks and Wild Life Conservation Fund that provides for financing wildlife operations directly from revenues generated through wildlife-related activities. The funding for ZPWMA is therefore coming from revenue generated through sport hunting conducted on state and private lands, concession leases, National Park visitor fees, and other wildlife related fees. While there have been requests by ZPWMA for funding from the central treasury in the past, to our knowledge, no other significant government funding has been provided, and only limited outside funding from NGOs or other governments appears to be available.

In response to the Service's May 12, 2015, letter, ZPWMA sent a letter on June 20, 2015, with additional information on their elephant hunting program. While the document did not specifically identify the amount of revenue generated from elephant hunting, it did state that in 2014, $5,072,493 was generated as hunting revenue. The document went on to state that historically 54% of the hunting market in Zimbabwe is made up of US hunters. Assuming the historical average provided by ZWPMA, US hunters may have contributed approximately $2.74 million of the total hunting revenue for 2014. The document estimated that 2015 revenues from hunting would increase to $6.2 million in 2015. While the document did not provide updated estimates on the role of U.S. hunters, it did assume the role of U.S. hunters would remain consistent with historical averages absent the fact that the Service was not approving the importation of elephant trophies at that time. ZPWMA stated that they had an operating budget of $25.7 million for 2014 and (budgeted) $34.1 million in 2015. According to this document, ZPWMA had revenue equaling $26.4 million in 2014 and estimated revenue of $35.5 million for 2015. While the Service did not receive information regarding ZWPMA's full 2016 or 2017 budget or the estimated revenue, we did receive information that as between January 2016 and August 2016, ZPWMA had spent $1.010 million on the implementation of the EMP. In addition,

we received more specific information regarding revenue generated in the communal areas that were managed by CAMPFIRE (see Revenue Utilization section below).

According to "The Role of Trophy Hunting of Elephant in Support of the Zimbabwe CAMPFIRE Program – December 2016", a report the Service received on December 17, 2016, the Reserve Bank of Zimbabwe, in collaboration with relevant stakeholders, has established the Tourism Receipts Accounting System (TRAS) that required all outfitters to submit returns listing the revenue generated for hunting activities. This system has been in place for several years, but required manual analysis of the data to extract information on hunting revenue. In January 2015, a web-based system (TRAS2) was introduced that links Safari Operators, ZPWMA Authority, Taxidermists, Shipping Agents, International Marketing Agents and Reserve Bank. Under this system all authorized hunts are registered allowing for the capture of hunting data, such as the origin of clients, value of trophies and hunts, and area hunted, to monitor hunting quota utilization and track hunted trophies. According to the December 2016 report, the Exchange Control Division of the Reserve Bank of Zimbabwe and the ZPWMA are now able to:

1. Assess regional price differentials of similar hunts and the reasons thereof;
2. Present TRAS2 system updates and reports to the users, including international marketing agents;
3. Engage with international marketing agents of sport hunting;
4. Obtain relevant insights on governing of the hunting sector; and
5. Come up with an effective mechanism to fully account for export proceeds from the hunting sector.

This system would be very beneficial in obtaining data in the future on how funds generated by elephant hunting in Zimbabwe, particularly from U.S. hunters, are utilized to enhance the survival of the species. .

One concern expressed by the Service in its previous findings was whether ZPWMA was responding to the apparent poaching crisis facing Zimbabwe. One particular concern was the poisoning event in Hwange. Based on communication from ZPWMA, as well as information received from NGOs, ZPWMA specifically responded to the threat of poaching in Hwange by improving radio communications, adding aerial surveillance, and holding 35 public awareness meetings in the area. ZPWMA has also stepped up its anti-poaching nationally by adopting a number of "Urgent Measures" (as identified in ZPWMA's July 2015 letter). ZPWMA has acted to increase poaching penalties, criminalize the use of cyanide in poaching, increase air surveillance of protected areas, collaborate with national law enforcement and military agencies to raise a national concern regarding elephant poaching, and improve intelligence-sharing across international borders. According to available information, ZPWMA has also held a judiciary awareness program to support better implementation of relevant poaching laws and penalties throughout prosecution and sentencing. As shown in the July 2015 Response, most of ZPWMA's budget (77%) is allocated for staff costs and patrol provisions. These expenditures reportedly fund anti-poaching efforts throughout the elephant range. ZPWMA reportedly has a staff of 1,504 active field rangers and has stated that there is an intent to increase this number. According to "The Zimbabwe National Elephant Supplementary Management Plan (2015-2020)", over 80% of spending under the new EMP has been on law enforcement (anti-poaching) and training, with law

enforcement identified as the top priority going forward.

The Parks and Wildlife Act Chapter 20:14 devolved authority to manage and benefit from wildlife on communal and private lands to the landholders. Although the Service raised questions on how successful this approach would be in previous findings, the Zimbabwe government has established dialogue and collaborated with NGOs, landowners, and safari area concessionaires to improve elephant management and anti-poaching efforts. According to their July 2015 response to the Service, and supported by the report on the implementation of the EMP provided in November 2016, ZPWMA is engaging private players in co-management in some areas and entering into long-term lease agreements (10-25 years) to manage some protected areas. In certain areas, ZPWMA is reportedly partnering with safari operators; in others, they partner with non-profits, such as the Tashinga Initiative in the Zambezi Valley and WWF in the Hwange-Sanyati Biological Corridor.

On November 12, 2015, a stakeholders conference was held in Harare. The meeting was called by Minister Mrs. Opah Muchinguri-Kashiri, Minister of Environment, Water and Climate, as the chairperson of a multi-ministerial cabinet committee established to look into the poaching crisis within Zimbabwe. In attendance were the Minister of Tourism and Hospitality, and the Minister of Rural Development, Preservation of Culture and Heritage. Other delegates included the Permanent Secretaries from the Ministries of Environment and Agriculture, representatives from the Zimbabwe National Army, the Air Force, the Zimbabwe Republic Police, Rural District Councils, NGO's, industry and civil society. The conference, partially funded by the African Wildlife Foundation, noted that Zimbabwe needed to reinstate a level of custodianship over wildlife to the local level and give communities and land owners broad user rights. It also noted the need to review the efficiencies of the private wildlife sector, community wildlife programs, and ZWPMA. A number of recommendations were made at the conference including addressing resource concerns of rangers in the field; evaluate how CAMPFIRE is interacting with local communities; and building greater trust between various ministries and agencies to address sport hunting issues. The Minister also called for establishing regular meetings of stakeholders to ensure that there is continual movement in addressing identified issues.

While no information was provided on whether these stakeholder meetings are proceeding as called for by the Minister, the Service was informed by AWF that they have established, and partially fund, the Environment and Wildlife Advisory Committee (EWAC) for the Minister. According to AWF, this committee will advise the Minister and provide technical assistance to ZWPMA. AWF stated that the November conference was the first of its kind to bring together such a wide array of ministries and agencies and, according to AWF, will greatly improve the wildlife industry in Zimbabwe.

At the 16th Meeting of the Conference of the Parties to CITES in 2013, the report on ETIS (CoP16 Doc. 53.2.2) expressed concerns about Zimbabwe in regard to illegal trade in ivory. The report stated that, as a group, Zimbabwe, Botswana, and Namibia, were in the middle range, when compared to 64 other consumer or producer countries of elephant ivory, in terms of the mean number of seizures identified, but ranked fifth in the measure of scale, indicating most of the seizures were in the 10-100 kg class (i.e., an average number of seizures that were predominately

smaller in size). The report noted that 65% of the ivory trade between 2006 and 2011 had occurred since 2009, indicating that illegal ivory trade is increasing. Governance indicators were mixed, with a much lower than average World Bank "rule of law" score, but the second highest law enforcement ratio of any group of countries evaluated.

At the 17th Meeting of the Conference of the Parties to CITES in 2016, the "Report on the Elephant Trade Information System (ETIS)" (CoP17 Doc. 57.6) reflected that there were some improvements in Zimbabwe. As in the previous report, the document grouped Botswana, Namibia, and Zimbabwe together in terms of their level of government oversight and capacity. These countries regularly report data to ETIS. In terms of all data that implicate these countries in an ivory seizure, this southern African grouping reflects middle range values in terms of mean number of seizures and the mean weight of ivory seized. The measure for assessing the presence of organized crime stands at zero which, according the document, is indisputably a good sign. Governance indicators are mixed, however, with the rule of law score problematic and suggesting the presence of corruption, but the relatively high law enforcement ratio partially mitigates that concern. As reported in earlier ETIS reports, Zimbabwe was the country that pulls the rule of law score down, indicating far greater governance challenges exist in that country. The domestic ivory market score is low, reflecting the complete absence of a market in Botswana and a very low level of trade in Namibia. Again, Zimbabwe is the exception with the tenth largest ivory market of any country in this analysis. While not directly addressed in the two ETIS reports, there is some evidence of corruption or collusion within the wildlife sector. It was revealed in 2016 that there was not adequate control of its rhino horn stockpile, and the former Director General Edson Chidziya was recently fired over the loss of a significant number of rhino horns. While this event raises concerns over ZPWMA's ability to maintain control over stockpiles and other resources, it should also be acknowledged that there are mechanisms in place, that were utilized, to address such governance issues.

Sustainable Use: According to the AfESG 2016 report, poaching for ivory has escalated in the past 10 years and has become a major problem in Zimbabwe. Poaching impacts are highest in the north of the country, particularly in the Sebungwe Region. However, at the same time, concerns have been expressed about the impact of high numbers of elephants on vegetation and other biodiversity in protected areas, particularly in areas with elephant densities higher than 0.5 elephants per km^2 (some areas of Zimbabwe have densities higher than 1 elephant per km^2). These two apparently opposing factors (uncontrolled poaching that may adversely affect elephant populations in some areas of Zimbabwe and overutilization of habitat by high numbers of elephants in other parts of Zimbabwe) previously raised concerns by FWS on what would constitute a sustainable utilization of elephants in Zimbabwe.

In previous findings, the Service did not have sufficient information regarding offtake in Zimbabwe, including basic information like the number of elephants that have been sport-hunted annually. For both the 2014 and 2015 hunting seasons (January – December), Zimbabwe had established an annual export quota of 500 elephants (1000 tusks). This is the same quota that

Zimbabwe has reported to the CITES Secretariat since 2004. Likewise, for 2016 and 2017, Zimbabwe has reported the same annual export quota to the Secretariat. It is unclear, given the improved population data now available to Zimbabwe and the revised management plan that specifically recognizes the use of population data when establishing quotas, why Zimbabwe maintains the same CITES export quota year to year. While the Service will request additional insight into Zimbabwe decision not to amend the voluntary quota provided to the CITES Secretariat before making a 2018 finding, unlike what was available to the Service when it made its previous findings, there is now clear information that Zimbabwe has not reached this export quota in the past and is unlikely to do so in the future given the new management efforts under the EMP. In ZPWMA's July 20, 2015, response, a chart was provided that identified the level of offtake between 2010 and 2014, as well as approximately six months of 2015. Based in this response, the average of 215 sport-hunted elephant trophies was taken each year between 2010 and 2014, with the first half of 2015 (75 trophies) being consistent with this annual average (between 2011 and 2013, the average off-take was 260 annually (274, 247, and 258, respectively), so a lower offtake in 2010 (134 trophies) and 2014 (162 trophies) made a significant difference in average annual offtake). Over this period, there were 57 and 23 animals culled in 2010 and 2011, respectively. According to ZPWMA, the number of live exports were low, with a total of 11 live elephants exported in 2012 and 2014 (however, according to the WCMC trade database, Zimbabwe reported the export of 3 live elephants in 2011, 18 in 2012, and 27 in 2015).

Of the five years of data (2009-2013) ZPWMA provided in their April 17, 2014, response, an average of 190 elephants were identified as being poached annually. In 2009 and 2010, there was an average of 111 elephants poached; however, between 2011 and 2013, the average more than doubled to 243 elephants. According to the information received in July 2015, 293 elephants were poached in 2013, including the 105 elephants poisoned in Hwange National Park. However, according to more recent information, the number of elephants poached in 2014 declined to 194, with 70 being identified as poached in the first 6 months of 2015. This identified decline was also corroborated by data presented at CoP17 (CoP17 Doc. 57.6).

While the number of elephants taken as problem animals was not elucidated in material provided by ZPWMA in 2014, their July 20, 2015, response did provide more details. Over a 5-year period (2010 to 2014), an average of 76 elephants was taken annually. There was a spike in 2012 of 173 animals, but other years the annual offtake was reportedly between 44 and 61 animals annually. The July 20, 2015, document also provided more information regarding natural mortality rates. According to this information, between 2010 and 2014, there was a spike of natural mortality in 2011 (1,015 mortalities), 2012 (1,373), and 2014 (1,981), with a five-year average of 940 animals (although the reported natural mortality in 2010 and 2013 was substantially lower, which raises questions regarding the reliability of the 2010 and 2013 figures). The partial data for 2015 (455 reported mortalities) is consistent with average annual mortality rate of 940 animals.

Taking into consideration all of the reported offtake between 2010 and 2014, there was an average offtake of approximately 1,500 animals. Based on this average and the reported population estimates coming from the 2014 GEC, Zimbabwe appears to be experiencing approximately 2% offtake of their elephant population. Even if the annual export quota was 500 elephants, based on the most recent survey data, the hunting offtake would be less than 1% of the total population

(noting, of course, that hunting offtake is typically focused on a select group of larger, tusked elephants). With the reported average hunting offtake of 215 trophies, as reported in 2015, the hunting offtake would be approximately 0.2% of the total population.

In our previous findings, the Service raised concerns about how quotas were established and allocated among safari outfitters and landowners. According to information from ZPWMA, as well as information provided by many of the comments received by the Service from safari outfitters and professional hunters associations, the principal form of utilization of the elephant in Zimbabwe is sport hunting. According to ZPWMA, quotas established in previous years (before the EMP) were set to maximize the sustainable production of high-quality trophies without detriment to the population. It appeared that the national export quota of 500 elephants was the goal to reach when establishing quotas for each hunting area, as opposed to determining the best quota to facilitate management goals for those areas. According to the material provided to the Service in 2014 and 2015, it appears that the complete quota of 500 elephants was allocated proportionally to each area based on recommendations from ZPWMA ecologists, field staff, safari operators, other stakeholders, and technical specialists through "multiple stakeholders participatory quota setting." Then, on an annual basis, stakeholders use available population data to propose a particular quota for an area to a Quota Setting Workshop. At this workshop, it is determined if the proposed quota should be adopted or modified in relation to other proposed quotas. Factors that are apparently considered each year include population estimates, growth rates of populations, size of hunting areas, status of habitat, and target elephant population size.

With the establishment of the EMP, there is a more systematic, scientifically-based approach to establish national quotas. According to a presentation made by the Zimbabwe elephant coordinator at a workshop in South Africa at the end of November 2016, Zimbabwe looks at a number of factors. While they are still starting with the quota identified to the CITES Secretariat (500 elephants), they are not immediately dividing this quota between all of the hunting areas. Instead, they are taking into consideration the results of the 2014 survey and subsequent surveys, results from research efforts, the size of the hunting area in relation to elephant habitat requirements, illegal off-take and other forms of off-take, how the hunting areas are managed in relation to land use or fencing, human-wildlife conflicts that have occurred previously, and recommended sustainable off-take levels developed based on ecological assessments of the hunting area. This information is then further evaluated in light of other species within the hunting area, past elephant trophy quality, and community benefits of proposed harvests.

The proposed quota is then discussed at stakeholder workshops in each of the four elephant regions. This process is presented in the District Quota Setting Toolbox and the Quota Setting Manual, published in 2000 and 1997, respectively, that were discussed in previous Service findings. The significant difference between how the quotas were set previously and the methodology carried out now is the weighted input of elephant ecologists and managers. While stakeholder interests are considered, the final quota determination is made by ZPWMA ecologists to ensure the quotas are assessed at a sustainable level, having negligible impact on the population. According to their July 2015 response, ZPWMA reduced the starting number from 500 to 300. For 2016, they stated that they were raising the starting point for determining a national quota to 400. However, based on the 2014 census data, a quota of 400 elephants would

constitute 0.49% of the total population of over 82,000. It should be noted that to date, the annual trophy harvest of 215 elephants is well below this value and therefore would account for less than a 0.49% off-take (It should be noted, however, that the proportional off-take of trophy animals would be higher when considering that trophy hunting is targeting a specific sub-group of the total population).

Revenue Utilization: On communal lands in Zimbabwe, the protection of elephants falls primarily under the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE), which encourages reductions in human-elephant conflicts through conservation-based community development. The program was established in 1989 as a means of providing an economic incentive and return to rural communities while encouraging tolerance for the elephant and sustainable use of natural resources. This program has been the model for community-based conservation efforts in several other African countries and identified as an innovative program in the past. Under this program, there are currently 29 Rural District Councils (RDCs) that have been granted Appropriate Authority status under the Parks and Wild Life Act. Based on several CAMPFIRE documents presented to the Service, between 12 and 16 RDCs with exploitable wildlife resources make up the core of the CAMPFIRE program.

According to the Revised CAMPFIRE Revenue Sharing Guidelines, which were incorporated into the Constitution of the CAMPFIRE Association in 2007, at least 55% of generated revenue from hunting should be devolved to producer communities, no more than 26% and 15% for management and overhead at RDC level, respectively, and 4% as a levy to the CAMPFIRE Association. According to an undated document (but presumably produced in late 2014, since it references data from 2014 but does not include any references to 2015 data) produced by CAMPFIRE (CAMPFIRE report undated) at least 10 RDCs comply with the Revenue Guidelines. As reported in this document, data were presented in an October 2013 report stating an estimated US$2,496,349 was generated by 15 RDCs in 2012 from hunting revenue. While this report states that 5 out of 13 RDCs contributed 84% of the hunting revenue, the supporting table to this statement does not reflect this number. Further, the report states that an assessment of 18 main CAMPFIRE districts allocated hunting quotas for 2014 shows that 106 out of 167 bull elephant hunts were booked by U.S. hunters and that elephant hunting contributes more than 70% of the income to the CAMPFIRE program, and that 90% of all CAMPFIRE revenue comes from all hunting.

The CAMPFIRE report (undated) stated that in the Community Based Natural Resources Management Stocktaking Assessment Report by Mazambani and Dembetembe (2010) [Service does not have a copy of this report], between 1989 and 2006, US$88.9 million in gross revenue was realized by key stakeholders in the CAMPFIRE program. Of this revenue, 55% went to safari outfitters, 23.4% to producer communities, 19.8% to RDCs, and 1.8% to the CAMPFIRE Association. (The Service has no additional documentation or information to validate these figures.)

On 17-18 November 2014, a workshop titled "CAMPFIRE Stakeholder's workshop: Towards the Development of a New Elephant Management Plan and Policy" was held in Zimbabwe. The

discussions and recommendations touched on the effectiveness of the CAMPFIRE concept and its relationship to tourist hunting. At the workshop, Charles McCallum Safari reported that they had contributed over $349,000 to CAMPFIRE wards and the RDC in 2013 – U.S. elephant hunters contributed 40% of this total ($132,870). In 2014, the total was up to $400,995 but contributions due to U.S. hunters dropped to 27% ($100,800) – all elephant hunting was only 32% of the total ($118,425). It appears that the workshop may have been a good starting point to address issues faced by RDCs and to improve the effectiveness of CAMPFIRE. However, according to Conservation Force, represented at the workshop, CAMPFIRE needed to find a balance between a large elephant population and human population pressures, as well as ensure that revenue from tourist hunting and other resource uses flows to local communities. The 2014 Pan African survey results confirmed that elephant populations in the Zambezi Valley and in Sebungwe have decreased significantly. These areas include communal land. The declines indicate that the persistence of elephants in these areas may be in question in future years if the trend is not halted or reversed.

In a November 11, 2015, presentation by CAMPFIRE to the 14th African Wildlife Consultative Forum in South Africa, it was reported that new CAMPFIRE Revenue Sharing Guidelines have been established where revenue are paid by Safari Operators within CAMPFIRE communities directly into community controlled bank accounts, not through RDCs. CAMPIRE areas would receive 100% of trophy fees for all animals hunted. The communities within the RDC would receive 55% of CAMPFIRE income for their projects, while 41% would be provided to the Rural District Councils for field patrols, monitoring of hunts, problem animal control, water, fire management, and district development. The remaining 4% would be given to the CAMPFIRE Association to coordinate the program and represent its interests at all levels. However, on average, 52% (below required 55%) went to communities, 44% (vs 41% required) went to councils, and 4% to the CAMPFIRE Association.

According to this presentation, the total income of all hunting in 2014, within CAMPFIRE areas that were surveyed, was $2,102,007, compared to $2,229,910 in 2013. It was stated that, on the average, elephant hunting contributed 54% ($1,138,375) of the total hunting income in 2014. Only one district, Matobo, did not generate any income from elephant hunting. Hwange district generated 100% of its income from elephant hunts. Average revenue was $82,475 per district, but one district, Matobo, generated $0 and Tsholotsho generated $381,500. Based on the actual division of the revenue, communities received $1,100,643, RDC received $917,283, and CAMPFIRE Association received $84,080 from all hunting related activities in 2014.

Reports received since 2014 indicate that funds have been invested in projects that benefit the communities overall, such as building classrooms or clinics; purchasing farm equipment; rehabilitating water supplies; purchasing vehicles used in wildlife monitoring and anti-poaching; installing solar power; and other infrastructure improvements. The purpose behind CAMPFIRE is to stimulate the long-term development and sustainable use of natural resources in Zimbabwe's communal areas. By linking these tangible benefits to the protection of wildlife within the communal areas, CAMPFIRE can provide a clear connection to rural residents for the

protection of wildlife, including elephants. Its infrastructure also creates jobs for conservation officers and in monitoring programs, as well as employing game scouts.

In September 2016, the Service received information regarding efforts to review the CAMPFIRE program, which is being supported by the EU through a 12 million Euros contribution. The review was to start in February 2016 and last for 18 months, with a report by the end of 2017. The review was stated to be an effort to develop an improved policy, regulatory, and institutional framework for CAMPFIRE. While this review is still under way and the Service has not received any information on the potential outcome of the review, this appears to be a significant move forward in addressing issues that have been raised about CAMPFIRE, such as their support to communities to better manage wildlife resources and equitably utilize their financial resources.

"The Role of Trophy Hunting of Elephant in Support of the Zimbabwe CAMPFIRE Program – December 2016," a report the Service received on December 17, 2016, contained a recent audit of nine CAMPFIRE districts that receive funds from elephant hunting. In these districts, approximately 60% of the allocated elephant quota (approximately 114 elephants/year of the annual average quota of 180 elephants) has historically been utilized and the majority of hunters (53%) originate from the United States. These U.S. hunters have contributed US$9 million toward the CAMPFIRE Program during 2010-2015, compared to US$8 million from hunters from 40 other nations. Based on this report, approximately 25% of Zimbabwe's people are receiving incentives to conserve wildlife and prevent anti-poaching through CAMPFIRE. Between 1994 and 2012, CAMPFIRE generated US$39 million of which US$21.5 million was allocated to communities and used for resource management (22%), household benefits (26%), and community projects (52%). According to this report, about 90% of CAMPFIRE revenue comes from hunting, with elephant hunting contributing up to 70% of annual revenue.

According to the report, a total of 1,087 elephants have been allocated on quotas to the nine CAMPFIRE areas since 2010. The distribution of this quota among the nine CAMPFIRE areas is dictated by the relative density of elephants in the neighboring protected areas and those residing in the CAMPFIRE areas. Tsholotsho, for example, which borders the southern boundary of Hwange National Park, was allocated 158 elephants (or approximately 26/year) while Hwange, Binga and Hurungwe CAMPFIRE Areas, which do not border onto areas of high elephant densities, received approximately 10 elephants/year. Over the six years, Tsholotsho (99%), Mbire (71%) and Chiredzi (68%) have successfully utilized their allocated quotas while areas such as Hurungwe (20%) and Binga (26%) have utilized a smaller percentage of their allocated quotas. Based on this information, and information in the "Supplement", approximately 53% of all sport-hunted elephant trophies taken annually in Zimbabwe were hunted CAMPFIRE areas.

As stated earlier, to fully account for earnings in the hunting sector, the Reserve Bank of Zimbabwe established the Tourism Receipts Accounting System (TRAS) and its web-based system, TRAS2 to links Safari Operators, ZPWMA, Taxidermists, Shipping Agents, International Marketing Agents and Reserve Bank. Under this system all authorized hunts are registered allowing for the capture of hunting data (origin of clients, value of trophies and hunts,

area hunted etc.), monitoring hunting quota utilization and tracking hunted trophies. Outfitters that operate hunting concessions in CAMPFIRE Areas are required to deposit copies of the TRAS2 form with the CAMPFIRE Office in their respective RDCs/Wards. Each Office is therefore able to extract data on daily rates, trophy fees and other incidental revenues. These data confirm the major role of American hunters to the CAMPFIRE program who contribute 52% of the overall income, but do not break down this contribution to species hunted, such as elephants.

Local conservation efforts: As was identified in our previous findings, Conservation Force and other commenters emphasized the economic impact of the suspension to local conservation efforts being carried out by individual landowners and leaseholders, safari outfitters, and conservancies. In our previous findings, we acknowledged that there were "pockets" of conservation work being carried out. It is now evident that after our 2014 and 2015 findings, due to greater efforts by ZWPMA and NGOs, there has been an increased effort by land owners and leaseholders to take a greater effort in addressing conservation needs of elephants and the habitat that they rely on. As stated previously, a number of regional and national workshops were held in 2014 and 2015 that promote a greater public-private partnership. While ZWPMA stated in 2014 that legislation was in place to decentralize management of wildlife within Zimbabwe, it does not appear that efforts were actually initiated until the workshops that were held after our original 2014 finding and the completion of the EMP in January 2016. In addition to the regional and national workshops that have been convened between ZWPMA and safari operators throughout Zimbabwe, there have been meetings targeting specific conservation needs with operators in the Lower Zambezi Valley and South East Lowveld. In addition, there appears to be a greater effort on the part of ZWPMA to put mechanisms into place to support these efforts. This has been reflected in collaboration between ZWPMA, WWF, Friends of Hwange, and other stakeholders on law enforcement efforts and funding conservation efforts in Northwest Matabeleland. In the Lower Zambezi Valley, ZWPMA has established joint ventures with WWF, Zambezi Society, the Tashinga Initiative, and other organizations to carry out anti-poaching efforts. Awareness campaigns to education local communities on wildlife conservation have been expanded in the South East Lowveld Northwest Matabeleland.

The Parks and Wildlife Act Chapter 20:14 devolved authority to manage and benefit from wildlife on communal and private lands to the landholders. Although the Service raised concerns about this approach in previous findings, there appears to have been an increase in working with NGOs, landowners, and safari area concessionaires to improve elephant management and anti-poaching efforts. According to their July 2015 response to the Service, and supported by the report on the implementation of the EMP provided in November 2016, ZPWMA is engaging private players in co-management in some areas and entering into long-term lease agreements (10-25 years) to manage some protected areas. In certain areas, ZPWMA is reportedly partnering with safari operators; in others, they partner with non-profits, such as the Tashinga Initiative in the Zambezi Valley and WWF in the Hwange-Sanyati Biological Corridor.

Evaluation:

As explained earlier in General Considerations, the Service evaluates a number of factors to

determine whether the killing of the trophy animal taken in a range country will enhance the survival of African elephants under 50 CFR 17.40(e)(6)(i)(B). The Service evaluates applications in accordance with the African elephant 4(d) rule and the permit issuance criteria outlined in 50 CFR 17.32(a)(2). In evaluating each of these criteria the Service has considered the information currently available to the Service as of the date of this finding on elephant hunting in Zimbabwe in 2016, 2017, and 2018, including information provided by the Government of Zimbabwe, current applicants to import sport-hunted elephant trophies, interested individuals and organizations, and other information available to the Service. In accordance with the regulatory requirements, the Service is able to make a determination that the killing of the trophy animal in Zimbabwe, on or after January 21, 2016 and on or before December 31, 2018, will enhance the survival of the African elephant. Therefore, with the information currently available, applications to import trophies hunted during this time period will be considered to have met this requirement unless we issue a new finding based on available information. In accordance with the 4(d) rule for the African elephant, 50 CFR 17.40(e), the Service will review each application received for import of such specimens on a case-by-case basis and each application also needs to meet all other applicable permitting requirements before it may be authorized. On an ongoing basis and as it evaluates each application, the Service will continue to monitor the status of the elephant population, the total management program for elephants in the country to ensure that the program is promoting the conservation of the species, and whether the participation of U.S. hunters in the program provides a clear benefit to the species. Accordingly, the Service may modify its determination based on available information consistent with the regulatory requirements. Further discussion for each of the criteria follows:

17.32(a)(2)(i): Whether the purpose for which the permit is required is adequate to justify removing from the wild or otherwise changing the status of the wildlife sought to be covered by the permit:

Zimbabwe has adequate legislation in place and on January 21, 2016, adopted the Zimbabwe Elephant Management Plan 2015-2020 (EMP), with regional components, which has clear objectives, action items, and measurables to more effectively monitor and evaluate elephant populations and management and facilitate a more systematic management regime. Further, ZWPMA has demonstrated through recent reports that the EMP, while somewhat constrained due to limited resources, is being implemented. Overall beginning January 21, 2016, while there are still concerns over the ability to fully implement the EMP, ZPWMA has provided a well-designed elephant management plan to incorporate an adaptive approach to management that considers regional variation in elephant management requirements. There is no doubt that efforts must continue in implementing the EMP to ensure adequate management of elephants in each of the four regions within Zimbabwe, but to date ZPWMA appears to have established a strong mechanism for national elephant management and has documented that identified targets and measurables are being achieved in a manner to enable elephant sport hunting that benefits the survival of African elephants in Zimbabwe now and is making an effort to make progress toward full implementation that achieves further benefits for elephants from sport hunting going forward.

The Pan African Elephant Aerial Survey, or Great Elephant Census (GEC), that was conducted in Zimbabwe in 2014, and became available in 2015, has provided ZPWMA a better elephant baseline population abundance estimate to assess future off-take quotas, management efforts, and anti-poaching activities. Although Zimbabwe did not conform to the new methods that GEC hoped to establish as the new standard, they opted to conduct surveys using other methods which were not necessarily more accurate but were directly comparable to previous surveys. While the revised population data was available in 2015, as well as other survey data obtained after the 2014 GEC it was not until implementation of the EMP in January 2016 that the data was fully incorporated into a systematic management regime. From information provided by ZPWMA in late 2016, it is clear that this population data has been incorporated into the implementation of the EMP and establishing scientifically defensible hunting quotas.

ZWPMA stated that U.S. hunters historically contribute approximately $3 million annually through all hunting activities. ZWPMA, as well as other commenters, has stated that elephant hunting is the key component of the hunting industry since the species is the primary draw for U.S. hunters to Zimbabwe. For the most part, the central Zimbabwean Government does not directly allocate treasury funds to ZPWMA. Therefore, the vast majority of funding for ZPWMA must come from hunting revenues. The same is true for CAMPFIRE. With the implementation of TRAC2, ZPWMA and CAMPFIRE can now better document and track revenue generated through sport hunting and how it is utilized. For the 2014 and 2015 hunting seasons, the Service received limited evidence to support a positive enhancement finding. With information provided by ZPWMA in 2016 in response to additional inquiries from the Service, as well as meetings with ZPMWA officials in late 2016, there are now accounting mechanisms in place that document hunting revenue.

According to the information provided to the Service in late 2014 and 2015, Zimbabwe has established hunting quotas for all areas of the country. However, it was not until late 2015 and 2016 that the Service received more specific information on how these quotas are established, including how other forms of offtake, such as poaching and problem animal control, were taken into account. Further, it was not until the EMP was signed into effect January 21, 2016 that the Service could have confidence that ZWPMA had in place effective mechanisms to establish scientifically based hunting quotas that took into consideration other forms of off-take to ensure the sustainable utilization of their elephant population.

Since our findings in 2014 and 2015, CAMPFIRE has provided significantly more information on how their programs support the conservation of elephants and provide benefits to and promote greater tolerance of wildlife in rural communities. While the program has come under criticism in recent years relating to excessive retention of generated funds by district councils and diminished benefits to communities and elephants, strides are being taken to address these concerns. An overarching analysis of CAMPFIRE, supported by a grant of 12 million Euros from the EU, is currently being conducted and is scheduled to be completed by the end of 2017. While this review is still under way and the Service has not received any information on the potential outcome of the review, significantly more information has been provided to the Service in regard to how funds are utilized and the basis for hunting off-takes.

As stated in the previous findings, there have been "bright spots" regarding elephant conservation efforts, particularly those carried out by non-governmental entities that are providing a benefit to elephants. Since our 2014 and 2015 findings, there appear to be strong indications that the efforts of private landowners and consortiums to management elephants within their areas of control have received greater support from ZWPMA and the Zimbabwe government. There is increased support from the Central Government and Rural District Councils to expand and support local conservation efforts and evidence that local conservation efforts are meeting management deficiencies that were identified previously by the Service.

Based on the information currently available to the Service, we believe that these efforts will continue through the remainder of 2017 and 2018 to address Zimbabwe's national and regional management issues, including monitoring the current population status of elephants, addressing poaching levels and prevention, and the appropriate utilization of hunting revenues that the Service identified in its previous Zimbabwe findings. Therefore, based on the information available to the Service and provided that elephants harvested in the 2016, 2017, and 2018 season were properly permitted and in compliance with international, national and provincial regulations, we find that the requirements of 17.32(a)(2)(i) is met.

17.32(a)(2)(ii): <u>The probable direct and indirect effect that issuing the permit would have on the wild populations of the wildlife sought to be covered by the permit</u>:

As a national management plan with regional management components, the EMP is extensive and addresses many aspects of elephant conservation and management. As reviewed above, the EMP provides a history of the relevant legislation in regard to elephant conservation and puts the current efforts into context. Objectives for elephant conservation are articulated in the EMP with clear goals identified. The monitoring plans have scientifically sound methodologies. While it is recognized that Zimbabwe does not currently have sufficient resources to fully implement the EMP, it has identified priority areas that have been established and are being implemented. To date ZPWMA appears to have established a strong mechanism for national elephant management and have documented that identified targets and measurables are being achieved in a manner to enable elephant sport-hunting that benefits the survival of African elephants in Zimbabwe from January 21, 2016, to present and is making an effort to make progress toward full implementation that achieves further benefits for elephants from sport-hunting going forward. Based on the information currently available to the Service, we have confidence that these efforts will continue in 2017 and 2018.

Evaluating the information provided by the Zimbabwe government and other sources, it appears that the elephant hunting program in Zimbabwe will address the concerns that were identified by the Service in our previous findings. Therefore, the management of elephants in Zimbabwe contributes to the on-going survival of the species.

Provided that the off-take of elephants continues to be monitored and the actions identified in the EMP be implemented, and that effective measures are taken to limit the illegal offtake of

elephants from poaching and offtake due to conflict with people, the participation of U.S. hunters in elephant hunts would provide an indirect benefit to wild populations by helping to support the ongoing management of the species. Therefore, based on the information available to the Service, the probable direct and indirect effect that issuing an import permit for a legally hunted elephants would have on the species would be a net positive.

17.32(a)(2)(iii): Whether the permit, if issued, would in any way, directly or indirectly, conflict with any known program intended to enhance the survival probabilities of the population from which the wildlife sought to be covered by the permit was or would be removed:

As stated above, Zimbabwe is monitoring and controlling the harvest of elephants through the EMP. The issuance of import permits for elephants legally hunted in Zimbabwe would not conflict with any programs intended to enhance the survival probability of the species in Zimbabwe. As with all aspects of an adaptive management approach to managing a species, the Service will continue to monitor the effectiveness of the hunting program to ensure that it continues to provide the stated benefits to elephants.

Therefore, based on the information available to the Service, the issuance of import permits for legally hunted elephants would not conflict with any known conservation programs.

17.32(a)(2)(iv): Whether the purpose for which the permit is required would be likely to reduce the threat of extinction facing the species of wildlife sought to be covered by the permit:

In some parts of Zimbabwe, elephant populations remain robust. In three of the four primary areas where elephants are found, population numbers exceed the desired density established by stakeholders in the EMP and resulting in significant modification of plant communities. A major component of the EMP is to manage elephant populations at a level that supports the biodiversity of the habitat and associated wildlife, as well as address poaching issues that have been a significant issue in the recent past. As identified in the EMP, with increased monitoring and oversight of elephant management efforts at both the national and regional level, the legal hunting activities that U.S. hunters would be involved in would contribute to reducing the threat of extinction of elephants by supporting ongoing management efforts. This legal hunting off-take must be evaluated in light of other off-takes, including poaching, to ensure that populations of elephants, particularly in the Sebungwe, are adequately maintained.

Therefore, based on the information available to the Service, the purposes for which import permits would be issued would likely reduce the threat of extinction facing elephants in Zimbabwe.

17.32(a)(2)(v): The opinions or views of scientists or other persons or organizations having expertise concerning the wildlife or other matters germane to the application:

Based on our review of comments provided to the Service since our 2014 finding, as well as information obtained through personal conversations and literature, there is a general agreement

that hunting, done properly and well managed, would not have an adverse effect on elephant populations. Researchers and others with substantial knowledge of elephant management have stated that, whether or not they support hunting in general, they see that benefits can be had through a scientifically based hunting program for elephants.

The IUCN Guiding Principles on Trophy Hunting as a Tool for Creating Conservation Incentives (Ver.1.0, August 2012) state that well-managed trophy hunting can "assist in furthering conservation objectives by creating the revenue and economic incentives for the management and conservation of the target species and its habitat, as well as supporting local livelihoods" and, further, that well-managed trophy hunting is "often a higher value, lower impact land use than alternatives such as agriculture or tourism." Lindsey et al. (2007), in their paper on the economic and conservation significance of the trophy hunting industry in sub-Saharan Africa, state their belief that, from a conservation perspective, "the provision of incentives which promote wildlife as a land use is the single most important contribution of the trophy hunting industry." In addition, they note that trophy hunting generates revenues in areas where alternatives, such as ecotourism, may not be viable. More recently, Di Minin et al. (2016) assert that trophy hunting "strongly contributes" to conservation in sub-Saharan Africa, where large areas currently allocated to use for trophy hunting support important biodiversity. They also note that, if revenue cannot be generated from trophy hunting, these natural habitats will be converted to other forms of land use. While recognizing that the degree to which trophy hunting contributes to conservation is a subject of debate, Mallon (2013), in his report on trophy hunting of CITES-listed species in Central Asia, states that "well-run hunting concessions have an economic interest in maintaining the resource (*i.e.*, conserving the species) so will also aim to manage the area to conserve high-quality habitat that supports high numbers of the hunting species, and also to prevent unregulated use by others (poaching, overgrazing)." Naidoo et al. (2015) describe the complementary benefits of tourism and hunting to communal conservancies in Namibia.

We have reviewed a number of comments from NGOs and the public opposing hunting any elephants. This opposition, however, is primarily based on the perceived ethics of hunting. While these comments are an indication of concerns from some members of the public over hunting, they are not germane to our review process.

Therefore, based on the information available to the Service, there is sufficient support by scientists and other persons or organizations having expertise that the well-managed, legal harvest of elephants, and the subsequent import of these trophies, would not have an adverse effect on the species, but can further efforts to conserve the species in the wild.

17.32(a)(2)(vi): Whether the expertise, facilities, or other resources available to the applicant appear adequate to successfully accomplish the objectives stated in the application:

Based on our understanding of the hunting program within Zimbabwe, U.S. hunters must be accompanied by a professional hunter on land that is being managed either by the landowner, concessionaire or representatives of the communal land where the hunt occurs. Although the U.S. may not have the expertise to ensure adequate and proper management of elephants on that

land, the professionals associated with the hunt have the expertise and resources to successfully accomplish the management goals of the EMP. Along with oversight established by the ZWPMA, there are expertise and facilities available to U.S. hunters to accomplish the stated objective of their application that the killing of an elephant in Zimbabwe whose trophy is intended for import into the United States would enhance the survival of the species in the wild. Therefore, based on the information available to the Service, that applicants that are hunting on properly permitted reserves that carry out their management practices in accordance with national and provincial regulations, have the expertise, facilities, or other resources available to them to successfully accomplish the objective their application; i.e., the long-term survival of elephants in Zimbabwe. In its evaluation of each application, the Service will further ensure that this criterion, along with the other criteria, is met by each applicant before issuing an import permit.

Given the significant amount of information that has been presented to the Service over the last three years, it can be difficult to clearly see how efforts in Zimbabwe since the 2015 finding have resulted in a clear improvement in the overall management of elephants to the point that the importation of elephant trophies by U.S. hunters would enhance the propagation or survival of the species. Therefore, the following comparison table is being provided to summarize the improvements and where we hope to see additional progress, as discussed more fully above.

Issue	2015 Finding	Present Finding
Management Plan	Zimbabwe's elephant management plan consisted of two primary documents drafted in 1996 and 1997. Although the documents provided a well-developed list of goals and objectives, there was no information on whether these goals and objectives had been met or could be met. Statements from ZPWMA that the plans were outdated and needed to be revised supported this view. In December 2014, ZPWMA hosted a workshop to review Zimbabwe's Elephant Conservation Policy and Management Plan. The workshop participants agreed on a framework for the revised management plan with the same long-term vision of the 1997 plan, similar target goals, and the beginnings of strategic objectives and outputs, as well as some key activities. However, there was insufficient time at the workshop to complete the revised plan. At the	On January 21, 2016, Zimbabwe adopted the Zimbabwe National Elephant Management Plan (EMP) that replaced The Policy and Plan for Elephant Management in Zimbabwe (1997) and Elephant Management in Zimbabwe, third edition (July 1996). The EMP incorporates an adaptive management framework with higher-level targets, with key components, strategic objectives, and outputs. Each key component has management actions that can be measured and verified through "Key Performance Indicators." A set deadline for each action was identified. These measurables allow ZPWMA to monitor the success of the new management plan and, through an adaptive management approach, address newly emerging concerns and long-term management needs. The EMP addresses the challenges identified by the 2014 workshop participants and concerns identified by the Service about the

	time of the 2015 finding, the work had not been completed and the plan had not been adopted by the Zimbabwe government.	previous management plans. The EMP was developed as an outcome of several national and regional workshops that included government officials, NGOs, Rural community leaders, and safari outfitters and landowners.
Population Status	In the 2014 findings, the Service found that Zimbabwe did not have adequate data to determine the elephant population levels in the four primary elephant areas. In 2014, the Pan African Elephant Aerial Survey was conducted in Zimbabwe and preliminary findings reported a preliminary estimate of between 82,000 and 83,000 elephants. This represented a 6% decline since 2001 surveys. The 2015 finding concluded that if a better elephant baseline population abundance estimate were to be used as part of a revised national management plan to assess future off-take quotas, management efforts, and anti-poaching activities, that Zimbabwe could establish scientifically defensible hunting quotas. If this were done, the Service would have a better basis to re-evaluate our determination not to authorize elephant trophy imports.	The 2014 Pan African Elephant Aerial Survey, available in 2015, provided ZPWMA with a better elephant baseline population abundance estimate to assess future off-take quotas, management efforts, and anti-poaching activities. Confirmed results from the GEC reported an estimate for elephant abundance in Zimbabwe to be 82,304 individuals (73,715-90,893), with a total carcass ratio of 7.8%. While this represented a 6% decline in the 2001 population estimate, the estimate is based on more accurate and more recent survey data then was available to Zimbabwe previously. The IUCN AfESG African Elephant Status Report – 2016 estimated Zimbabwe's elephant population at 82,630 ± 8,589 across a range of 81,228 km^2. The results of the 2014 GEC, and subsequent survey data reported in the 2016 AfESG report, being utilized in the EMP and quota setting, is more reliable and provide a better basis for establishing management priorities than previous surveys and guesses.
Regulation and Enforcement	The 2015 finding confirmed that the Zimbabwe laws and regulations in place to address elephant	As identified in the 2015 finding, the Service still finds that if properly implemented, the ZPWMA regulatory

	management are sufficient provided they were appropriately implemented, but it was not clear if or to what extent ZPWMA was able to successfully implement them. While the Parks and Wild Life Conservation Fund provides for financing wildlife operations directly from revenues generated through wildlife related activities, no other government funding was provided, and only limited outside funding from NGOs or other governments appeared to be available. Therefore, appropriate utilization of funds was necessary. The Service concluded that proper accounting mechanisms need to be in place to document hunting revenue and how it was being used to support elephant conservation efforts. While ZPWMA stated that elephant hunting contributes in excess of US$14 million annually and that approximately 30% of ZPWMA's revenue was from hunting, we did not have adequate information about how much money is generated by elephant hunting, particularly from U.S. hunters, how these funds are distributed, or how these funds impact the ability of ZPWMA. Both of the Elephant Trade Information System (ETIS) reports at the 15th and 16th Meetings of the Conference of the Parties to CITES expressed concerns about Zimbabwe, specifically regarding illicit ivory trade. The reports noted the existence of organized criminal activities within Zimbabwe, including reports of the involvement	mechanisms for managing elephants appears to be adequate. The key issue in the 2015 finding was whether there is an adequate mechanism in place to reliably document the financial benefits US hunters are providing for elephant conservation to demonstrate that U.S. hunters, through their participation in the hunting program, contribute funds to address management needs of the species, and that the funds were utilized in a meaningful manner. Since the 2015 finding, the Service has received information regarding the Tourism Receipts Accounting System (TRAS) and its web-based system (TRAS2) under which the Reserve Bank of Zimbabwe, in collaboration with relevant stakeholders, can now track all revenue generated through hunting activities. Under this system, all authorized hunts are now being registered allowing for the capture of hunting data, such as the origin of clients, value of trophies and hunts, and area hunted, to monitor hunting quota utilization and track hunted trophies. This system will provide data that was not previously easily obtained and, presumably, greatly improve the tracking of hunting revenue. One concern expressed by the Service in its previous findings was whether ZPWMA was responding to the apparent poaching crisis facing Zimbabwe. Based on communication from ZPWMA, as well as information received from other sources, ZPWMA has also stepped up its anti-poaching nationally by adopting a number of "Urgent Measures". As shown in the July 2015 Response, most of ZPWMA's budget (77%) is allocated for staff costs and patrol provisions.

	of politicians, military personnel, and Chinese nationals in illicit wildlife trade. The CoP15 report stated that the law enforcement effort ratio within the three countries grouped for the analysis had dropped to 40%, a decline of 4% from the CoP14 analysis, and was attributed to the situation in Zimbabwe. The CoP16 report indicated that Governance indicators were mixed, with a much lower than average World Bank "rule of law" score, again contributed to Zimbabwe. The Service received several statements from Zimbabwean safari outfitters that stated that the large number of US hunters in Zimbabwe were a major deterrent to poaching. However, the Service was not provided any evidence to support this statement. The 2015 finding did recognize, however, that it was possible the various meetings and workshops that occurred in December 2014 and in 2015 might lead to a clearer understanding of funding levels and the utilization of ZPWMA revenue or result in improved mechanisms for demonstrating that U.S. hunters, through their participation in the hunting program, contribute funds to address management needs of the species, and that the funds were utilized in a meaningful manner.	These expenditures reportedly fund anti-poaching efforts throughout the elephant range. ZPWMA reportedly has a staff of 1,504 active field rangers and has stated that there is an intent to increase this number. According to "The Zimbabwe National Elephant Supplementary Management Plan (2015-2020)", over 80% of spending under the new EMP has been on law enforcement (anti-poaching) and training, with law enforcement identified as the top priority going forward. With the adoption of the EMP in January 2016, it appears that ZPWMA has the mechanism to successfully implement these laws and regulations. Moreover, ZPWMA has a mechanism in place to monitor the effects of the EMP and adapt to changing environmental and social factors that would adversely affect elephant populations within Zimbabwe. The "Report on the Elephant Trade Information System (ETIS)" (CoP17 Doc. 57.6) reflected that there were some improvements in Zimbabwe. As in the previous report, the document grouped Botswana, Namibia, and Zimbabwe together in terms of their level of government oversight and capacity. These countries regularly report data to ETIS. In terms of all data that implicate these countries in an ivory seizure, this southern African grouping reflects middle range values in terms of mean number of seizures and the mean weight of ivory seized. The measure for assessing the presence of organized crime stands at zero which, according to the document, is indisputably a good sign. Governance indicators are mixed, however, with the rule of law score

		problematic and suggesting the presence of corruption, but the relatively high law enforcement ratio partially mitigates that concern. As reported in earlier ETIS reports, Zimbabwe was the country that pulls the rule of law score down, indicating far greater governance challenges exist in that country than others in the group.
Sustainable Utilization	According to the information provided for the 2015 finding, Zimbabwe had established hunting quotas for all areas of the country. However, the Service did not receive adequate information regarding offtake, including how hunting quotas were established and whether other forms of offtake, such as poaching and problem animal control, were taken into account in establishing these quotas. Further, the Service had limited information to what extent biological factors are taken into consideration (as opposed to economic and societal considerations). While there was information that supported ZPWMA statements that the full quota is not actually met each year, we did not get complete information on how many trophies were taken annually. At the time the Service made its finding in 2015, we determined that without more definitive population data, it was difficult to determine whether these numbers, combined with other offtake, was sustainable. We had fundamental questions regarding how the number of elephants to be hunted in an area is decided. In addition to questions about how the overall offtake is	According to the information provided to the Service in late 2014 and 2015, Zimbabwe had established hunting quotas for all areas of the country. However, it was not until late 2015 and 2016 that the Service received more specific information on how these quotas are established, including how other forms of offtake, such as poaching and problem animal control, were taken into account. Further, it was not until the EMP was signed into on January 21, 2016, that the Service had confidence that ZWPMA had in place effective mechanisms to ensure long-term sustainability of its elephant population. For 2016 and 2017, Zimbabwe established the same annual export quota of 500 elephants and reported that quota to the CITES Secretariat. While the Service will request clarification before making a finding for the 2019 hunting season as to why Zimbabwe maintains the same voluntary export quota as it has since 2004, given the improved population data now available to Zimbabwe and the revised management plan that specifically recognizes the use of population data when establishing quotas, there is now clear information that Zimbabwe has not reached this export quota in the past and is unlikely to do so in the future given the current

	determined, we also had not received an adequate explanation on how the quota is allocated geographically.	management efforts. According to ZPWMA, quotas established before the EMP were set to maximize the sustainable production of high-quality trophies without detriment to the population. With the establishment of the EMP, there is a more systematic, scientific approach to establish national quotas. While ZPWMA still currently starts with the quota of 500 elephants, they are not immediately dividing this quota between all of the hunting areas. Instead, they are taking into consideration the results of the 2014 survey and subsequent surveys, results from research efforts, the size of the hunting area in relation to elephant habitat requirements, illegal off-take and other forms of off-take, how the hunting areas are managed in relation to land use or fencing, human-wildlife conflicts that have occurred previously, and recommended sustainable off-take levels developed based on ecological assessments of the hunting area. This information is then further evaluated in light of other species within the hunting area, past elephant trophy quality, and community benefits of proposed harvests.
Revenue Utilization by rural communities	Based on information the Service had when making its previous findings, CAMPFIRE has provided conservation benefits in the past and improved tolerance of wildlife in rural communities. However, the program has come under criticism relating to excessive retention of generated funds by district councils, resulting in diminished benefits to communities and elephants. While sport hunting may be an important tool that gives these communities a stake in sustainable management of	Since our findings in 2014 and 2015, CAMPFIRE has provided more information on how their programs support the conservation of elephants and provide benefits to and promote greater tolerance of wildlife in rural communities, including new efforts to improve the effectiveness of CAMPFIRE and new revenue sharing guidelines. An overarching analysis of CAMPFIRE, supported by a grant of 12 million Euros from the EU, is currently being conducted and is scheduled to be completed by the end of 2017. While

	the elephant as a natural and economic resource and offsets the costs of conflict with wildlife, without current information on how funds are utilized and the basis for hunting off-takes, the Service was unable to confirm whether revenue generated through sport hunting actually provided an incentive to local communities to conserve elephants.	this review is still under way and the Service has not received any information on the potential outcome of the review, more information has been provided to the Service regarding how funds are utilized and the basis for hunting off-takes.
Local conservation efforts	As was stated in the 2014 finding, the Service acknowledged that there were "bright spots" regarding elephant conservation efforts, particularly those carried out by non-governmental entities that are providing a benefit to elephants in some areas. We had received statements from several sources that emphasized the economic impact of the suspension to local conservation efforts being carried out by individual landowners and leaseholders, safari outfitters, and conservancies. In our 2015 finding, the Service recognized that effective conservation work is being carried out in some independently managed areas; however, it was unknown whether and to what extent these individuals would reduce their conservation efforts based on the inability of U.S. hunters to import a sport-hunted trophy. In addition, the information available to the Service on the conservation work being carried out by non-governmental entities was limited, and is not the norm for Zimbabwe as a whole. The Service recognized that without support from the Central Government and Rural District Councils, these efforts were not likely to be successful or to	Since our 2014 and 2015 findings, there are strong indications that the efforts of private landowners and consortiums to manage elephants within their areas of control have received greater support from ZWPMA and the Zimbabwe government. The Parks and Wildlife Act Chapter 20:14 devolved authority to manage and benefit from wildlife on communal and private lands to the landholders. There now appears to be a greater effort on the part of ZPWMA to work with NGOs, landowners, and safari area concessionaires to improve elephant management and anti-poaching efforts. According to their July 2015 response to the Service, and supported by the report on the implementation of the EMP, ZPWMA is engaging private players in co-management in some areas and entering into long-term lease agreements (10-25 years) to manage some protected areas. In certain areas, ZPWMA is reportedly collaborating with safari operators; in others, they collaborate with non-profits, such as the Tashinga Initiative in the Zambezi Valley and WWF in the Hwange-Sanyati Biological Corridor. There is increased support from the Central Government and Rural District Councils to expand and support local conservation efforts and there is evidence that local conservation efforts

	compensate for the management deficiencies described above.	are meeting management deficiencies that were identified previously by the Service.

Conclusion:

The issue before us, in accordance with the 4(d) rule for African elephants, is whether the killing of a trophy animal in Zimbabwe would enhance the survival of the species. In short, as previously explained, the Service is assessing whether Zimbabwe has sufficient numbers of elephants to support a hunting program, if the country has a management plan and adequate laws and regulations to effectively implement a hunting program, and if the participation of U.S. hunters in the program provides a clear benefit to the species to meet the requirements for the import of sport-hunted trophies under paragraph 17.40(e)(6)(i)(B).

Since our 2014 and 2015 findings, Zimbabwe has carried out a number of actions at the national level and in collaboration with regional and local communities and interested partners on the ground that together demonstrate a clear interest in and concrete efforts toward establishing a better management regime and providing greater support for conservation efforts to enable elephant sport hunting that provides a clear benefit to the survival of African elephants in Zimbabwe.

Importantly, on January 21, 2016, Zimbabwe adopted the National Elephant Management Plan, with regional components, to more effectively monitor and evaluate elephant populations and management. The National Elephant Management Plan has clear objectives, action items, and measurables to facilitate a more systematic management regime than was previously established in Zimbabwe. Further, ZWPMA has demonstrated through recent reports that the effort to implement the EMP, while somewhat constrained due to limited resources, is being implemented. There is no doubt that efforts must continue in implementing the EMP to ensure adequate management of elephants in each of the four regions within Zimbabwe, but to date ZPWMA appears to have established a strong mechanism for national elephant management and has documented that identified targets and measurables are being achieved in a manner to enable elephant sport hunting that benefits the survival of African elephants in Zimbabwe now and is making an effort to make progress toward full implementation that achieves further benefits for elephants from sport hunting going forward.

The Pan African Elephant Aerial Survey that was conducted in Zimbabwe in 2014, although it utilized the same methodology used by Zimbabwe since the 1960s, did provide ZPWMA with a better elephant baseline population abundance estimate to assess future off-take quotas, management efforts, and anti-poaching activities. ZPWMA has demonstrated it is incorporating these data for these purposes through the EMP. Having up to date information and population estimates was a critical first step in the process of establishing scientifically defensible hunting

quotas.

While ZPWMA had established hunting quotas for all areas of the country in the past, it was not until late 2015 and 2016 with the implementation of the EMP, that the Service received more specific information on how these quotas are established, including how other forms of offtake, such as poaching and problem animal control, were taken into account. Further, it was not until the EMP that the Service could have confidence that ZWPMA had in place effective mechanisms to establish scientifically based hunting quotas that took into consideration other forms of off-take to ensure the sustainable utilization of their elephant population.

Since our findings in 2014 and 2015, CAMPFIRE has provided significantly more information on how their programs support the conservation of elephants and provide benefits to and promote greater tolerance of wildlife in rural communities. While the program has come under criticism in recent years relating to excessive retention of generated funds by district councils and diminished benefits to communities and elephants, strides are being taken to address these concerns. An overarching analysis of CAMPFIRE, supported by a grant of 12 million Euros from the EU, is currently being conducted and is scheduled to be completed by the end of 2017. While the Service has not received any information on the potential outcome of the review, significantly more information has been provided to the Service in regard to how funds are utilized and the basis for hunting off-takes.

As stated in the previous findings, there have been "bright spots" regarding elephant conservation efforts, particularly those carried out by non-governmental entities that are providing a benefit to elephants. Since our 2014 and 2015 findings, there appear to be strong indications that the efforts of private landowners and consortiums to management elephants within their areas of control have received greater support from ZWPMA and the Zimbabwe government. There is increased support from the Central Government and Rural District Councils to expand and support local conservation efforts and evidence that local conservation efforts are meeting management deficiencies that were identified previously by the Service.

Further Actions:

The Service currently has a number of applications pending for the import of elephant trophies taken in Zimbabwe in 2016 and for import of elephant trophies taken or to be taken in 2017 and 2018. Based on the Service's determination, applications for permits currently pending before the Service for import of trophies taken in Zimbabwe on or after January 21, 2016 and on or before December 31, 2018, will be considered to have met the enhancement requirement. The Service will complete its review of each application to determine whether they meet all other applicable permitting requirements, and if so, issue the required import permit. In order to assist the Service in its ongoing efforts to assess whether imports of elephant trophies may meet the enhancement requirement in 2019 and beyond, the Service will send a letter to ZPWMA requesting the following information:

- An up-to-date report on the progress that has been made implementing the Zimbabwe

Elephant Management Plan (2015-2020), including the status of each action item identified in the plan and progress on meeting the goals of that action.

- A report generated through the TRAS2 system identifying hunting revenue for 2016 and 2017, and to the extent available, 2018. In addition, an accounting of the funds generated by each of the US hunters who hunted elephants in 2016 and 2017, and up to date in 2018 that a letter is sent requesting the report. This accounting should be broken down by hunter (hunter's name would be redacted) and should include money provided to ZPWMA, CAMPFIRE, or other agencies. (A similar report will be requested from each hunter for comparison).

- Annual reports on implementation of the elephant plan, including budgets allocated for elephant management and specific activities undertaken for anti-poaching and reduction of human-elephant conflict.

- Additional information on elephant distribution and population trends with respect to land custodianship/land use.

- An explanation of how Zimbabwe sets its voluntary CITES export quota each year and why is has been consistently 500 elephants between 2004 and 2017. Further, if this export quota remains the same for 2018, an explanation for this continuation in 2018.

- Specific information on the 2017 quota set for each of the four major elephant populations and how the quota was distributed between communal areas, concession, and safari companies. In addition, information on the quota set for the 2018 hunting season and any explanation on why it was maintained/decreased/ increased.

- Information on the continued cooperation and coordination between ZWPMA, CAMPFIRE, landowners, safari outfitters, and NGOs to implement continued conservation benefits for elephants in Zimbabwe.

Further, the Service will be requesting a copy of the EU funding review of CAMPFIRE that will reportedly be finalized by the end of 2017.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
International Affairs
5275 Leesburg Pike, MS: IA
Falls Church, VA 22041-3803

In Reply Refer To:
FWS/AIA/DMA

OCT 11 2017

Memorandum

To: The File

From: Chief, Branch of Permits

Subject: Enhancement Finding for Lions Taken as Sport-hunted Trophies in Zimbabwe during 2016, 2017 and 2018

After evaluating the available information from the Government of Zimbabwe, other information available to the U.S. Fish and Wildlife Service (Service), and comments received from interested parties, the Service has determined that permits for the importation of sport-hunted trophies of wild lions (*Panthera leo melanochaita*), which are threatened under the Endangered Species Act (ESA), taken in Zimbabwe during the 2016, 2017, and 2018 calendar years **meet** the enhancement criteria under the Service's regulations at 50 CFR 17.32. Therefore, applications received for import of such specimens will be considered to have met this requirement. In accordance with the 4(d) rule for *P. l. melanochaita*, 50 CFR 17.40(r), the Service will review each application for import of such specimens on a case-by-case basis and each application will also need to meet all other applicable permitting requirements before it may be authorized. The Service will reassess the situation in Zimbabwe towards the end of the 2018 season to determine if hunts conducted in 2019 and beyond continue to meet the enhancement criteria under 50 CFR 17.32.

Governance of the Lion in the United States:

On October 29, 2014, the Service published in the Federal Register a finding that listing the African lion subspecies (*Panthera leo leo*) as a threatened species under the ESA was warranted and proposed a rule under section 4(d) of the ESA to provide conservation measures for the African lion. 79 Fed. Reg. 64472. On December 23, 2015, after fully considering the comments from the public and the peer reviewers on the proposed rule, the Service published in the Federal Register the final rule in which the taxonomic classification of the Asiatic lion (previously classified as *P. l. persica* and listed as an endangered species under the ESA) was changed to *P. l. leo* (Asia and western, central and northern Africa) and listed as an endangered species, and the *P. l. melanochaita* (southern and eastern Africa) subspecies was listed as a threatened species with a rule under section 4(d) of the ESA, which is set forth at 50 CFR 17.40(r) (USFWS 2015; 80 Fed. Reg. 79999). The effective date of this listing is January 22, 2016. Therefore, as of January 22, 2016, the lion

subspecies *Panthera leo melanochaita*, whose range includes Zimbabwe, is listed as threatened under the ESA and is regulated under an ESA section 4(d) special rule [50 CFR 17.40(r)].

Section 9 of the ESA and our implementing regulations at 50 CFR 17.21 and 50 CFR 17.31 set forth a series of general prohibitions that apply to all endangered and threatened wildlife, respectively, except where a 4(d) rule applies to threatened wildlife, in which case the 4(d) rule contains all the applicable prohibitions and exceptions. Under the 4(d) rule for *P. l. melanochaita*, all of the prohibitions under 50 CFR 17.31 apply to *P. l. melanochaita* specimens. These prohibitions, at 50 CFR 17.21 and 17.31, in part, make it illegal for any person subject to the jurisdiction of the United States to "take" (includes harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or to attempt any of these) within the United States or upon the high seas; import or export; deliver, receive, carry, transport, or ship in interstate or foreign commerce, by any means whatsoever, in the course of commercial activity; or sell or offer for sale in interstate or foreign commerce any lion specimens. It also is illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken in violation of the ESA. Permits may be issued to carry out otherwise prohibited activities involving endangered and threatened wildlife species under certain circumstances. Regulations governing permits for endangered species, such as *P. l. leo*, are codified at 50 CFR 17.22. Regulations governing permits for threatened species, such as *P. l. melanochaita*, are codified at 50 CFR 17.32.

In sum, under paragraph 50 CFR 17.40(r)(1), all the prohibitions and exceptions under 50 CFR 17.31 and 50 CFR 17.32 apply to *P. l. melanochaita*. Accordingly, the Service may authorize the import of a sport-hunted lion trophy from Zimbabwe, but only if it first makes a finding that permitting the import of a trophy would enhance the survival of the species in the wild.

As we explained when finalizing the 4(d) rule for *P. l. melanochaita*, any person wishing to conduct an otherwise prohibited activity, including all imports of *P. l. melanochaita* specimens, must first obtain a permit under 50 CFR 17.32. As with all permit applications submitted under 50 CFR 17.32, the individual requesting authorization to import a sport-hunted trophy of *P. l. melanochaita* bears the burden of providing information in their application showing that the activity meets the requirements for issuance criteria under 50 CFR 17.32. In some cases, such as for import of sport-hunted trophies, it is not always possible for the applicant to provide all of the necessary information needed by the Service to make a positive determination under the ESA to authorize the activity. In such cases, the Service may consult with the range country and other interested parties to the extent practicable to obtain necessary information. The Service has the discretion to make the required findings on sport-hunted trophy imports of *P. l. melanochaita* on a countrywide basis, although individual import permits will be evaluated and issued or denied for each application. While the Service may make enhancement findings for sport-hunted trophy imports of *P. l. melanochaita* on a countrywide basis, the Service encourages the submission of information from individual applicants. We rely on the information available to the Service and may rely on information from sources other than the applicant when making a permitting decision.

General considerations:

As we also explained when finalizing the 4(d) rule, our threatened species permitting regulations at 50 CFR 17.32 provide issuance criteria for threatened species permits (50 CFR 17.32(a)(2)) , but do not specify what would constitute the enhancement of propagation or survival with regard to authorizing the import of parts or products of *P. l. melanochaita,* including sport-hunted trophies.

Therefore, when making a determination of whether an otherwise prohibited activity enhances the propagation or survival of *P. l. melanochaita,* the Service examines the overall conservation and management of the subspecies in the country where the specimen originated and whether that management of the subspecies addresses the threats to the subspecies (*i.e.,* that it is based on sound scientific principles and that the management program is actively addressing the current and longer term threats to the subspecies). In that review, we evaluate whether the import contributes to the overall conservation of the species by considering whether the biological, social, and economic aspects of a program from which the specimen was obtained provide a net benefit to the subspecies and its ecosystem.

The Service will evaluate any application received that involves *P. l. melanochaita* in the context of enhancement of propagation or survival permitting in accordance with our threatened species permitting regulations at 50 CFR 17.32 and issuance criteria for threatened species permits (50 CFR 17.32(a)(2)). These include, in addition to the general permitting criteria in 50 CFR 13.21(b):

(i) Whether the purpose for which the permit is required is adequate to justify removing from the wild or otherwise changing the status of the wildlife sought to be covered by the permit;

(ii) The probable direct and indirect effect that issuing the permit would have on the wild populations of the wildlife sought to be covered by the permit;

(iii) Whether the permit, if issued, would in any way, directly or indirectly, conflict with any known program intended to enhance the survival probabilities of the population from which the wildlife sought to be covered by the permit was or would be removed;

(iv) Whether the purpose for which the permit is required would be likely to reduce the threat of extinction facing the species of wildlife sought to be covered by the permit;

(v) The opinions or views of scientists or other persons or organizations having expertise concerning the wildlife or other matters germane to the application; and

(vi) Whether the expertise, facilities, or other resources available to the applicant appear adequate to successfully accomplish the objectives stated in the application.

In addition to these factors, particularly in relation to sport hunting, we find the *IUCN Species Survival Commission (SSC) Guiding Principles on Trophy Hunting as a Tool for Creating Conservation Incentives, Ver. 1.0* (IUCN SSC 2012), to provide useful principles, which, considered in conjunction with our threatened species issuance criteria, will aid the Service when making an enhancement finding for importation of sport-hunted trophies of *P. l. melanochaita.* This document sets out guidance from experts in the field on the use of trophy hunting as a tool for "creating incentives for the conservation of species and their habitats and for the equitable sharing of the benefits of use of natural resources" (IUCN SSC 2012, p. 2) and recognizes that recreational hunting, particularly trophy hunting, can contribute to biodiversity conservation and more specifically, the conservation of the hunted species.

The SSC document lays out five guiding principles that, considered in conjunction with our threatened species issuance criteria, will aid the Service when making an enhancement finding for importation of sport-hunted trophies of *P. l. melanochaita:*

(a) *Biological sustainability:* The hunting program cannot contribute to the long-term decline of the hunted species. It should not alter natural selection and ecological function of the hunted species or any other species that share the habitat. The program should not inadvertently facilitate poaching or illegal trade in wildlife by acting as a cover for such illegal activities. The hunting program should also not manipulate the ecosystem or its component elements in a way that alters the native biodiversity.

(b) *Net Conservation Benefit:* The biologically sustainable hunting program should be based on laws, regulations, and scientifically based quotas, established with local input, that are transparent and periodically reviewed. The program should produce income, employment, and other benefits to create incentives for reducing the pressure on the target species. The program should create benefits for local residents to co-exist with the target species and other species. It is also imperative that the program is part of a legally recognized governance system that supports conservation.

(c) *Socio-Economic-Cultural Benefit:* A well-managed hunting program can serve as a conservation tool when it respects the local cultural values and practices. It should be accepted by most members of the community, involving and benefiting local residents in an equitable manner. The program should also adopt business practices that promote long-term economic sustainability.

(d) *Adaptive Management: Planning, Monitoring, and Reporting:* Hunting can enhance the species when it is based on appropriate resource assessments and monitoring (*e.g.*, population counts, trend data), upon which specific science-based quotas and hunting programs can be established. Resource assessments should be objective, well documented, and use the best science available. Adaptive management of quotas and programs based on the results of resource assessments and monitoring is essential. The program should monitor hunting activities to ensure that quotas and sex/age restrictions of harvested animals are met. The program should also generate reliable documentation of its biological sustainability and conservation benefits.

(e) *Accountable and Effective Governance:* A biologically sustainable trophy-hunting program should be subject to a governance structure that clearly allocates management responsibilities. The program should account for revenues in a transparent manner and distribute net revenues to conservation and community beneficiaries according to properly agreed decisions. All necessary steps to eliminate corruption should be taken and to ensure compliance with all relevant national and international requirements and regulations by relevant bodies such as administrators, regulators and hunters.

This approach to enhancement findings for the importation of sport-hunted trophies of *P. l. melanochaita* is consistent with the purpose and intent of the Endangered Species Act. As such, before the Service will authorize the importation of a sport-hunted trophy, we must determine that the trophy-hunting program is managed to ensure the long-term survival of the species. As part of this evaluation, we recognize that in many parts of the world, wildlife exists outside of protected areas and must share the same habitat and compete with humans living in these areas for space and resources. As identified in the *IUCN SSC Guiding Principle on Trophy Hunting as a Tool for Creating Conservation Incentives*, if communities that share these resources with wildlife do not

perceive any benefits from the presence of wildlife, they may be less willing to tolerate the wildlife. However, under certain circumstances, trophy hunting can address this problem by making wildlife more valuable to the local communities and encourage community support for managing and conserving the hunted species, as well as other species.

When evaluating whether the importation of a trophy of *P. l. melanochaita* would be authorized pursuant to 50 CFR 17.32, in accordance with our threatened species issuance criteria, we will examine how a country's management program for lions addresses the three main threats that have led to the decline of the subspecies: habitat loss, loss of prey base, and human-lion conflict. When examining a management program and whether trophies taken as part of that program meet the issuance criteria, we study a number of factors. Some of the factors we consider include whether the program is based on sound scientific information and identifies mechanisms that would arrest the loss of habitat or increase available habitat (*i.e.*, by establishing protected areas and ensuring adequate protection from human encroachment). We consider whether the management program actively addresses the loss of the lion's prey base by addressing poaching or unsustainable offtake within the country. A component of a management plan from which trophy imports would meet the issuance criteria would be whether there are government incentives in place that encourage habitat protection by private landowners and communities and incentives to local communities to reduce the incursion of livestock into protected areas or to actively manage livestock to reduce conflicts with lions. We examine if the hunting component of the management program supports all of these efforts by looking at whether hunting concessions/tracts are managed to ensure the long-term survival of the lion, its prey base, and habitat. Hunting, if properly conducted and well managed, can generate significant economic benefits that may contribute to the conservation of lions. In looking at whether we are able to authorize the import of a trophy under the issuance criteria of 50 CFR 17.32, we will examine if the trophy hunting provides financial assistance to the wildlife department to carry out elements of the management program and if there is a compensation scheme or other incentives to benefit local communities that may be impacted by lion predation. We will also consider how a U.S. hunter's participation in the hunting program contributes to the overall management of lions within a country.

Management programs for *P. l. melanochaita* are expected to address, but are not limited to, evaluating population levels and trends; the biological needs of the species; quotas; management practices; legal protection; local community involvement; and use of hunting fees for conservation. In evaluating these factors, we will work closely with the range countries and interested parties to obtain the information. By allowing entry into the United States of *P. l. melanochaita* trophies from range countries that have science-based management programs, we anticipate that other range countries would be encouraged to adopt and financially support the sustainable management of lions that benefits both the species and local communities. In addition to addressing the biological needs of the subspecies, a scientifically based management program would provide economic incentives for local communities to protect and expand *P. l. melanochaita* habitat.

Basis for Finding for Lions in Zimbabwe:

On February 1, 2016, the Service sent a letter to the Parks and Wildlife Management Authority in Zimbabwe (ZPWMA) with a list of questions related to management plans, population status, conservation, management, hunting policies, and regulations of Zimbabwe's lion populations. Additionally, in the letter the Service referenced the *IUCN Species Survival Commission (SSC)*

Guiding Principles on Trophy Hunting as a Tool for Creating Conservation Incentives, Ver. 1.0 (IUCN SSC 2012), as it provides useful principles which, when considered in conjunction with the Service's permit issuance criteria, would aid when making the required enhancement finding for permitting importation of sport-hunted lion trophies.

On February 16, 2016, the Service sent a second request to ZPWMA for specific documents related to the conservation status of lions in Zimbabwe. ZPWMA responded to the Service's request on February 17, 2016, with a copy of *Conservation Status of African Lion in Zimbabwe*, and subsequently, on November 29, 2016, provided a copy of *Enhancement and Non-detriment Finding for Lion (Panthera leo) in Zimbabwe*. The Service has also been corresponding with ZPWMA regarding African elephant management for several years. In this correspondence, ZPWMA, as well as other sources, have provided the Service with documents and information that are relevant to our evaluation of lions in Zimbabwe. These documents, along with the Service's own final rule on the lion listing under the Act, as well as other relevant information from reliable sources and contained in comments received from interested parties, were the basis of this finding.

Governance of Lions in Zimbabwe: The legal framework for Zimbabwe's regulatory mechanism is informed by the Wildlife Policy (1992), which is intended to maintain a protected area network for the conservation of the nation's wild resources and biological diversity. The Wildlife Policy (1992) provides for the Government of Zimbabwe to maintain a network of protected areas known as the Parks and Wild Life Estate, comprised of the country's National Parks, safari areas, botanical gardens, and sanctuary and recreational areas, for the conservation of the nation's wild resources and biological diversity (CITES 2016; ZPWMA 2016). It is intended to create economic activity to enhance rural development and encourages the conservation of wild animals and their habitats outside the protected areas.

ZPWMA was established by the Parks and Wildlife Act of 1996 (Chapter 20:14) [as amended by Act Number 19 of 2001] which came into operation on June 1, 2002, through Statutory Instrument 144C of 2002. The Act provides for the establishment of a Parks and Wildlife Board; establishment of national parks, botanical reserves, botanical gardens, sanctuaries, safari areas and recreational parks; and the preservation, conservation, propagation or control of wildlife, fish, and plants of Zimbabwe and the protection of her natural landscape and scenery. The Parks and Wild Life Act includes sections on virtually every aspect of ZPWMA, including requirements for annual financial audits and reporting to the central government. The Parks and Wild Life Act also provides for substantial penalties for the unlawful possession of or trading in protected wildlife species. In addition, the General Laws Amendment Act (No. 5) of 2010 provides for mandatory imprisonment for poaching.

The Parks and Wildlife Act, Chapter 20:14, devolved authority to manage and benefit from wildlife on communal and private lands to the landholders. In 1982, the legal provisions of this Act were extended to Rural District Councils (RDCs), on behalf of rural communities in communal lands whose areas contain viable populations of wildlife. Communal areas in Zimbabwe are administered by RDCs, which have become a mechanism for implementation of the government's policy of conservation by utilization of natural resources. It enables local communities to manage and benefit from wildlife resources through the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) established in 1989. CAMPFIRE was developed to encourage reduction in human-wildlife conflicts through conservation-based community development and to provide an economic incentive to improve community tolerance of wildlife, including lions. At the time, the

CAMPFIRE program was the model for community-based conservation efforts in several other African countries and was identified as an innovative program. Under a community-based conservation program, like CAMPFIRE, rural communities should benefit from revenue generated by sport hunting.

As Zimbabwe's premiere wildlife agency, the main functions of the ZPWMA are to control, manage and maintain Zimbabwe's wildlife resources and perform the service function with the primary role of protecting and conserving Zimbabwe's natural heritage for the present and future generations on behalf of the State. It also provides the cornerstone of Zimbabwe's tourism industry (ZPWMA 2015). The rationale behind the establishment of the ZPWMA was to allow for a self-funding mechanism, and thereby reduce its dependence on the national treasury. In January 1996, the Government of Zimbabwe approved the establishment of the Parks and Wild Life Conservation Fund that provides for financing wildlife operations directly from revenues generated through wildlife-related activities. The funding for ZPWMA is therefore coming from revenue generated through sport hunting conducted on state and private lands, concession leases, National Park visitor fees, and other wildlife-related fees. While there have been requests by ZPWMA for funding from the central treasury in the past, to our knowledge, no other significant government funding has been provided, and only limited outside funding from NGOs or other governments appears to be available.

A major component of ZPWMA's mandate is law enforcement. ZPWMA had 2,146 rangers at its establishment in 2002 (ZPWMA 2016); however, by the end 2015, there were 1,448 rangers in post (67% of 2002 level). Of the 1,448 rangers in post, 1,004 are deployable for anti-poaching operations (ZPWMA 2016). Hunting operators are obligated through their concession lease agreements to assist with anti-poaching efforts (ZPWMA 2016). Reportedly, USD590,000 was spent on anti-poaching efforts by Bubye Valley Conservancy (BVC) alone during 2015 (K. Leathem, pers. comm., as cited in du Preez et al. 2016), and USD546,000 is spent annually on anti-poaching by Save Valley Conservancy (SVC) (Lindsey et al. 2012); these expenses are mainly covered by sport-hunting revenue (du Preez et al. 2016). If anyone is found in possession of poached specimens, they must pay a fine of USD5,000 or face a mandatory jail sentence. If convicted of lion poaching, courts could require the payment of a compensation fee of USD20,000 (ZPWMA 2014). Poaching mainly occurs along the boundaries of the protected areas where lions are incidentally snared as non-target prey. Between 2013 and 2015, 21 lions were killed illegally, with six animals killed through snaring in the area adjacent to Hwange National Park in 2015; poverty stands as the major driver of illegal hunting (ZPWMA 2016).

Zimbabwe is a member of the Southern African Development Community (SADC). Under the SADC Treaty, Article 5(g) establishes objectives to, among other aspects, promote the sustainable use of wildlife, harmonization of legal instruments governing wildlife use and conservation, promote the conservation of shared wildlife resources through the establishment of trans-frontier conservation areas (TFCA), and facilitate community-based natural resources management practices. To implement the SADC Treaty, member states are required to establish management programs for the conservation and sustainable use of wildlife. According to the ZPWMA *Enhancement and Non-Detrimental Findings for Panthera leo in Zimbabwe*, Zimbabwe has two established TFCAs, the Great Limpopo Trans-frontier Park (GLTP), which includes Gonarezhou National Park, and the Limpopo/Shashe TFCA. Additionally, there are other TFCAs that are in various stages of development, including Lower Zambezi-Mana Pools, Zimbabwe-Mozambique-Zambia (ZiMoZa), Chimanimani, and the Kavango-Zambezi (KAZA) trans-frontier conservation

area (TFCA) initiative, which links 52 million hectares of conservation areas between itself, Botswana, Zambia, Namibia, and Angola (ZPMWA 2016; Masterson 2016). Through TFCAs, wildlife management entities are linking many of the major protected areas by removing boundary fences along national borders that separate many reserves in addition to creating or improving corridors to link good-quality habitat for wildlife (Newmark 2008). The principle of ecological and migratory connectivity lies at the heart of the TFCA initiative linking large protected areas across international boundaries and providing space for wildlife populations.

In addition to Zimbabwe's domestic laws, it is also a Party to CITES. The lion is listed in Appendix II of the Convention. As an Appendix-II species, certain criteria must be met before such species can be exported, including a finding from the exporting country's CITES Scientific Authority that the proposed activity will not be detrimental to the survival of the species in the wild. In their reply to our inquiry, Zimbabwe provided a copy of their CITES non-detriment finding for lions. Their finding applied to all lion exports from Zimbabwe.

Current Lion Status in Zimbabwe: When the Service listed the lion in southern and eastern Africa as threatened under the ESA, three primary threats to the species throughout its range were identified: loss of habitat, loss of prey base, and human-lion conflict. While human population growth clearly has an impact due to lose of available habitat for lions, increasing human population has a direct impact on prey base. Prey availability affects the reproduction, recruitment, and foraging behavior of lions and, as a result, strongly influences lion movements, abundance, and population viability (Winterbach et al. 2012, as cited in USFWS 2015). Lion densities are directly dependent on prey biomass (Hayward et al. 2007). Outside of protected areas, the lion's prey base is much reduced (du Preez et al. 2016); inadequate management and law enforcement has led to poaching of the lion's prey base in Africa for bushmeat, which has been critically depleted (USFWS 2015). Population trends across eastern and southern Africa show that most prey species have declined in recent years, and for Zimbabwe droughts have been a critical factor (ZPWMA 2016). A reduced prey base results in a relatively greater chance of lions encountering livestock (du Preez et al. 2016). While actual losses of livestock to predators may be relatively low, the perceived financial cost to farmers can be high, and lions are persecuted intensely in livestock areas as a consequence. Their scavenging behavior makes them particularly vulnerable to the practice of lacing prey carcasses with poison to eliminate predators (CITES 2016). Co-existence of lions and people is promoted through giving value to lions, through tourism and hunting in CAMPFIRE areas (ZPWMA 2014). The threat to lions from habitat loss is especially present in Sebungwe and the South East Low Veld where the fragmented nature of the protected areas is compounded by increasing human and livestock populations surrounding these areas (ZPWMA 2016).

According to the Service's CoP17 *Consideration of Proposals for Amendment of Appendices I and II*, international trade in lion products is emerging as an additional threat; however, the relative extent to which this threat has contributed to lion population declines is difficult to evaluate accurately (CITES 2016). According to ZPWMA (2016), the illegal local and international trade in lions and their products poses an insignificant risk to the species in Zimbabwe, as there are no records of people found in possession of illegally acquired lion specimens in Zimbabwe. It is not clear what the level of legal trade, if any, occurs within Zimbabwe.

The bulk of Zimbabwe's wildlife occurs within the Parks Estate which includes 11 national parks, 16 safari areas, 16 recreational parks, 6 sanctuaries, 12 botanical reserves and 3 botanical gardens, all spread across the country (Parks and Wildlife Act 2001 Chapter 20:14). Wildlife populations

also occur on the state Forest Areas, Communal CAMPFIRE areas and private conservancies dedicated to wildlife-based land use. According to ZPWMA (ZPWMA 2016), there are approximately 319,317 km^2 of land where some form of wildlife based land use is practiced in Zimbabwe. Lions occur permanently in 45% of this available range (c. 145,00km^2), with the majority occurring in national parks (96% of the all national parks) and safari areas (92% of all safari areas). Lions also occur permanently in 47% of the State forest areas and 66% of privately owned conservancies. The CAMPFIRE areas comprise approximately 247,000km^2 and lions occur in 36% of these areas. Lion are transient in CAMPFIRE, conservancy and resettled areas adjacent to the major protected areas, and move across the border into Zambia, Mozambique, South Africa, and Botswana.

Zimbabwe's main lion range includes the Hwange-Matetsi Ecosystem, Mid Zambezi Valley, Sebungwe, and South East Lowveld. The lion population estimates in Zimbabwe are determined primarily through carnivore spoor surveys, systematic lion collaring, and call-up surveys. According to ZPWMA's *Conservation Status of the African lion (Panthera leo) in Zimbabwe* July 2014 report, starting in 2015, lion spoor surveys will be done at two-year intervals in all wildlife areas, and lion call-up surveys will be done every three years in all major lion areas (ZPWMA 2014). The Service has not received confirmation that these surveys have been conducted since 2015.

ZPWMA (ZPWMA 2016) has estimated that the minimum number of lions that occur on approximately 51,642km^2 of land where reliable survey data are available is approximately 1,900 (range 1,800 – 2,000). The western portion of the country, consisting primarily of Hwange National Park and the surrounding safari areas, forest areas, communal areas and private conservancies, supports approximately 737 lions (or 38% of the overall population). The southern portion of the country, dominated by the two major conservancies (Save and Bubye) and Gonarezhou National Park supports approximately 896 lions (48%). These numbers are supported by several studies. Groom et al. 2014 used call-up surveys to obtain direct estimates of the lion population within Gonarezhou National Park and compared actual lion densities with potential density estimates. In this study, while lions were only seen at five percent of calling stations, this equated to a population estimate of 33 lions, which is consistent with spoor survey results conducted in June 2010 (Groom et al. 2014). A 2015 spoor count survey of Gonarezhou National Park revealed an estimated 125 lions within the park (ZPWMA 2016). From 2007 to present, annual track index surveys at the SVC have been conducted using a standardized methodology (Groom and Watermeyer 2015, as cited in du Preez et al. 2016). Prey availability models suggest that the carrying capacity for this lion population is approximately 271 lions (Hayward et al. 2007). In 2015, the estimated population was 284 lions (du Preez et al. 2016). The Rifa Safari Area was surveyed using camera trapping and spoor counts in 2015, which supported an estimated population of 68 lions. The central and northern portions of the country reportedly support an estimated population of 284 lions (15%). The 12-year (2000-2011) average lion density per 100km^2 is 2.8 in Hwange National Park, 6.0 for South Eastern Lowveld in the SVC, 9.0 in Malilangwe, and 0.8 in Gonarezhou National Park (ZPWMA Annual Report 2013, as cited in ZPWMA 2014).

To manage any population to ensure an appropriate population level and determine whether sport hunting is having a positive effect, it is vital to have sufficient data on population numbers and population trends on which to base management decisions. According to Riggio et al. 2013 (pg.32), and Bjorklund in Riggio et al 2013 (p.32), the minimum number estimated to constitute a viable population is 500 individuals. Hwange National Park, with an estimated population of 559, is the

only area within Zimbabwe that has a viable population as laid out by Riggio et al. 2013. However, the two regions that make up the largest percentage of the country's lion population (Western 38% and Southern 48%) have regional populations of 737 and 896, respectively. The areas within the Central and Northern regions of Zimbabwe, albeit smaller, encompass parks that are part of Transfrontier Conservation Areas, such as the Mana Pools region.

Lion Management in Zimbabwe: In response to discussions surrounding a possible up-listing of lion to Appendix I under CITES at the 13th Meeting of the Conference of the Parties (CoP13), and subsequent workshops involving lion range states, IUCN, ZPWMA, and other key stakeholders held a workshop to develop the *Conservation Strategy and Action Plan for the Lion (Panthera leo) in Zimbabwe* which was published by ZPWMA in 2006. The plan responds to regional and international standards set by Treaties such as CITES and the Convention on Biological Diversity (CBD), among others. The plan states, "it will guide the conservation and management of this top predator" which "addresses the needs of th[e] country." The Service is not aware of any additional or updated iterations of the plan since 2006; however, in their 2016 response, *Enhancement and Non-Detrimental Findings for Panthera leo in Zimbabwe*, ZPWMA provides updates on the each of the outputs and respective targets established under the 2006 *Conservation Strategy and Action Plan for the Lion (Panthera leo) in Zimbabwe* (ZPWMA 2016).

The 2006 plan identifies a vision that "...lions should be conserved and managed sustainably for their aesthetic, cultural, and ecological values, and the socio-economic development of Zimbabwe." The plan lays out three broad targets to achieve this objective:

- Ensure the persistence of key lion populations and other important populations including those of doubtful viability.
- Human and livestock loss reduced.
- Optimize wildlife conservation-related net benefits to local communities.

All three targets are stepped down to seven specific outputs with their own targets and activities to meet such targets. Although the plan does not identify a time period, some activities do, of which a period of 5 years is the most common. In response to inquiries from the Service, ZPWMA provided a summary of the progress made to implement the 2006 strategy.

While all three of the broad targets appear to serve a valuable role in lion management in Zimbabwe, three of the specific outputs are most relevant to determining if the implementation of the strategy enhances the propagation or survival of the species, as required by the ESA for the issuance of import permits. The first output, "lion populations, their habitats and wild prey effectively conserved and managed in collaboration with local stakeholders" has been broken down into a number of targets: establish a baseline survey and monitoring program; maintain and strengthen capacity for lion conservation, management, monitoring and research; identify and implement best management standards and practices for the hunting program; develop and implement co-management frameworks; and expand the geographic distribution range of lions. According to ZPWMA (2016), baseline surveys have been completed for the Parks Estate using monitoring protocols for key variables (populations, habitats, prey), and selected surveys have been undertaken in areas outside National Parks. Active carnivore research programs conducted by NGOs and research institutions, such as WildCRU, are taking place in various parts of the country; in addition, personnel have been trained in data collection and capture, management, lion aging and analysis. Adaptive age-based criteria for male trophy animals are in place and functioning. The

quota for a certain year is determined by a point system based off the hunts from the previous season. Therefore, ZPWMA is actively working toward meeting the target areas for this output.

The second output, "human-lion related conflicts minimized and, where possible, eliminated" has also been broken down into a number of targets: develop and establish databases on lion-human conflicts; Identify and implement methods to reduce and mitigate livestock losses and lion attacks on humans; and train and properly staff problem animal control (PAC) units to conduct rapid response and precisely target problem animals. According to information from ZPWMA (2016), approaches to mitigate livestock losses and lion attacks on humans are in the process of being tested and implemented in Hwange and methods to mitigate lion attacks on livestock are being implemented as appropriate at selected sites (e.g. Tsholotshe). Data on PAC reports for lion-related problems have been collated, and PAC units at ZPWMA field station and/or RDC levels have been partially established. In Matusadona, Hwange, and Gonarezhou regions, specific awareness and education packages on lion conservation and management have been developed and implemented. The information submitted in the ZPWMA update suggests that they have met one target, and are in the process of implementing the remaining two.

The third output, "(t)he costs and benefits of long-term lion management equitably distributed," is a socio-economic output to establish agreement and implementation of area-specific lion management plans with identified stakeholders in each wildlife region, and implement a transparent mechanism to equitably distribute lion-related income to identified stakeholders." The specific targets for this output are: complete an inventory of stakeholders directly affected by lion conservation, deliver appropriate training and capacity building to prioritized stakeholders, agree to and implement collaboratively developed area-specific lion management plans with identified stakeholder groups in each wildlife region within 5 years, and implement transparent mechanisms to equitably distribute lion-related/generated income to identified stakeholders (groups and/or communities). Current information from ZPWMA shows that they have identified key stakeholders and assessed the financial impacts of lion conservation and the magnitude of socio-economic impacts on each stakeholder group. Limited training has been undertaken for representative stakeholders in Hwange, Matusadona, and Gonarezhou. ZPWMA has also implemented an adaptive management program across four wildlife regions and are in the progress of developing and implementing area-specific lion management plans with identified stakeholder groups. According to ZPWMA, a Management Plan for Hwange has been approved. However, the Service does not have a copy of this plan. With these updates, ZPWMA has made progress toward this output's targets.

The strategy also identifies roles and responsibilities for a number of players in Zimbabwe's lion conservation efforts. According to the strategy, there is a national lion coordinator that is to coordinate all national activities on lion conservation, research, and management including census surveys, setting up monitoring needs and coordinating data on human-lion conflicts. The strategy goes on to identify roles for the field stations, wardens, ecologists and utilization units, which are responsible for ensuring compliance with hunting regulations and maintaining safari-hunting databases. In addition, the strategy identifies roles for CAMPFIRE, safari operators, and professional hunters to facilitate training and ensure compliance with hunting regulations.

The Conservation Strategy and Action Plan for the Lion in Zimbabwe (ZPWMA 2006) borrows language from the *IUCN SSC Conservation Strategy* (2006). It iterates areas in need of improvement regarding lion conservation in Zimbabwe, including standardized lion census methods and surveys, further mitigating human-lion conflicts, and maximizing benefits for rural

communities that live with lions. ZPWMA (2006) notes their intention to review and put in place criteria for age-based identification of male trophy animals, but do not mention if they will be reviewing possible combination strategies. As part of the 2006 lion conservation strategy for eastern and southern Africa, six objectives were established to secure and restore sustainable lion populations, which were housed under the following categories: management, mitigation, socio-economics, policy and land-use, politics, and trade. The strategy was intended to be implemented within 10 years (Macdonald 2016), and Zimbabwe gave an update on progress regarding these objectives in their *Enhancement and Non-Detrimental Findings for Panthera leo in Zimbabwe* (ZPWMA 2016) that also addressed outputs and targets laid out in their 2006 action plan.

Additionally, to mitigate human-lion conflict, the "Long Shields Guardian Programme" was initiated whereby communities are notified of movements of collared lions into their areas via cell phone, and then have the opportunity to take appropriate action, such as moving cattle. In 2013 alone, 1,850 warnings were passed to the "Long Shields." These actions may reduce the incidents of lions marauding livestock; however, retaliatory killing of lions still occur. Further, as is policy under The Parks and Wildlife Act of 2001, any lions that attack humans or livestock will be lethally eliminated (ZPWMA 2016). Between 2007 and 2013 a total of 1,113 conflict incidents were recorded in the Hwange area in which 915 head of stock were lost to lions.

Hunting and Utilization: Lions are infamously infanticidal (Schaller 1972, as cited in du Preez et al. 2016), which is often used as an argument against sport-hunting of the species (e.g. Packer et al. 2011), where it is feared that the removal of dominant males causes cub mortality that eventually results in lowered population recruitment and survival (Packer et al. 2009). Infanticide, however, may be less of an issue in terms of sport-hunting if age-appropriate males, past their prime and no longer territorial or with dependent cubs, are harvested (Whitman et al. 2004).

The minimum number of lions that occur in approximately 51,642km^2 of land in Zimbabwe, where reliable survey data are available, is estimated to be 1,917 (range 1,800 – 2,000), the majority of which occur in western and southern Zimbabwe. When taking this population estimate into consideration, trophy hunting harvests average 2.7% of adult male lions annually. This percentage has decreased since the establishment of age restrictions on lion hunting (ZPWMA 2016).

Trophy hunting of wildlife is permitted in safari areas, of which there are 16 in Zimbabwe (ZPWMA 2014). According to the Forest Act, Chapter 19:05, there are 24 gazetted indigenous forest areas in Zimbabwe; within these forest areas, lions may be hunted in the following forests: Fuller, Kazuma, Pandamasuwe, Ngamo, Sikumi, Gwayi, Sijarira, and Gwampa (ZPWMA 2014). In 2013, an adaptive quota management system for lion hunting based on the ages of lions hunted was agreed to in Harare, Zimbabwe, during a meeting hosted by ZPWMA and an independent non-governmental conservation organization (du Preez et al. 2016). After reviewing aging techniques, attendees at the July 2013 meeting in Harare, Zimbabwe, were confident that hunters could be expected to categorize lions as being below or above five years of age. In determining quotas for the following years, operators would be rewarded with increased quotas if they hunted animals of six years or older, would not be penalized if they hunted animals five years of age, but would have quotas cut if they hunted animals younger than five years old or if they failed to complete hunt returns (ZPWMA and Panthera 2014). In 2013, only 28% of lions hunted were five years old or older. In 2015, that figure rose to 77.3% (ZPWMA 2016). According to Hunter et al. (2013), an adaptive quota management system utilizing age-based criteria would not only aid in the prevention of over-harvesting lions, but would also prevent excessively conservative quotas. Further,

according to Miller et al. (2016), results indicate that age-based hunting is feasible for sustainably managing threatened and economically significant species such as the lion, but must be guided by rigorous training, strict monitoring of compliance and error, and conservative quotas. No single trait can be relied upon exclusively to precisely age lions. Rather, multiple traits must be examined in combination to cross-validate an individual's age and, according to Whitman et al. (2004), restricting hunting to individuals that are at least six years old is desirable from a biological perspective due to the reduced risk of the loss of pride males and infanticide of cubs associated with the harvest of such individuals (Whitman et al. 2004).

During 2013, operators were requested to submit hunt returns and photos as a trial run to get the adaptive quota system up and running. In 2014, operators were requested to do the same but were informed that the age of the lions hunted in 2014 would determine their lion quotas in 2015 (du Preez et al. 2016). In 2015, there was a marked increase in the age of lions hunted in Zimbabwe as a whole. The majority of lions hunted were on the cusp of 5-6 years of age but were not older than six years. National hunting offtakes for lions in Zimbabwe from 2013 to 2015 were 29, 42, and 47 respectively (Masterson 2016). It appears these do not include illegal forms of hunting offtake.

Previously, Zimbabwe set quotas for the hunting of female lions. Between 1998 and 2004, Zimbabwe maintained a mean quota of $0.3 \pm 0.1/100$ km^2 for female lions; during the same period, actual offtake was lower at $0.08 \pm 0.1/100$ km^2, or a mean of 30.6 percent of the quota actually harvested (Loveridge et al. 2007). However, females are the most productive portion of a population; if they are removed from a pride, there is inherent risk that dependent cubs will die and the overall breeding success of the pride will be reduced. Zimbabwe discontinued issuing quotas for female lions in 2011 (USFWS 2015). In 2011, Zimbabwe's quota was set at 101 lions; in 2014, it was reduced to 50 male lions following the implementation of age restrictions (Henschel 2015, pers. comm., as cited in USFWS 2015).

In setting adaptive lion quotas, Zimbabwe uses scientific information including spoor surveys, camera traps, and ranger-based sighting. In CAMPFIRE areas, incidences of human-lion conflict are also taken into consideration where survey information is not readily available, when determining quotas for those areas (ZPWMA 2014). The quota setting process involves all stakeholders, including the ZPWMA, landowners, safari operators, and CAMPFIRE managers and their representatives. During the annual quota-setting workshop, presentations are made by the proponents who then make proposals for quotas. Where it is felt that not enough information has been presented, however, a precautionary quota will still be issued (ZPWMA 2014). The Service is not aware of how precautionary quotas are treated after they are issued, or if there is a protocol for obtaining necessary information when a precautionary quota is put in place.

ZPWMA (2016) mentions seven concessions that are leased on five-year terms, and how these concessionaires pay a five-year "right to lease" fee, annual rental, fixed quota fee (payable if animals are shot or not) and a supplementary quota fee that allows additional animals to be bought as needed. It is unclear to what extent Zimbabwe still utilizes fixed quotas, as du Preez et al. claims fixed quotas are no longer being used by Zimbabwe, but a fixed quota fee is mentioned in ZPWMA (2016). It is also unclear how many animals concessionaires are able to "buy as needed," and how such requests may be accommodated without going over the national quota (ZPWMA 2016).

Between 1999 and 2004, data were collected in and around Hwange National Park that suggested that hunting surrounding the park was having a negative impact on the lion population. Therefore,

sport hunting of lions was suspended in the area surrounding the park between 2005 and 2009. Following the lifting of the moratorium, and by implementing stricter monitoring and hunting guidelines through the Hwange Lion Research Project, the overall Hwange lion population has continued to show a positive trend, and is now estimated at over 550 animals (ZPWMA 2015).

CAMPFIRE is the program through which the Zimbabwean Government has developed the management of wildlife resources to communal farmers. As of July 2014, there are at least 58 Rural Districts that have been granted the Appropriate Authority status to manage wildlife resources in their areas; however, according to *Enhancement and Non-Detrimental Findings for Panthera leo in Zimbabwe* (ZPWMA 2016), only 16 are actively engaged in some form of wildlife-based land use (ZPWMA 2016). Lions are found in communal areas that are adjacent to major protected areas, and lion hunting is allowed in CAMPFIRE districts (ZPWMA 2014). According to EcoWeb (2015), all income generated by trophy hunting in CAMPFIRE areas was distributed to communities (52%, when they are typically prescribed 55%), rural district councils (RDCs) (44%, when they are typically prescribed 41%), and the CAMPFIRE association (4%). Communities, rather than dividing income by households, typically invest in projects that benefit the communities as a whole, such as schools, clinics, and grinding mills. Councils use funding for patrols, monitoring of hunts, problem animal control, water, and fire management, while the CAMPFIRE association uses their funding to cover administrative costs and representation of the program (EcoWeb 2015).

As agreed upon at the 2013 lion management meeting in Harare, the CAMPFIRE areas in which lions occur are currently exempted from the age restrictions. This approach was adopted as a means of ensuring that impoverished communities obtain the opportunity to benefit from the presence of lions, recognizing the potential negative impacts the species has on the livelihoods of livestock farmers (ZPWMA 2016). According ZWPMA's 2016 response, between 2010 and 2015, lions accounted for 2% of the total income generated from hunts conducted on CAMPFIRE lands and trophy fees accounted for 74% of the total funds generated for CAMPFIRE. Further, U.S. hunters accounted for 51% of the funds generated from hunting in CAMPFIRE areas during the same period. While hunting is allowed in CAMPFIRE areas, it is unclear if American sport hunters conduct lion hunts in these areas; if so, the Service is not aware if sport hunters are exempted from the age restriction in this case, and how this exemption in CAMPFIRE areas is taken into consideration when setting quotas for other portions of the country.

According to the Revised CAMPFIRE Revenue Sharing Guidelines, which were incorporated into the Constitution of the CAMPFIRE Association in 2007, at least 55% of generated revenue from hunting should be devolved to producer communities, no more than 26%, and 15% for management and overhead at RDC level, respectively, and 4% as a levy to the CAMPFIRE Association. According to an undated document (but presumably produced in late 2014, since it references data from 2014 but does not include any references to 2015 data) produced by CAMPFIRE (CAMPFIRE report undated) at least 10 RDCs comply with the Revenue Guidelines.

According to *The Role of Trophy Hunting of Elephant in Support of the Zimbabwe CAMPFIRE Program – December 2016*, a report the Service received on December 17, 2016, the Reserve Bank of Zimbabwe, in collaboration with relevant stakeholders, has established the Tourism Receipts Accounting System (TRAS) that required all outfitters to submit returns listing the revenue generated for hunting activities. This system has been in place for several years, but required manual analysis of the data to extract information on hunting revenue. In January 2015, to account

fully for earnings in the hunting sector, the Reserve Bank of Zimbabwe, in collaboration with relevant stakeholders, introduced the Tourism Receipts Accounting System (TRAS2) a web-based system (TRAS2) that links Safari Operators, ZPWMA Authority, Taxidermists, Shipping Agents, International Marketing Agents, and Reserve Bank. Under this system, all authorized hunts are registered, allowing for the capture of hunting data, such as the origin of clients, value of trophies and hunts, and area hunted, to monitor hunting quota utilization and track hunted trophies. According to the December 2016 report, the Exchange Control Division of the Reserve Bank of Zimbabwe and the ZPWMA are now able to:

1. Assess regional price differentials of similar hunts and the reasons thereof;
2. Present TRAS2 system updates and reports to the users, including international marketing agents;
3. Engage with international marketing agents of sport hunting;
4. Obtain relevant insights on governing of the hunting sector; and
5. Come up with an effective mechanism to fully account for export proceeds from the hunting sector.

The TRAS2 information was utilized in *Enhancement and Non-Detrimental Findings for Panthera leo in Zimbabwe* (ZPWMA 2016) to provide a breakdown of the source of hunting income, and the amount of funds generated by trophy fees by land category, among other insights, and has proven the TRAS2 system's ability to obtain relevant insights on governing of the hunting sector.

Evaluation:

As stated earlier, the Service will evaluate any application in accordance with our threatened species permitting regulations at 50 CFR 17.32 and issuance criteria for threatened species permits (50 CFR 17.32(a)(2)). In evaluating each of these criteria based on information available to the Service, we have been able to determine that sport-hunted lion trophies taken in 2016 and 2017 would qualify for the issuance of the required import permit.

17.32(a)(2)(i): Whether the purpose for which the permit is required is adequate to justify removing from the wild or otherwise changing the status of the wildlife sought to be covered by the permit:

Zimbabwe's lion hunting industry generated 9% of all sport hunting revenue in 2015; 51% was contributed by U.S. hunters during 2010-2015 country-wide, and 90% of the sport-hunting market in BVC and SVC during 2005-2015. Based on the information available to the Service, the participation of communities in CAMPFIRE has heralded a reversal in wildlife declines on private land. When the benefits of CAMPFIRE were extended to RDCs, it further aided in the equitable distribution of benefits from trophy hunting to local communities, which incentivizes them to conserve the African lion. In the case of SVC, without the hunting industry, these wildlife areas, which have become conservation havens in the threat of human encroachment across much of Zimbabwe, would not be economically viable, and therefore would not exist.

There was conflicting information presented to the Service on how many lions were included in the quota in 2015. du Preez et al. (2016) reports a national lion hunting quota of 85 with 39 hunted;

ZPWMA (2016) reports that the national lion hunting quota in 2015 was 82 lions, with 49 hunted. When evaluating the lower quota with higher utilization reported by ZPWMA (2016), and taking into consideration the land area of the Parks Estate alone, Zimbabwe did not exceed the best management practice of 0.5 lions/1,000 km^2; the 2015 offtake would have accounted for 0.125 lions/1,000 km^2.

Zimbabwe also has taken into consideration other best management practices, including age-based criteria for an adaptive management strategy, and takes past performance of hunting organizations into consideration when determining future quotas.

Further, sport hunting was essential for the successful transition of SVC from cattle to wildlife (du Preez et al. 2016), in that it provided monetary benefits for the conservation of lions and local communities. BVC donates over 45 tons of meat from sport hunting to the local communities each year. This meat donation is worth over USD100,000 per year. BVC also supports several schools, clinics, and community projects in the three surrounding districts of Mwenezi, Maranda, and Jopempe. The local community sees a direct benefit from the wildlife in BVC, but is also empowered by job opportunities created both with these community projects, as well as on BVC (du Preez et al. 2016).

While Zimbabwe's hunting industry generated approximately 8 million in 2015, not all of this is connected to lion hunting or to U.S. hunters. However, lions are a key component of the hunting industry since they are part of the "Big 5" trophies and draw U.S. hunters to Zimbabwe. Based on the information available to the Service, the funds generated by hunting trophies contribute to the ZPWMA's ability to manage the country's lion populations as well as the success of CAMPFIRE. It appears that without the hunting industry, it would not be economically viable to maintain lions. Although U.S. hunter participation in lion hunts is not enough to make or break the industry, U.S. hunters have played a significant role in the industry in Zimbabwe, previously making up 51% of all hunting in Zimbabwe and 72% of lion hunts within the country. As such, the removal of their participation could have a long-term negative impact.

Further, through the *Strategy and Action Plan,* Zimbabwe has put into place mechanisms to adequately oversee the harvest of lions in Zimbabwe. With an annual harvest of approximately 85 lions, Zimbabwe is not exceeding the limits identified of 0.5 lions/1,000 sq. km. The objectives of the *Strategy and Action Plan* and the actions and monitoring activities that have been put into place to achieve these objectives should support the adaptive management approach that Zimbabwe has established for managing lions. The Service will continue to monitor the effectiveness of the Strategy and Action Plan, and revise our finding as appropriate.

Therefore, based on the information available to the Service. and provided that the reserve where the lion was taken was properly permitted and in compliance with national and local regulations, the purpose for which a permit being requested is adequate to justify removing lions from the wild or otherwise changing their status.

17.32(a)(2)(ii): <u>The probable direct and indirect effect that issuing the permit would have on the wild populations of the wildlife sought to be covered by the permit</u>:

The total area under wildlife-based land use and conservation in Zimbabwe amounts to 10.7 million hectares, and represents 27% of the total surface area of the country. Of this, 7.9 million

hectares, or 75% of all conservation land in the country, falls under safari hunting as the primary or only source of revenue. With the CAMPFIRE program, private landholders and RDCs are given the opportunity to benefit from the wildlife on their land, including lion, and incentivize them to conserve the species. Sport hunting of lions by U.S. hunters supports the programs in Zimbabwe that provide the opportunity for locals to see value in lions, which in turn conserve the species in the long-term.

A scientifically based quota is the number of a given species that can be removed from a specific population without damaging the biological integrity and sustainability of that population (WWF 1997). However, full implementation and enforcement of the age-based strategy could potentially cause the need for quotas to become irrelevant or eliminated (USFWS 2015). Age restrictions will naturally restrict offtake to a limited number of individuals that meet the age criteria (Loveridge et al. 2007, Whitman et al. 2004).

Based on the information provided to the Service, it is clear that Zimbabwe has made strides in their management of their lion populations. Although prior to 2011, Zimbabwe allowed the hunting of lionesses and males under 5 years old, they made significant changes to ensure their hunting program is sustainable. In 2011, Zimbabwe restricted the hunting of female lions. In 2013, they proposed an adaptive age-based quota-setting process. In 2015, the development TRAS2 allowed the country to assess regional price differentials of similar hunts and the reasons thereof; present TRAS2 system updates and reports to the users, including international marketing agents; engage with international marketing agents of sport hunting; obtain relevant insights on governing of the hunting sector; and come up with an effective mechanism to fully account for export proceeds from the hunting sector.

According to CITES trade data and Service records, from 2011 to 2016, there were 223 lion trophies imported to the U.S. from Zimbabwe. Best practice would be to import only male lions, as pointed out by Macdonald (2016), but Zimbabwe has already taken the initiative by placing a moratorium on lioness hunting. The fixed-quota concept, in which hunting quotas had to be paid for upfront before the hunting season begins, and results in poor quality trophies and young animals being hunted, has also been abandoned (du Preez et al. 2016). Zimbabwe appears to be transparent in their implementation of the age-based adaptive management strategy (USFWS 2015). The adaptive quota management system for lion hunting based on the ages of lions hunted has been accepted and embraced by all stakeholders. This adaptive quota management system has not only led to a reduced national lion hunting quota, but has also resulted in a significant increase in the age of harvested lions to a level that is considered to have a reduced ecological impact (du Preez et al. 2016).

Between 2005 and 2015, the U.S. market has represented over 90% for the sport-hunting market in both BVC and SVC. If this market was effectively lost due to an inability of prospective clients to import their trophies, it would become unviable to continue managing BVC as a wildlife area in its current form (du Preez et al. 2016). Across all CAMPFIRE districts, from 2010 to 2015, there was a total quota of 140 lions, with actual offtake equaling 45 animals. During this same period, U.S. sport hunters apparently accounted for 51% of Zimbabwe's sport hunting clients; trophy fees represented 74% of CAMPFIRE income, of which lions play a small role. In 2015, lion sport hunting generated USD753,000 in revenue, which accounted for about 9% of all sport hunting revenue in Zimbabwe that year (ZPWMA 2016).

Evaluating the information provided by the Zimbabwe government and other sources, it appears that the hunting program in Zimbabwe is addressing the three main threats that were identified by the Service when making the determination that the species was threatened with the possibility of extinction. The hunting areas are maintaining habitat for lions and ensuring that there is no further loss, provided that the hunting areas can remain economically viable. In order to maintain a viable population of lions, the parks, safari, and CAMPFIRE areas must maintain biodiversity and a sustainable prey base. Finally, Zimbabwe is actively working to reduce human-lion conflicts and the number of lions killed in retaliation for killing livestock. Therefore, the management of lions with in Zimbabwe and the limited hunting of lions contributes to the on-going survival of the species in Zimbabwe.

Provided that the off-take of lions continues to be monitored and the actions identified in the Strategy and Action Plan continue to be implemented, the participation of U.S. hunters in lion hunts would provide an indirect benefit to wild populations by helping to support the reserves where lions are found. Therefore, based on the information available to the Service, the probable direct and indirect effect that issuing an import permit for a legally hunted lion would have on the species would be positive.

17.32(a)(2)(iii): Whether the permit, if issued, would in any way, directly or indirectly, conflict with any known program intended to enhance the survival probabilities of the population from which the wildlife sought to be covered by the permit was or would be removed:

As stated above, Zimbabwe is monitoring and controlling the harvest of lions through permitting under their regulations and through the Strategy and Action Plan. The issuance of import permits for lions legally hunted under these authorities would not conflict with any programs intended to enhance the survival probability of the species in Zimbabwe. If import permits for sport hunted lion trophies from Zimbabwe were to be issued, it would work in favor of, not against, the principal acts governing lion conservation in Zimbabwe. Furthermore, sport hunting opportunities for hunters in CAMPFIRE districts would help local communities realize the value in conserving the African lion.

Therefore, based on the information available to the Service, the issuance of import permits for legally hunted lions does not conflict with known conservation programs and rules.

17.32(a)(2)(iv): Whether the purpose for which the permit is required would be likely to reduce the threat of extinction facing the species of wildlife sought to be covered by the permit:

With limited, controlled off-take of lions in a manner that would maintain sustainability, the legal hunting activities that U.S. hunters would be involved in would contribute to reducing the threat of extinction of lions. This off-take must be monitored to ensure that it is sustainable and that, to the extent possible, normal lion behavior and ecology are not negatively impacted. It appears that the permitting activities under Zimbabwe's laws and CITES, as well as the implementation of the adaptive age-based lion quota, and a continuation of implementation of the outputs in the *Strategy and Action Plan* will ensure the long-term survival of lions. The utilization of hunters to manage the populations on the reserves is an important element of the success of lion management in Zimbabwe.

Therefore, based on the information available to the Service, the issuance of import permits for legally hunted lions does not conflict with known conservation programs and rules.

17.32(a)(2)(v): The opinions or views of scientists or other persons or organizations having expertise concerning the wildlife or other matters germane to the application:

From reviewing comments made during the listing process for lions, as well as information obtained through personal conversations and literature, there is general agreement that hunting, done properly and well managed, would not have an adverse effect on lion populations. Numerous researchers have stated that, while they may not support hunting in general, they see that benefits can be received through a scientifically based hunting program for lions.

Based on the information available to the Service, there is general support by scientists and other persons or organizations having expertise concerning lions that the legal harvest of lions, and the subsequent import of these trophies, would not have an adverse effect on the species, but would further efforts to conserve the species in the wild into the future.

17.32(a)(2)(vi): Whether the expertise, facilities, or other resources available to the applicant appear adequate to successfully accomplish the objectives stated in the application:

While, over the years, ZPWMA has failed to generate adequate revenue for its operations, U.S. sport hunters play a large role in the hunting industry of Zimbabwe. The Service anticipates that by granting the importation of sport-hunted lion trophies, there would be an increase in funds provided to Zimbabwe's conservation initiatives through this program by U.S. sport hunters. ZPWMA has also been forthcoming in involving relevant stakeholders as well as independent researchers and non-governmental organizations in determining best management practices.

Therefore, based on the information available to the Service, Zimbabwe has the proper expertise, facilities, and other resources to accomplish the objectives laid out in their *Strategy and Action Plan* to enhance the propagation and survival of the species, partly through the utilization of funds generated by U.S. hunters' participation in lion hunts throughout the country.

Conclusion

Given the current status of lions within Zimbabwe and the level of management and oversight provided to them, the Service is able to find that the harvest and import of sport-hunted trophies of lions within Zimbabwe meet the purposes of the ESA. As stated earlier, each application received by the Service for the import of a sport-hunted trophy lion from Zimbabwe will be evaluated on a case-by-case basis. The applicant must have hunted on a properly licensed hunting area within Zimbabwe. The Government of Zimbabwe must continue to implement the *Strategy and Action Plan* in the manner identified in the documents. The on-going adaptive management and limited off-take of lions is important to the survival of lions in Zimbabwe and the Service will reassess lion management within Zimbabwe and whether the importation of sport-hunted trophies enhance the survival of the species at the end of the 2018 hunting season or at which time substantive information becomes available to the Service in the interim.

Although the Service is able to make a finding that the management of lions within Zimbabwe meet the enhancement criteria under the ESA, there are certain documents and data the Service needs to evaluate in order to continue our current finding past the 2018 hunting season. The Service expects to be able to review data from the 2016, 2017, and 2018 hunting seasons to assess the lion populations and ensure that management efforts are enhancing the propagation and survival of the lion within Zimbabwe. Given that Zimbabwe's last management plan for lion was produced in 2006, the Service would like to see an updated plan established. Local management plans, such as the Management Plan for Hwange National Park will be sought. Although Zimbabwe has made progress on their 2006 *Strategy and Action Plan*, the Service will seek updates on further progress of the outputs or targets not yet accomplished. Lastly, the Service will also seek an update on the quota setting process. Specially, we will need further information on the establishment and implementation of precautionary quotas.

Therefore, with the information currently available to the Service, the Service is able to make a determination that the import of lions taken in Zimbabwe in 2016, 2017 and 2018 would meet the issuance criteria under 50 CFR 17.32. In accordance with the 4(d) rule for *P. l. melanochaita*, 50 CFR 17.40(r), the Service will review each application received for import of such specimens on a case-by-case basis and each application will also need to meet all other applicable permitting requirements before it may be authorized.

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November 20, 2017

Mr. Timothy Van Norman
Chief, Branch of Permits
U.S. Fish and Wildlife Service
5275 Leesburg Pike
Falls Church, VA 22041

Re: Imports of African Lion Trophies from Zimbabwe

Dear Chief Van Norman:

On October 11, 2017, the U.S. Fish and Wildlife Service ("FWS" or "the Service") issued a positive enhancement finding for African lion trophies from Zimbabwe. That finding is not based on the best available science and the conclusions made in the finding are not supported by the information relied on by the agency. On behalf of The Humane Society of the United States ("HSUS"), Humane Society International ("HSI"), and Humane Society Legislative Fund ("HSLF"), we write to strongly urge the U.S. Fish and Wildlife Service ("FWS" or "the Service") to rescind the enhancement finding for Zimbabwean lions, as it cannot be demonstrated that trophy hunting of lions in Zimbabwe affirmatively benefits the conservation of the species. Issuing any import permits for lion trophies from Zimbabwe in reliance on this finding would violate the Endangered Species Act ("ESA").

ESA Requirements for Lion Trophy Imports

The Endangered Species Act (ESA) listings for *Panthera leo leo*[1] and *Panthera leo melanochaita* went into effect on January 22, 2016 (80 Fed. Reg. 79999 (Dec. 23, 2015)). Pursuant to the Section 4(d) regulation for *Panthera leo melanochaita* (50 C.F.R. § 17.40(r)), the Service can only issue a permit to import a lion trophy from east or southern Africa if the best available science supports a finding that trophy hunting enhances the survival of this subspecies. Pursuant to the plain language of this statutory term (16 U.S.C. § 1539(a)(1)), "enhancement" permits may only be issued for

[1] HSUS, HSI, and HSLF fully expect that no permits will be issued to import trophies of endangered *Panthera leo leo*, as this subspecies is on the brink of extinction and cannot sustain recreational offtake. As the U.S. Fish and Wildlife Service (FWS) acknowledged in the lion listing rule, in western and central Africa, "[m]anagement programs do not appear to be sufficient to deter unsustainable offtakes" and "experts agree that there is no level of offtake that would be sustainable for *P. l. leo* populations…" 80 Fed. Reg. 79999, 80040 (Dec. 23, 2015).

activities that *positively benefit* the species in the wild. *See also* FWS, *Ensuring the Future of the Black Rhino* (Nov. 25, 2014), *at* http://www.fws.gov/news/blog/index.cfm/2014/11/25/Ensuring-the-Future-of-the-Black-Rhino (acknowledging that the ESA enhancement standard is more stringent than the CITES non-detriment standard); U.S. Fish and Wildlife Service Handbook for Endangered and Threatened Species Permits (1996) (making clear that an enhancement activity "must go beyond having a neutral effect and actually have a positive effect"). It is critical that FWS apply the precautionary principle and strictly scrutinize the impacts that trophy hunting has on African lions – indeed, as recently published in *Nature*, overutilization, including trophy hunting, is the biggest threat to biodiversity.[2]

HSUS, HSI, and HSLF agree with the standard that FWS established in the 4(d) Rule for *Panthera leo melanochaita*, requiring that,

> "when making a determination of whether an otherwise prohibited activity enhances the propagation or survival of *P. l. melanochaita*, the Service will examine the overall conservation and management of the subspecies in the country where the specimen originated and whether that management of the subspecies addresses the threats to the subspecies (i.e., that it is based on sound scientific principles and that the management program is actively addressing the current and longer term threats to the subspecies). In that review, we will evaluate whether the import contributes to the overall conservation of the species by considering whether the biological, social, and economic aspects of a program from which the specimen was obtained provide a net benefit to the subspecies and its ecosystem" (emphasis added).

HSUS, HSI, and HSLF also agree that FWS must consider the following factors when making an enhancement finding for importation of hunting trophies of *P. l. melanochaita*:

> "(a) Biological sustainability: The hunting program cannot contribute to the long-term decline of the hunted species. It should not alter natural selection and ecological function of the hunted species or any other species that share the habitat. The program should not inadvertently facilitate poaching or illegal trade in wildlife by acting as a cover for such illegal activities. The hunting program should also not manipulate the ecosystem or its component elements in a way that alters the native biodiversity.
>
> (b) Net Conservation Benefit: The biologically sustainable hunting program should be based on laws, regulations, and scientifically based quotas, established with local input, that are transparent and periodically reviewed. The program should produce income, employment, and other benefits to create incentives for reducing the pressure on the target species. The program should create benefits for local residents to co-exist with the target species and other species. It is also imperative that the program is part of a legally recognized governance system that supports conservation.
>
> (c) Socio-Economic-Cultural Benefit: A well-managed hunting program can serve as a conservation tool when it respects the local cultural values and practices. It should be accepted

[2] Sean L. Maxwell et al., *Biodiversity: The Ravages of Guns, Nets, and Bulldozers*, Nature Vol. 536, 143-145 (Aug. 11, 2016), *at* http://www.nature.com/news/biodiversity-the-ravages-of-guns-nets-and-bulldozers-1.20381.

by most members of the community, involving and benefiting local residents in an equitable manner. The program should also adopt business practices that promote long-term economic sustainability.

(d) Adaptive Management: Planning, Monitoring, and Reporting: Hunting can enhance the species when it is based on appropriate resource assessments and monitoring (e.g., population counts, trend data), upon which specific science-based quotas and hunting programs can be established. Resource assessments should be objective, well documented, and use the best science available. Adaptive management of quotas and programs based on the results of resource assessments and monitoring is essential. The program should monitor hunting activities to ensure that quotas and sex/age restrictions of harvested animals are met. The program should also generate reliable documentation of its biological sustainability and conservation benefits.

(e) Accountable and Effective Governance: A biologically sustainable trophy-hunting program should be subject to a governance structure that clearly allocates management responsibilities. The program should account for revenues in a transparent manner and distribute net revenues to conservation and community beneficiaries according to properly agreed decisions. All necessary steps to eliminate corruption should be taken and to ensure compliance with all relevant national and international requirements and regulations by relevant bodies such as administrators, regulators and hunters."

Evidence is Insufficient to Support Claims that Lion Trophy Hunting in Zimbabwe Enhances the Survival of the Subspecies

(1) Unfenced lion populations in Zimbabwe have declined over the past decade and today fewer than 300 truly wild adult male lions remain in the country

As acknowledged in the Service's October 2017 enhancement finding (USFWS 2017), it is critical that lion management, quotas, and assessments should be based on sound science and it is "vital" to have data on population numbers and trends. Specifically, the finding states that: "when making a determination of whether an otherwise prohibited activity enhances the propagation or survival of *P. l. melanochaita*, the Service examines the overall conservation and management of the subspecies in the country where the specimen originated and whether that management of the subspecies addresses the threats to the subspecies (i.e., that it is based on sound scientific principles and that the management program is actively addressing the current and longer term threats to the subspecies)" (p. 3, emphasis added); hunting should be based on "appropriate resource assessments and monitoring (e.g., population counts, trend data), upon which specific science-based quotas and hunting programs can be established. Resource assessments should be objective, well documented, and use the best science available" (p. 4, emphasis added); and "to manage any population to ensure an appropriate population level and determine whether sport hunting is having

a positive effect, it is vital to have sufficient data on population numbers and population trends on which to base management decisions" (p. 9, emphasis added).

The Zimbabwe enhancement and non-detriment finding document (ZPWMA 2016) provides a table with "estimated minimum" population sizes by subpopulation, and gives a total estimated minimum population size in Zimbabwe of 1,917 lions (p. 6) (Figure 1, below). The source of the data is said to have been "compiled from a variety of reports" (p. 6). As ZPWMA did not provide the source of the data contained in the table, or the methodology employed to obtain the estimates, or the year in which the data were collected, the data cannot be considered by the Service to be objective, well-documented or to be made using the best science available. Later in the Zimbabwe document it is stated that population estimates are determined through "carnivore spoor surveys, systematic lion collaring and call-up surveys" and also "patrol reports, field observations by ZPWMA rangers and other sightings by tour operators and tourists" and in Safari Areas, "resident safari operators, including those operating in CAMPFIRE areas" (p. 15). While the "carnivore spoor surveys, systematic lion collaring and call-up surveys" may be made using the best science available (although the document itself does not make that clear), the other sources of population estimates listed are not. Random, unplanned sightings by patrols, rangers, tour operators and tourists cannot meaningfully contribute to population estimates.

REGION	AREA	AREA (km²)	Estimated Number of Lions	Percentage
Western	Hwange NP	14,900	559	38%
	Matetsi Units 1-5	1,934	59	
	Matetsi Units 6-7 and Zambezi NP	1,585	67	
	Kazuma Pan NP	313	20	
	Kazuma Forest	240		
	Panda Masuie Forest	355		
	Matetsi ECA	1,556	15	
	Ngamo and Sikumi Forest	1,386	6	
	Gwaai Conservancy	927	22	
	Hwange Communal Land	392	2	
	Tsholotsho buffer adjacent HNP	1,275	7	
Subtotal		**24,863**	**737**	
Central	Chizarira NP	1,948	31	4%
	Chirisa SA	1,713		
	Omay	1,865	10	
	Matusadona NP	1,427	31	
Subtotal		**6,953**	**72**	
Northern	Chewore North and South	1,648	45	11%
	Dande	1,155	21	
	Hurungwe (Nyakasanga and Rifa)	1,709	32	
	Charara/Mukuti	1,692	20	
	Mana Pools	1,287	94	
Subtotal		**7,491**	**212**	
Southern	Gonarezhou National Park	5,053	125	48%
	Malilangwe	400	37	
	Bubye Valley Conservancy	3,440	450	
	Save	3,442	284	
Subtotal		**12,335**	**896**	
Overall Total		**51,642**	**1,917**	

Figure 1. Enhancement and Non-Detrimental Findings for Panthera leo in Zimbabwe (ZPWMA 2016, Table 2, p. 6)

The ZPWMA (2016) national lion population size estimate of 1,917 is much higher than other published estimates, including studies cited in the Service's 2015 final rule listing lions under the ESA. Bauer and Van Der Merwe (2004) estimated a national population size of 987; Chardonnet (2002) estimated 1,686; and Bauer et al. (2016, IUCN Red List assessment) estimated 703 in five well-studied populations (Bubye, Gonarezhou, Hwange, Malilangwe, and Save Valley) in 2014.

ZPWMA (2016) provides information indicating that several of the population estimates come from scientific studies that used appropriate methodologies; these are populations of Gonarezhou National Park, Save Valley Conservancy, Bubye Valley Conservancy, Mana Pools National Park,

Hwange National Park, Zambezi National Park, Units 6 and 7 of the Matetsi Safari Area, and Chizarira National Park and Chirisa / Sengwa Safari Area.

Assuming the population estimates for these areas given in the table are accurate, when added together they total 1,610 which is 307 (16%) fewer lions than the 1,917 estimate. As there appears to be no scientific basis for the existence of these 307 lions, the Service cannot consider the number to be objective, well-documented or to have been made using the best science available. Therefore, it is arbitrary and capricious for the Service to conclude that the national population of lions in Zimbabwe is any greater than 1,610. According to Loveridge et al. (2007), "Almost all lion populations show a bias towards females and have an adult population sex ratio of 1:2;" given this, there are, at most, 536 adult male lions in all of Zimbabwe.

Most of Zimbabwe's lion population sizes have decreased in the past decade (Table 1). The only exceptions are those in Save Valley Conservancy and Bubye Valley Conservancy, which are fenced and have increased, and Hwange, which has stayed the same. Comparing the population sizes estimated by Chardonnet (2002) to those estimated by ZPWMA (2016), there is a 32% decrease in Gonarezhou, an 81% decrease in Mana Pools, and a 55% decrease in Zambezi National Park and Units 6 and 7 of the Matetsi Safari Area. Comparing the Chizarira National Park and Chirisa / Sengwa Safari Area population size estimated by Bauer and Van der Merwe (2004) to that estimated by ZPWMA (2016), there is a 69% decrease; this decrease is acknowledged in Zimbabwe's "enhancement and non-detriment" finding (ZPWMA 2016), but was not acknowledged by USFWS (2017). USFWS (2017) did not acknowledge any lion population decreases in Zimbabwe, contrary to the information before the agency at the time of its finding.

Table 1: Zimbabwe lion population size trends.

Population	Chardonnet 2002	Bauer and Van Der Merwe 2004	ZPWMA 2016	Trend
Gonarezhou National Park	183	130	125	32% decrease
Save Valley Conservancy		-	284	100% increase
Bubye Valley Conservancy	-	-	450	100% increase
Mana Pools National Park	495	97	94	81% decrease
Hwange National Park	543	120	559	same
Zambezi National Park and Units 6 and 7 of the Matetsi Safari Area	150	85	67	55.5% decrease
Chizarira National Park and Chirisa / Sengwa Safari Area	-	100	31	69% decrease

Returning to Bubye Valley Conservancy and Save Valley Conservancy, as noted in ZPWMA (2016), these are fenced areas that were formerly used for cattle, where the owners decided to pursue a new business model based on raising wildlife to sell them to trophy hunters. Both Conservancies are multi-million dollar a year businesses that plow revenue back into the management of the Conservancies; this is not surprising, as these are businesses that must take necessary measures to ensure that their investment is protected. These lion populations started with the introduction of a small number of lions and the populations have grown exponentially. As noted above, this contrasts starkly with the populations in the National Parks which are mostly decreasing.

The contribution of fenced lion populations to the conservation status of lions is highly questionable, particularly when they are not part of a metapopulation management program that mimics, to the extent possible, natural genetic exhange. Indeed, according to Bauer et al. (2015), "Fenced reserves in Kenya and southern Africa are very effective, but these reserves include many small populations that require metapopulation management, euthanasia, and contraception and only make limited contributions to ecosystem functionality and conservation outcomes" (p. 14897). Instead of implementing the management protocols noted by Bauer et al. (2015), these conservancies have allowed the lion population density to increase to abnormal levels, presumably in order to be able to sell more lions to hunters. The population density in Save Valley Conservancy is 11.7 lions/100km² and that of Bubye Valley Conservancy is 19 lions/ 100km^2, which is much higher than the average population density estimate of 9.6 lions/100km² for some other lion populations (Kruger, Hwange, Selous and Serengeti) (du Preez et al. 2015). This high lion density negatively impacts other species, not only their prey species, but also competitors such as leopard, cheetah, and wild dog (du Preez et al. 2015). It is also likely that the lions on these conservancies are highly inbred as they started from a small number of lions. And while the Conservancies reportedly provide benefits to people in the local communities (including meat, jobs, schools, and community projects), since the lions are fenced in, this does not offset livestock loss to Conservancy lions and make people more tolerant of lions; thus, the management of these lion populations cannot be said to benefit the conservation of the species.

The Service has committed to using the IUCN Species Survival Commission (SSC) Guiding Principles on Trophy Hunting as a Tool for Creating Conservation Incenties when making enhancement findings. The first of these principles is "biological sustainability" including that "it should not alter natural selection and ecological function of the hunted species or any other species that share the habitat" and "the hunting program should also not manipulate the ecosystem or its component elements in a way that alters the native biodiversity." (USFWS enhancement finding, p. 4). Clearly, Bubye Valley Conservancy and Save Valley Conservancy have violated these principles. Accordingly, the Service must conclude that lion hunting on these Conservancies is not enhancing the survival of the species, contrary to the positive finding it made in October 2017.

With regard to Hwange National Park, Loveridge et al. (2016) estimated to the total number of lions to be approximately 120 in 2012 (Figure 2F). By comparison, Zimbabwe estimates the current population to be "over 550" (ZPWMA 2016, p. 18). It would seem impossible for the Hwange lion population to have nearly quadrupled in four years. Even the lion population at Bubye Valley Conservancy only doubled over a four year period between 2008 and 2012 (du Preez et al. 2016, Figure 7). The document from Zimbabwe does not provide any details on the source of the "over 550" figure. If the true population size is much lower, it would mean that the population has decreased as compared to the population figure of Chardonnet (2002).

In summary, although the current national lion population size estimate, based on studies that use appropriate scientific methodology, is similar to that in 2002 (Chardonnet 2002), wild lion populations in Zimbabwe have decreased over approximately the past decade, while two fenced populations have increased over this time. Truly wild (not fenced in) lions in Zimbabwe number only 876 and, given a typical female:male ratio of 2:1, this means there are only 292 truly wild male lions in Zimbabwe, far less lions that assumed in the Service's enhancement finding.

(2) Zimbabwe's lion hunting quotas are not science-based, and age restrictions are poorly implemented and do not apply to all lion hunting areas in the country

Another one of the IUCN Species Survival Commission (SSC) Guiding Principles on Trophy Hunting as a Tool for Creating Conservation Incenties principles is "Net Conservation Benefit: The biologically sustainable hunting program should be based on laws, regulations, and scientifically based quotas, established with local input, that are transparent and periodically reviewed" (USFWS 2017, p. 4, emphasis added).

According to ZPWMA (2016), a new system for quota setting, the "points system for adaptively managing lion quotas", commenced in 2015 (ZPWMA 2016, p. 37). This new system, based on a study that modelled the impact of age-based lion hunting restrictions on a Tanzania lion population (Whitman et al. 2004), aims to ensure that only male lions five years of age and older are hunted. The system "rewards operators with increased quotas if they hunt animals of six years and older, but it does not penalize them if they hunt animals of five years. Neither are they penalised if they do not shoot a lion that they have on quota, however, the quotas will be reduced if they hunt animals younger than five years or if they failed to complete hunt returns" (ZPWMA, p. 40).

However, there are several major flaws with this quota setting system.

First, as pointed out by Loveridge et al. (2007), who studied lions and lion hunting in Hwange National Park, because male lions in Zimbabwe mature later than their counterparts in Tanzania, the 5 year age limit is not appropriate there. The authors said, "Measures of maturity of males in HNP (mane size, testicle size) suggest that lions in this population reach physical maturity at around 6–7 years old. These data accord with those from Kruger National Park, South Africa, showing that testicle weight, seminiferous tubule diameter, body weight and size peak between 5

and 9 years (Smuts et al., 1978b) and mean age of pride males was 6.5 (range 5–9) years (Smuts, 1978). It appears that male lions in southern Africa mature later than conspecifics in East Africa (Tanzania), where male lions reach maturity at 4 years (West and Packer, 2002; Whitman et al., 2004). If an age threshold is used to determine harvests of male lions then the 6 year minimum that Whitman et al. (2004) suggest may need to be reviewed and adjusted to take into account what is apparently later maturation of males in southern Africa. Off-take of males aged between 7 and 8 years might be more appropriate" (p. 553).

Second, the starting point for establishing quotas under this new system was the previously existing quotas (ZPWMA 2016, p. 37); however, the scientific basis for the previously existing quotas is not provided by ZPWMA (2016). ZPWMA states, "Zimbabwe implements an adaptive quota setting quota system that uses inputs from monitoring data and input from a variety of stakeholders including ZPWMA field and research staff, local communities, hunting operators, and independent biologists. Quotas are set based on population estimates or trend analyses, monitoring data, hunt return data, research work and indices as may be reflected in various reports by field personnel" (ZPWMA 2016, p. 56). It seems from this statement that some science may inform the setting of quotas but this does not mean the final outcome is science-based. Indeed, the Service concedes in its finding that quotas are not science based in some situations: "In CAMPFIRE areas, incidences of human-lion conflict are also taken into consideration where survey information is not readily available, when determining quotas for those areas (ZPWMA 2014). The quota setting process involves all stakeholders, including the ZPWMA, landowners, safari operators, and CAMPFIRE managers and their representatives. During the annual quota-setting workshop, presentations are made by the proponents who then make proposals for quotas. Where it is felt that not enough information has been presented, however, a precautionary quota will still be issued (ZPWMA 2014). The Service is not aware of how precautionary quotas are treated after they are issued, or if there is a protocol for obtaining necessary information when a precautionary quota is put in place" (USFWS 2017, p. 13).

Third, quotas do not take into account all forms of lion mortality including retaliatory killing and snaring. Indeed, the number of lions killed as a result of human-lion conflict exceeds the number killed by trophy hunters: ZPWMA states, "The exact number of lions killed in this way is difficult to assess, but may number over 50/year" (ZPWMA 2016, p. 44). Loveridge et al. (2007), who studied lion mortality in Hwange 1999-2004, found that, in addition to hunting, the population "also experienced mortality from other anthropogenic sources, including illegal snaring and killing. Lions are often inadvertently caught in snares set for other wildlife. While this only accounted for 11.8% of all mortality of [62] marked animals, we know of at least seven additional unmarked lions killed in snares during the study. It is possible that this source of mortality is under-represented as this is difficult to measure because evidence of illegal killing is often concealed. Conflict mortality needs to be taken into account when setting hunting quotas, as this mortality is additive and it is possible that even conservative hunting off-takes coupled with high levels of illegal killing could make a population vulnerable to decline" (p. 555). ZPWMA (2016) states that

21 lions were killed illegally 2013-2015, although this is likely an underestimate because the full scope of illegal activities are usually not known to government authorities.

Another form of lion mortality that may not be adequately accounted for in the quota setting process is official Problem Animal Control. Groom et al. (2014), who studied lions in Gonarhezou, said "Another important cause of lion mortality in Gonarezhou was the destruction of lions considered to be problem animals. Problem animal control incidences are poorly recorded and the responsibility is often handed over to hunting operators, with apparently little record-keeping (RJG, pers. obs.). However, we acquired records of at least 18 lions being shot as problem animals between 1993 and 2009 around the southern half of Gonarezhou. In many cases the sex of the lion killed was not recorded but at least five of them were females and one was a cub. This is likely to affect the population negatively, as regular removal of even small numbers of reproductive females can expose a population to decline (Van Vuuren et al., 2005). Moreover, as reproductive success is closely related to pride size, and prides of three or more adult females are significantly more successful at rearing cubs than smaller prides (Packer et al., 1988), removal of adult females may result in lower cub survival. Since 2009 there has been virtually no lethal problem animal control for lions around Gonarezhou, although lions are still reported to be killing livestock and there is evidence that communities poison them. Exact figures are unknown but presumed to be higher than recorded" (p. 6).

Fourth, CAMPFIRE areas are exempt from age-based quotas. ZPWMA (2016) states "the CAMPFIRE areas in which lions occur are currently exempted from the age restrictions. This approach was adopted as a means of ensuring that impoverished communities obtain the opportunity to benefit from the presence of lions, recognising the potential negative impacts the species has on the livelihoods of livestock farmers" (p. 41). This exemption is acknowledged by the Service (USFWS 2017, p. 14) but later in the document the Service arbitrarily states, "The adaptive quota management system for lion hunting based on the ages of lions hunted has been accepted and embraced by all stakeholders" (USFWS 2017, p. 17). The Service downplays the importance of this exemption by stating, "While hunting is allowed in CAMPFIRE areas, it is unclear if American sport hunters conduct lion hunts in these areas; if so, the Service is not aware if sport hunters are exempted from the age restriction in this case, and how this exemption in CAMPFIRE areas is taken into consideration when setting quotas for other portions of the country" (p. 14). It is unclear why the Service would think that American trophy hunters would not be exempt from the age restrictions if they hunted lions in CAMPFIRE areas, and it is unreasonable for the Service to make an enhancement finding based on such a presumption.

As to the question of whether American trophy hunters hunt lions in CAMPFIRE areas, the Service repeatedly argues later in the document that American hunters do hunt lions in CAMPFIRE areas and that this is an important source of income. For example, the Service states, "Across all CAMPFIRE districts, from 2010 to 2015, there was a total quota of 140 lions, with actual offtake equaling 45 animals. During this same period, U.S. trophy hunters apparently accounted for 51% of Zimbabwe's trophy hunting clients; trophy fees represented 74% of CAMPFIRE income, of

which lions play a small role" (USFWS 2017, p. 17). Using these figures, it can be hypothesized that of the approximately eight lions killed annually from 2010-2015, four were killed by Americans. The fact that Zimbabwe is willing to forgo age-restrictions for lions hunted in CAMPFIRE areas, means that hunting in these areas is potentially detrimental to the lion populations therein because younger lions will be killed. Consequently, it would violate the Endangered Species Act for the Service to issue import permits for lions killed in CAMPFIRE areas based on the October 2017 finding and without evidence that they were at least five years old when killed.

Fifth, the age restrictions are poorly implemented. According to du Preez et al. (2016), in 2015, 16% of lions hunted were under 5 years of age; this means that, of the 49 lions hunted that year (ZPWMA 2016, p. 38), seven were under age. Furthermore, the implementation of the restrictions varied between the three main lion-hunting areas in 2015: In Zambezi Valley, about 50% of lions hunted were less than 5 years old, compared to about 20% in Lowveld and about 5% in Matland North (Du Preez et al. 2016, Table 6, p. 11); thus, certain areas of the country is more prone to violating the age restrictions. Hunting of lions under the age of 5 is detrimental of lion populations. Consequently, the Service cannot lawfully issue import permits for lions from Zimbabwe hunted in areas that are prone to violating the age restrictions.

In summary, although the current national lion population size estimate, based on scientific surveys, is similar to that in 2002 (Chardonnet 2002), wild lion populations in Zimbabwe have decreased over approximately the past decade, while two fenced populations have increased over this time. Truly wild (not fenced in) lions in Zimbabwe number only 876 and, given a typical female:male ratio of 2:1, this means there are only 292 truly wild male lions in Zimbabwe. Given that the 2016 hunting quota was 81 male lions (ZPWMA 2016, p. 38), and subtracting the 15 lion quota for Bubye (du Preez et al. 2016, p. 13) and 10 lion quota for Save (du Preez et al. 2016, p. 18), the 56 wild lions remaining on quota represent 19 percent of the wild male population. This exceeds the recommendation of Loveridge et al. (2007, p. 556) that quotas should be reduced "to realistic levels (no more than 10% of adult males) based on robust population estimates would ease excessive off-takes of male lions." Therefore, the Service's positive enhancement finding is not in accordance with law and import permits cannot lawfully be issued pursuant to this finding.

(3) Zimbabwe's 11-year-old lion management plan still has not been substantially implemented

The Service states, "when making a determination of whether an otherwise prohibited activity enhances the propagation or survival of *P. I. melanochaita*, the Service examines the overall conservation and management of the subspecies in the country where the specimen originated and whether that management of the subspecies addresses the threats to the subspecies (i.e., that it is based on sound scientific principles and that the management program is actively addressing the current and longer term threats to the subspecies)" (USFWS 2017, p. 2)

The Service further states, "When evaluating whether the importation of a trophy of *P. I. melanochaita* would be authorized pursuant to 50 CFR 17.32, in accordance with our threatened species issuance criteria, we will examine how a country's management program for lions addresses the three main threats that have led to the decline of the subspecies: habitat loss, loss of prey base, and human-lion conflict. When examining a management program and whether trophies taken as part of that program meet the issuance criteria, we study a number of factors. Some of the factors we consider include whether the program is based on sound scientific information and identifies mechanisms that would arrest the loss of habitat or increase available habitat (i.e., by establishing protected areas and ensuring adequate protection from human encroachment). We consider whether the management program actively addresses the loss of the lion's prey base by addressing poaching or unsustainable offtake within the country. A component of a management plan from which trophy imports would meet the issuance criteria would be whether there are government incentives in place that encourage habitat protection by private landowners and communities and incentives to local communities to reduce the incursion of livestock into protected areas or to actively manage livestock to reduce conflicts with lions. We examine if the hunting component of the management program supports all of these efforts by looking at whether hunting concessions/tracts are managed to ensure the long-term survival of the lion, its prey base, and habitat" (USFWS 2017, p. 5).

Finally, the Services states, "Management programs for *P. I. melanochaita* are expected to address, but are not limited to, evaluating population levels and trends; the biological needs of the species; quotas; management practices; legal protection; local community involvement; and use of hunting fees for conservation. In evaluating these factors, we will work closely with the range countries and interested parties to obtain the information. By allowing entry into the United States of *P. I. melanochaita* trophies from range countries that have science-based management programs, we anticipate that other range countries would be encouraged to adopt and financially support the sustainable management of lions that benefits both the species and local communities. In addition to addressing the biological needs of the subspecies, a scientifically based management program would provide economic incentives for local communities to protect and expand *P. I. melanochaita* habitat" (USFWS 2017, p. 5).

The Service has previously stated, "We evaluate whether a country has a valid national or regional management plan and if the country has the resources and political will to enact the plan. If there is a plan, what government entities implement the plan and how often is it reviewed and updated? Does the plan have clear, achievable objectives? Are the objectives measurable and are they being achieved? Is there an adaptive management approach within the plan so that enacting agencies can quickly respond to changing environmental or social issues?" (USFWS 2015, p. 1-2).

The Service concedes that the most recent lion management plan for Zimbabwe is the 2006 Conservation Strategy and Action Plan for the Lion (*Panthera leo*) in Zimbabwe (USFWS 2017). The plan aims to: ensure the persistence of key lion populations and other important populations including those of doubtful viability; reduce human and livestock loss; and optimize wildlife

conservation-related net benefits to local communities. The plan contains seven objectives, each with several targets; each target has activities to be conducted to achieve the target. If fully implemented, the plan could address the three main threats that have led to the decline of the subspecies: habitat loss, loss of prey base, and human-lion conflict. However, data in the Service's possession reveals that the plan has not been fully implemented.

ZPWMA (2016) provided an update on implementation of the plan (Table 2, below). According to the information provided by ZPWMA (2016), after eleven years, none of the seven identified outputs in the plan have been completed. Of the 24 identified targets in the plan, only one, Target 1.4 (develop and implement a national lion captive breeding management policy), is completed, but this is irrelevant to the Service's finding regarding enhancement based on hunting of wild lions in Zimbabwe. Of the 108 activities in the plan, evidence presented by ZPWMA (2016) indicates that only 26 have been completed. Therefore, Zimbabwe has not made substantial progress on implementation of the plan over the past eleven years and it is arbitrary and capricious for the Service to issue an enhancement finding based on this outdated plan.

Instead of conducting a thorough analysis of whether or not the plan has been implemented over the past eleven years, using the information provided by ZPWMA (2016) – as we have in Table 2 below – the Service instead examined implementation of only three outputs which the Service states "are most relevant to determining if the implementation of the strategy enhances the propagation or survival of the species, as required by the ESA for the issuance of import permits" (USFWS 2017, p. 10); these are Output 1 (lion populations, their habitats and wild prey effectively conserved and managed in collaboration with local stakeholders), Output 3 (human-lion related conflicts minimized and, where possible, eliminated), and Output 4 (the costs and benefits of long-term lion management equitably distributed). However, even the Service's analysis of these outputs is flawed.

For each Output, the Service (USFWS 2017) copied and pasted information provided by ZPWMA (2016) about the output's targets with no analysis. Furthermore, the Service failed to analyze whether or not the activities in plan to meet the targets had been undertaken or completed. Our analysis of Outputs 1, 3 and 4 (Table 2) indicate that these outputs have not been completed. Specifically, for Output 1, only one of the six targets have been completed (on captive breeding management), and only 12 of 28 activities have been completed (and six of these relate to captive lions). Yet, the Service finds that "ZPWMA is actively working toward meeting the target areas for this output" (USFWS 2017, p. 11). For Output 3, none of the six targets have been completed, and only 2 of 21 activities have been completed. Yet, the Service finds that "information submitted in the ZPWMA update suggests that they have met one target, and are in the process of implementing the remaining two" (USFWS 2017, p. 11). For Output 4, three of the four targets have not been completed and the remaining target has been partially completed, and only 3 of 18 activities have been completed. Yet, the Service finds that "ZPWMA has made progress toward this output's targets" (USFWS 2017, p. 11).

In summary, the information provided by ZPWMA and adopted without independent analysis by the Service, clearly demonstrates a lack of progress toward meeting the stated targets and undertaking the stated activities in the plan. Without such evidence, principally this is a plan on paper only, and it is entirely arbitrary and capricious for the Service to have made a positive enhancement finding based on this information.

Table 2. Implementation status of the 2006 Conservation Strategy and Action Plan for the Lion (*Panthera leo*) in Zimbabwe.			
Outputs and Targets	**Information Provided in ZPWMA (2016) Regarding Target Completion**	**Analysis of Progress on Completing Targets and Activities** (underscored text)	
		Targets (targets cannot be considered "completed" unless all activities are completed)	**Activities** (activities cannot be considered "completed" unless they are thoroughly completed; partial completion is not considered to be completed)
Output 1. Lion Management - Lion populations, their habitats and wild prey effectively conserved and managed in collaboration with local stakeholders			
Target 1.1 Establish a baseline survey and monitoring programme for identified lion populations and their range inside and outside the Parks & Wildlife Estate	Baseline surveys have been completed for the Parks Estate using monitoring protocols for key variables (populations, habitats, prey). Selected surveys undertaken of areas outside National Parks in conservancies and some communal land and forest areas.	Not completed.	1) Undertake baseline surveys, and where necessary, identify populations outside Parks & Wildlife Estate. Not completed (only partially completed). 2) Design, develop and set up simple but robust monitoring protocols for key variables (populations, habitats, prey). No details provided to substantiate this has been concluded. 3) Set up systems for carrying out collaborative surveys and monitoring across boundaries with shared lion populations (National Park, Safari Area, Forest Area, Communal Land, Large/Small Scale Commercial Farming and/or International). No information provided.
Target 1.2 Maintain and strengthen capacity for lion conservation, management, monitoring and research	Carnivore research programmes undertaken by NGOs (Mana, Matusadona, Gonarezhou, Zambezi and Hwange NPs,	Not completed.	1) Undertake training needs assessment. No information provided. 2) Identify and secure funding resources. No information provided.

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within PWMA and amongst other key stakeholders	Matetsi, Chirisa SA) and research institutions (Bubye and Save Conservancies) in various parts of the country. Personnel trained in data collection and capture, management, lion aging and analysis.		3) Provide training and capacity strengthening within PWMA and amongst other key stakeholders e.g. RDCs. No information provided. 4) Train personnel in data capture, management and analysis. No details provided to substantiate this has been concluded.
Target 1.3 Identify and implement best management standards and practice for all trophy hunted lion populations, ensuring their viability and sustainable, equitable and adaptively managed trophy quotas	Quota setting methodology reviewed and annual quotas and offtakes analysed considering population changes, trophy quality and levels of PAC over time. Trophy hunting database in place and in process of being refined to provide cost-effective system for collation, entry, analysis, reporting and feedback to key stakeholders in the wildlife industry (ZPWMA, RDCs, SOAZ, ZPHGA, conservation NGOs, Researchers etc.). System of fixed and optional quotas reviewed and age- based	Not completed.	1) Implement Quota Setting Methodology rigorously and consistently across all hunting areas. No information provided to address rigorousness or consistency across all hunting areas. 2) Review and analyse annual quotas and offtakes to ensure these are adaptive and responsive to population changes, trophy quality and levels of PAC over time. Insufficient details provided to substantiate this has been concluded.. 3) Allocate quotas at a scale reflective of lion ecological and biological functionality which invariably differs

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	criteria for male trophy animals in place and functioning.		across different land unit sizes or land uses. No information provided. 4) Refine and update the hunt return form [TR2] and the trophy hunting database and review annually thereafter. Annual review, and TR2 not addressed in information provided. 5) Ensure centralised database and cost-effective system for data collection from hunting areas and subsequent collation, entry, analysis, reporting and feedback to key stakeholders in the wildlife industry (PWMA, RDCs, SOAZ, conservation NGOs, Researchers etc). Apparently in progress. 6) Replicate Matetsi Safari Area hunt data collection system in all Parks and non-Parks hunting areas and train PWMA, RDC and other relevant field staff to gather and collate hunting data as per the Matetsi system. No information provided.

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Outputs and Targets	**Information Provided in ZPWMA (2016) Regarding Target Completion**	**Analysis of Progress on Completing Targets and Activities** (underscored text)	
		Targets (targets cannot be considered "completed" unless all activities are completed)	**Activities** (activities cannot be considered "completed" unless they are thoroughly completed; partial completion is not considered to be completed)
			7) Train PWMA, RDC and other relevant field staff in the Quota Setting Methodology. No information provided. 8) Review system of fixed and optional quotas (and auctioned hunts) to improve incentives to hunt trophy male lion only, including quota-based incentives/disincentives. Reportedly completed. 9) Review trophy fees to maximise benefit and generate additional revenue. No information provided. 10) Review and put in place criteria for age-based identification of male trophy animals. Reportedly completed.
Target 1.4 Develop and implement a national lion captive breeding management policy	Policy in place.	Reportedly completed; policy is available.	1) Identify captive breeding enterprises and establish purpose 2) Consult with stakeholders including breeders, ZNSPCA, IUCN Captive Breeding Specialist Group, and others e.g. Tikki Hywood Trust (THT) 3) Establish destination and role of captive bred lions upon reaching maturity

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Outputs and Targets	**Information Provided in ZPWMA (2016) Regarding Target Completion**	**Analysis of Progress on Completing Targets and Activities** (underscored text)	
		Targets (targets cannot be considered "completed" unless all activities are completed)	**Activities** (activities cannot be considered "completed" unless they are thoroughly completed; partial completion is not considered to be completed)
			4) Relate captive bred lions to existing captive breeding policies for crocodiles, ostriches and operations for other captive bred wild species, e.g. Lion & Cheetah Park, Chipangali 5) Review existing policies and/or guidelines 6) Appoint Working Group to develop captive lion breeding policy as appropriate or necessary e.g. WWF-SARPO, NSPCA, THT, Captive Breeders, Wildlife Veterinary Unit.
Target 1.5 Develop and implement co-management frameworks for wildlife management	Collaborative national lion action plans to co-management lion populations in place for NW Matabeleland and SE Lowveld, including three conservancies (Bubye Valley, Save and Malilangwe).	Not completed.	1) Develop a national lion action plan that articulates collaborative co-management of lion populations amongst different land categories and users in the four major wildlife areas of the country: NW Matabeleland, Sebungwe Region, Zambezi Valley and SE Lowveld. Partially completed. 2) Ensure adoption and implementation of co-managements plans by stakeholders

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Outputs and Targets	**Information Provided in ZPWMA (2016) Regarding Target Completion**	**Analysis of Progress on Completing Targets and Activities** (underscored text)	
		Targets (targets cannot be considered "completed" unless all activities are completed)	**Activities** (activities cannot be considered "completed" unless they are thoroughly completed; partial completion is not considered to be completed)
			including conservancies. No information provided. 3) Develop and implement participatory monitoring of implementation of plans. No information provided.
Target 1.6 The geographic distribution range of the lion population expanded	Conservancies and neighbouring communities are working together to maintain existing geographic distribution of lion populations. Zimbabwe proactive in the KAZA and GLTFCA programmes.	Not completed. Information provided relates to maintaining existing geographic distribution, rather than expanding the distribution.	1) Conservancies and neighbouring communities to work together and incorporate neighbouring communal lands into conservancies where possible. Reportedly completed, but lack of details makes it impossible to evaluate. 2) TFCAs to develop programmes to increase jointly managed lion populations. No information provided on all programs.
Output 2. Lion Research - Information for effective and adaptive lion conservation management generated			
Target 2.1 Initiate targeted research on lion ecology, management and mitigation of conflict	Extensive research programmes focussing on lion ecology and biology undertaken in Hwange, Bubye, Save, Malilangwe, Matusadona, Chizarira and Chirisa. ZPWMA have cooperated with NGOs, such as Panthera, to	Not completed.	1) Identify gaps in knowledge of lion ecology and biology that require research. No information provided. 2) Identify areas where collaborative (including cross boundary/border) research is required. No information provided.

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	develop cost-effective age determination methods for lions. Key threats to lion populations, with focus on human-lion conflict, snaring and poisoning, undertaken and continually monitored.		3) Standardise methodology where collaborative research is required. No information provided. 4) Develop cost-effective age determination methods for lions. Reportedly completed. 5) Identify population ecology research questions in key lion populations. No information provided. 6) Explore predator-prey relationships. No information provided. 7) Identify socio-ecological research needs. No information provided. 8) Assess the impact of key threats to lion populations in Zimbabwe at present, with particular focus on human-lion conflict, snaring (both direct mortality of lions in snares and depletion of prey populations), and the sustainability of hunting quotas. Reportedly completed.

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Output 3. Mitigation - Human-lion related conflicts minimized and, where possible, eliminated			
Target 3.1 Develop and establish databases on lion/human conflict	Data on Problem Animal Control (PAC) reports on lion related problems collated.	Not completed.	1) Collect PAC (Problem Animal Control) reports on lion related problems. Reportedly completed, although whether this is national or more limited in scope is not clear. 2) Analyse reports & produce evaluation matrix. No information provided. 3) Produce report with recommendations on appropriate PAC monitoring system, e.g. MOMS Oriented Monitoring Systems). No information provided. 4) Undertake community training on MOMS. No information provided.
Target 3.2 Identify and implement methods to reduce and mitigate livestock losses and lion attacks on humans	Approaches to mitigate livestock losses and lion attacks on humans being tested and implemented in Hwange. Methods to mitigate lion attacks on livestock being implemented as appropriate at selected sites (e.g. Tsholotsho).	Not completed.	1) Undertake participatory planning on how to mitigate livestock losses and lion attacks on humans. No information provided. 2) Undertake field work to identify weakness in livestock husbandry in relation to mitigation. No information provided. 3) Review literature, capitalise on experiences and lessons learned

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			elsewhere, e.g. Namibia, and undertake community leadership exchange visits. No information provided. 4) Examine and design appropriate farmer-based compensation schemes, e.g. HACSIS, Namibia. No information provided. 5) Provide training on lion mitigation methods. Limited efforts underway in a few places, according to information provided. 6) Implement mitigation methods as appropriate at selected sites. Reportedly completed.
Target 3.3 Trained and properly staffed PAC Units established to conduct rapid response, restrained and precisely targeted problem animal control	PAC Units at ZPWMA field station and/or RDC levels partially established.	Not completed.	1) Undertake needs assessment and capacity for managing PAC Units at PWMA field station and/or RDC levels. No information provided. 2) Define the role and responsibility of Units. No information provided. 3) Train and equip Units. No information provided. 4) Training and capacity building for PAC to be delegated to the responsible

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			appropriate authority (RDC) and sub-district levels. No information provided. 5) Collaborative and effective PAC techniques developed and implemented within 5 years. No information provided.
Target 3.4 Incidents of human-lion conflict reduced by at least 30% in 5 years while also reducing retaliatory killing	Specific awareness and education package on lion conservation and management developed and implemented in Matusadona, Hwange and Gonarezhou regions.	Not completed. Answer does not address target percent reduction or timeline.	1) Specific awareness and education package on lion conservation and management developed and implemented within 5 years. Partially implemented, according to information provided. 2) Mechanisms developed with the livestock sector to reduce livestock predation by lions by at least 35% from the current level within 5 years. No information provided.
Target 3.5 Number of lions killed through indiscriminate killings reduced by at least 30% in 5 years after baseline established.		Not completed. Target missing from ZPWMA (2016).	1) Country specific awareness and education package on lion conservation and management developed and implemented within 5 years. No information provided. 2) Develop incentives for communities to use legal PAC in identified 3 hotspots within 5 years. No information provided.

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Target 3.6 Incidences of lion attacks on humans reduced by at least 30% from the current levels in 5 years		Not completed. Target missing from ZPWMA (2016).	1) Develop and implement collaborative and effective PAC techniques. No information provided. 2) Develop appropriate educational and awareness programmes to promote avoidance of potentially lethal encounters between humans and lions. No information provided.
Output 4. Socio- Economic - The costs and benefits of long-term lion management equitably distributed			
Target 4.1 Complete an inventory of stakeholders directly affected by lion conservation	Stakeholder groups (e.g. local communities, CAMPFIRE RDC representatives, commercial safari hunting operators (SOAZ, ZPHGA), tourism operators (ZATSO) identified. Financial impacts of lion conservation and extent and magnitude of socio-economic impacts on each stakeholder group completed.	Partially completed.	1) Identify stakeholder groups (e.g. local communities, CAMPFIRE RDC representatives, commercial safari hunting operators (SOAZ, ZPH&GA), tourism operators ZATSO) at the appropriate scale. Reportedly completed. 2) Identify the financial impacts of lion conservation on each stakeholder group. Reportedly completed. 3) Determine extent and magnitude of socio-economic impacts on each stakeholder group. Reportedly completed.

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			4) Prioritise groups for intervention based on extent and magnitude of socio-economic impacts. No information provided.
Target 4.2 Deliver appropriate training and capacity building to prioritised stakeholders	Representative stakeholder groups in some regions identified (Hwange, Matusadona, Gonarezhou). Limited training undertaken. Implement adaptive programme across four wildlife regions	Not completed.	1. Identify representative stakeholders groups per wildlife region. Partially completed according to information provided. 2. Identify training needs in consultation with identified stakeholders. No information provided. 3. Develop training materials and implement training programmes. No information provided. 4. Review effectiveness of training material and programme in consultation with identified stakeholders. No information provided. 5. Implement adaptive programme across 4 wildlife regions. No information provided.
Target 4.3 Agree and implement collaboratively	In progress. Hwange NP Management Plan approved.	Not completed.	1) Consult identified stakeholders. No information provided.

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developed area-specific lion management plans with identified stakeholder groups in each wildlife region within 5 years			2) Determine the scope and scale of the key activities of the management plan. No information provided, although reportedly a management plan for one area, Hwange NP, is approved. 3) Identify and integrate 'best practices', making provisions for: • Ownership issues • Zoning for wildlife • Mutually binding agreement • Verifiable compliance • Suitable wildlife utilization plan (e.g. tourism, trophy hunting) • Income flows and cost distribution (including rainy-day funds to anticipate uncertainties in tourist revenues) • Appropriate husbandry techniques • Conflict-mitigation measures • Regulation of human immigration • Adequate wildlife and conflict monitoring • Annual environmental audits No information provided.

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			4) Implement management plan. No information provided. 5) Review plan annually and amend where necessary. No information provided.
Target 4.4 Implement transparent mechanisms to equitably distribute lion-related/generated income to identified stakeholders (groups and/or communities)	Scale of income generated from lion conservation reviewed and use of funds to encourage protection of lion populations reach local stakeholders undertaken (see CAMPFIRE generated revenues)	Not completed.	1) Identify income generated from lion conservation (see CAMPFIRE generated revenues). No detailed information provided. 2) Ensure that benefits of protecting lion populations reach local stakeholders. No information provided. Zimbabwe document does not provide enough details to evaluate if this activity occurred and its scope (national or local). 3) Distribute generated income according to intensity of lion impact (Apply CAMPFIRE Producer Community/Ward principles). No information provided. 4) Provide appropriate incentives, e.g. implementation of mitigation measures

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			and/or local re-location of people in high-conflict areas to low-conflict areas. No information provided. 5) Provide appropriate incentives e.g. participatory land use planning, to discourage immigration into lion and other wildlife range. No information provided.
Output 5. Regulations - Effective regulation of consumptive lion utilisation ensured			
Target 5.1 Implement approved policy and practice at national and local levels regarding problem animal control (PAC) of lions within 2 years	Current policy and practice regarding problem animal control of lion reviewed, at national and local levels. PAC offtakes reconciled with trophy hunting quota offtake to ensure that the overall offtake (i.e. total quota) is sustainable.	Not completed. ZPWMA (2016) did not address timeline in target.	1) Review, and revise where necessary, current policy and practice at national and local levels regarding problem animal control of lions (PAC). Reportedly completed. 2) Identify key responsibilities of the Appropriate Authority (AA), i.e. the land occupier in respect of problem animal control of lions, given the vulnerable status of lions and recent changes in land tenure. No information provided. 3) Incorporate PAC offtakes with trophy hunting quota offtake to ensure that the

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			overall offtake (i.e. total quota) is sustainable. Reportedly completed, but lack of details makes it impossible to analyze. 4) Determine need for regulation of PAC, including the provision of incentives/disincentives. No information provided. 5) Establish database for lion PAC (see Targets 1.5 & 3.1 above). Reportedly completed. 6) Ensure PAC policy and practice conforms to the appropriate scale of lion ecological functionality, temporally and spatially, and that this is recognised as an AA responsibility with respect to hunting and PAC offtakes. No information provided.
Output 6. Communication, Awareness and Information Dissemination			
Target 6.1 To carry out awareness programmes in 50% of the districts in	Awareness programmes initiated at a national level, with professional hunters, communities and NGO community. Awareness	Not completed. ZPWMA (2016) did not address percentage and	1) Identify target groups that need awareness. Reportedly completed.

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Zimbabwe within the next three 3 years	campaigns being carried out by the Extension and Interpretation Unit in all the regions.	timelines in the target.	2) Identify awareness needs for different target groups e.g. hunters, politicians, farmers. No information provided. 3) Develop and package awareness materials for different target groups, e.g. multi-media tools, TV, internet, radio. No information provided. 4) Implement awareness programmes. Information provided indicates that awareness programs have been 'initiated,' but no information is provided on whether this reached 50% of districts in three years, as per the target. 5) Create feedback mechanisms for target groups. No information provided. 6) Provide extension, information and interpretative services to surrounding communities. Reportedly completed.
Target 6.2 Create lion conservation and management information units within one year	Databases established at some key research centres using dedicated external research programmes (e.g. WILDCRU).	Not completed. ZPWMA (2016) did not address target of	1) Facilitate flow of information from various sources. No information provided.

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		establishing lion conservation and management units in one year.	2) Document and process information from various sources. No information provided. 3) Create information database. Reportedly completed. 4) Use Mushandike Natural Resources College as a training centre. No information provided. 5) Define personnel needs and resource requirements. No information provided. 6) Training, M&E, Research. No information provided.
Output 7. Regional and Trans-Boundary Collaboration			
Target 7.1 Undertake an inventory of national strategies for lion management	Done.	Not completed. Reportedly "done"; however, no information is provided on activities for this target.	1) Make a presentation at the AWCF Meeting in November 2006. Reportedly completed, but outcome not reported. 2) Develop a budgeted proposal seeking funds to undertake the inventory. No information provided. 3) Appoint 1/. a consultant or 2/. design questionnaire or 3/. use TFCA Conservation Committee or a combination of 2 & 3. No information provided.

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Target 7.2 Encourage the development of national lion conservation strategies where these are missing &/ or incomplete	National lion conservation strategies discussed at AWCF (meeting held under auspices of KAZA).	Not completed. ZPWMA (2016) did not report on outcome of activities for this target.	1) Seek consensus from the AWCF for the development & implementation of national lion conservation strategies. No information provided on outcome. 2) Contact counterparts before the AWCF Meeting. No information provided. 3) Present national lion strategies where applicable and/or available. No information provided on whether presentations were made. 4) Obtain support from neighbouring countries for the development of national lion conservation strategies. No information provided. 5) Persuade neighbours to develop national lion conservation strategies. No information provided.
Target 7.3 Develop an integrated and harmonised lion management strategy for Transfrontier Conservation Areas (TFCAs)	Lion conservation strategies for SADC discussed at AWCF meeting held under auspices of KAZA.	Not completed. ZPWMA (2016) did not report on activities for this target.	1) Within 2-3 years (medium term) develop the SADC strategy for lion conservation and management. No information provided; no information on outcome or whether time-frame in activity was met.

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			2) Develop appropriate framework: − Develop National strategies − Seek consensus through AWCF Incorporate into TFCA Treaties − Develop SADC strategy No information provided on outcome of discussions held at meetings.
Target 7.4 Implement lion conservation strategy and management plan	Strategy under review.	Not completed. ZPWMA (2016) did not report on activities for this target.	1) Incorporate strategy into TFCA Conservation Committee workplans [& other stakeholder workplans]. No information provided. 2) Seek funding as required. No information provided. 3) Carry out half-yearly compliance reviews. No information provided. 4) Report back annually to all stakeholders especially those not involved in implementation. No information provided.

(4) ZPWMA lacks funding to enforce existing laws

As noted by the Service, "only revenues generated through sport-hunting conducted on state and private lands are used to finance ZPWMA; to our knowledge, no other government funding is provided, and only limited outside funding from NGOs or other governments appears to be available" (USFWS 2015, p. 8). ZPWMA (2016) confirmed this remains the case, and stated that it is unable to generate adequate revenue to cover both the capital and operating requirements (p. 26). In 2015, ZPWMA incurred a loss of US$5.4 million including depreciation (ZPWMA 2016, p. 26). The Service has expressed concerns about "the ability of ZPWMA to generate sufficient funds to support adequately their stated mission" and "if Zimbabwe has adequate resources to enforce existing laws and regulations" (USFWS 2015, p. 10-11). According to ZPWMA itself "no amount is budgeted for conservation in the national budget,"[3] leading to inadequate enforcement and implementation of laws and regulatory mechanisms. Lack of government funding also leaves the ZPWMA to rely on trophy hunting, even when unsustainable, to pay its bills, creating an inherent conflict of interest for the wildlife management agency. Therefore, the Service's concern – expressed in its 2015 finding concluding that Zimbabwe does not sustainably manage its elephant populations – that there is a lack of a national mechanism to sustain wildlife conservation efforts in Zimbabwe (USFWS 2015) remains valid.

ZPWMA (2016) noted that enforcement efforts have been hampered by lack of funding:

- "The current remuneration levels have remained low with the lowest paid worker receiving a gross salary of $375 per month. The last salary increase of 23% was in January, 2014. A comparison with other Parastatals within the same parent ministry, shows that the Authority has the lowest salary scales" (p. 20).
- "Only 70% of the Authority's vehicle fleet are in "sound condition" and, of three aircraft owned by the Authority, only one is in operation (p. 20).
- At the end of 2015, there were only 67% of rangers in post (1,448 out of 2,146), and only 1,004 of these were deployable for anti-poaching operations (p. 20).
- "Commercial wildlife poaching involving both local and foreign nationals continues to plague Zimbabwe, especially with respect to elephant and rhino located in the Zambezi Valley, Sebungwe, North-West Matabeleland, South-East Lowveld" (p. 21) "Note that 21 lions were killed illegal between 2013 – 2015, with 6 animals killed through snaring in the area adjacent to Hwange National Park in 2015." (p. 21).

In its October 2017 finding, the Service acknowledged the lower number of rangers in post, but ignored these other enforcement problems (USFWS 2017, p. 7).

[3] http://zimparks.org/zimbabwe-parks-and-widlife-management-authority-zimparks-successfully-exports-35-african-elephants-to-china/ (viewed 5 October 2017)

Lack of funding for ZPWMA has limited anti-poaching efforts and this has had negative effect on wildlife conservation. Mana Pools National Park and neighboring safari areas, which are located in the mid-Zambezi area, is one of the areas hardest hit by poaching. At a 2015 workshop held by ZPWMA to develop an anti-poaching strategy for the Park,[4] the Area Manager for the Park, Marvellous Mbikiyana, was quoted in a workshop report as having stated, "While the ideal staffing level for rangers is 110 for the Park, 75 have been approved, and only 38 are on site. Of the 38 on site, only 13 are deployable at any one time, due to a number of other commitments, such as driving duties, serving in the front office, and so on." The workshop report noted that the effectiveness of enforcement was negatively affected by low manpower.

Furthermore, according to the 2016 report on the Elephant Trade Information System (ETIS) at CITES CoP17 Doc. 57.6 (Rev. 1),[5] "Zimbabwe is the country that pulls the rule of law score down, indicating far greater governance challenges exist in that country" (p. 16). The World Justice Project (WJP) Rule of Law Index 2016 ranked Zimbabwe at 108 out of 113 countries and jurisdictions, meaning that Zimbabwe has the sixth worst rule of law.[6] According to WJP, "Effective rule of law reduces corruption, combats poverty and disease, and protects people from injustices large and small. It is the foundation for communities of peace, opportunity, and equity—underpinning development, accountable government, and respect for fundamental rights."[7]

Indeed, instead of effectively implementing and enforcing wildlife laws and regulations, ZPWMA personnel have been implicated in the illegal wildlife trade. In 2015, three ZPWMA staff members were arrested for involvement in the theft of ivory from a government stockpile held at Hwange National Park.[8] The arrests came after a shipment of 62 tusks on its way to China was seized at the international airport in Harare. Serial numbers on the tusks were traced to the Hwange government stockpile. An alleged Chinese smuggler, who claimed he represented the Chinese government, had obtained export permit signed by the most senior of the three ZPWMA people arrested. All three were released from custody, the senior ZPWMA person after paying a $600 bail; none appeared in court again. Allegedly, the investigation was stopped after senior ZPWMA officials in Harare intervened in order to cover the involvement of other ZPWMA officials in the smuggling. The investigation seemed implicate senior parks and Ministry of Environment, Water and Climate officials. Allegedly, the ZPWMA trio had been exporting ivory from the stockpile since 2012.

[4] http://www.zamsoc.org/wp-content/uploads/2016/04/MPNP-Anti-Poaching-Workshop-Summary-Report-15-April-2015.pdf
[5] https://cites.org/sites/default/files/eng/cop/17/WorkingDocs/E-CoP17-57-06-R1.pdf (viewed 5 October 2017)
[6] https://worldjusticeproject.org/sites/default/files/documents/ROLIndex_2016_Zimbabwe_en.pdf (viewed 5 October 2017)
[7] https://worldjusticeproject.org/sites/default/files/documents/ROLIndex_2016_Zimbabwe_en.pdf (viewed 5 October 2017)
[8] https://oxpeckers.org/2016/04/how-to-steal-an-ivory-stockpile/ (viewed 5 October 2017)

They had the assistance of ZPWMA security personnel and police units who guarded the trucks carrying the ivory over the 880 km from Hwange to the airport.

Corrupt government officials allegedly have been involved in both poaching of elephants and illegal export of ivory tusks, and involvement in a transnational syndicate.[9] Edson Chidziya, the former Director General, Zimbabwe Parks and Wildlife Management Authority, and one-time regional representative for Africa on the Animals Committee of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES),[10] and who has supported Safari Club International's lawsuit against the U.S. Department of the Interior regarding the prohibition of elephant trophies from Zimbabwe,[11] was fired in May 2017 for his alleged involvement in the disappearance of rhino horns worth $3 million two years before.[12]

Of further concern is that the ZPWMA operates without a board which, as noted by Mupfiga and Chirimumimba (2015), creates "a leadership vacuum and also legal constraints for the validation of policy decisions and approval or authorization of programmes" and it is "worrying for State entities to operate without boards for long periods because management are then left to operate without accountability, a situation which may compromise the efficiency and effectiveness of an entity due mainly to the absence of an effective oversight function" (p. 4).

Politics and corruption also play roles in trophy hunting in Zimbabwe. A 2012 news article explained how officials from Zimbabwe's ruling party since 1980 sought to cash in on trophy hunting by taking over hunting concessions.[13] A 2015 news article quoted Mary-Jane Ncube of a Zimbabwe NGO that monitors corruption, Transparency in Zimbabwe, as stating "In the area of conservation, I think it [the government] has behaved like a predatory state, going after big investments, giving them to cronies, family, and really not having any concern for communities that are dependent on that land …"[14] Furthermore, she was quoted as saying, "National Parks was the authority in charge of concessions and licensing, but because of the corruption … concessions and licenses are now given according to who you are and who you can pay the highest dollar to." A June 2017 news article described how the Tsholotsho Rural District Council sold permits to a safari hunting company, Lodzi Hunters, to hunt 50 elephants in order to get money to fund the construction of a football stadium. This reportedly came about after Higher and Tertiary Education, Science and Technology Development Minister Professor Jonathan Moyo, who is the MP for the

[9] http://globaljournalist.org/2017/02/zimbabwe-journalist-fights-charges-poaching-report/ (viewed 10 August 2017)
[10] https://cites.org/sites/default/files/eng/com/ac/22/E22-05-01.pdf (viewed 5 October 2017)
[11] https://www.courtlistener.com/docket/4212662/safari-club-international-v-jewell/ (viewed 5 October 2017)
[12] http://www.thezimbabwean.co/2017/05/zim-wildlife-boss-fired-3m-rhino-horn-goes-missing-report/ (viewed 5 October 2017)
[13] https://mg.co.za/article/2012-09-07-00-big-bucks-trigger-zimbabwe-scramble (viewed 5 October 2017)
[14] https://mg.co.za/article/2015-10-22-hunters-feed-corrupt-zim-officials (viewed 5 October 2017)

area, made a deal with then Minister of Water, Climate and Environment, Saviour Kasukuwere, who then issued the hunting quota of 50 to the Council. Of relevance, according to Transparency International, in 2016 Zimbabwe was the 22nd most corrupt country, ranking 154 of 176.[15]

Thus, the Service's concern – expressed in its negative enhancement finding for Zimbabwe elephants in 2015 – that Zimbabwe's wildlife laws and regulatory mechanisms are inadequately implemented and enforced (USFWS 2015) remains valid.

(5) There is no evidence that revenue from lion hunting enhances the survival of lions

The Service states "Hunting, if properly conducted and well managed, can generate significant economic benefits that may contribute to the conservation of lions. In looking at whether we are able to authorize the import of a trophy under the issuance criteria of 50 CFR 17.32, we will examine if the trophy hunting provides financial assistance to the wildlife department to carry out elements of the management program and if there is a compensation scheme or other incentives to benefit local communities that may be impacted by lion predation" (USFWS 2017, p. 5). It is clear from this statement that no amount of economic benefit from hunting will offset the detrimental effect on lion populations of unsustainable, poorly managed trophy hunting. Thus, any economic benefit from hunting alone is not sufficient evidence that hunting is enhancing the survival of lions.

As noted previously, Zimbabwe's wild lion populations have declined since 2002 and fewer than 300 truly wild (not fenced in) male lions remain; Zimbabwe's lion hunting quotas are not science-based and age restrictions are poorly implemented; Zimbabwe's lion management plan has not been substantially implemented after eleven years; and the ZPWMA does not receive funding from the Zimbabwe government and consequently has insufficient funds to enforce existing laws. Given this situation, lion hunting in Zimbabwe clearly is not properly conducted or well managed and it is irrelevant that there is economic benefit from such unsustainable hunting.

Yet, the Service ignores the poor management of lion trophy hunting in Zimbabwe and states, "While, over the years, ZPWMA has failed to generate adequate revenue for its operations, U.S. sport hunters play a large role in the hunting industry of Zimbabwe. The Service anticipates that by granting the importation of sport-hunted lion trophies, there would be an increase in funds provided to Zimbabwe's conservation initiatives through this program by U.S. sport hunters" (USFWS 2017, p. 19).

As noted above, the Service states that it will examine "if there is a compensation scheme or other incentives to benefit local communities that may be impacted by lion predation" (USFWS 2017, p. 5). The Service explains, "we recognize that in many parts of the world, wildlife exists outside

[15] https://www.transparency.org/news/feature/corruption_perceptions_index_2016 (viewed 5 October 2017)

of protected areas and must share the same habitat and compete with humans living in these areas for space and resources" and "if communities that share these resources with wildlife do not perceive any benefits from the presence of wildlife, they may be less willing to tolerate the wildlife. However, under certain circumstances, trophy hunting can address this problem by making wildlife more valuable to the local communities anti encourage community support for managing and conserving the hunted species, as well as other species." Further, "A component of a management plan from which trophy imports would meet the issuance criteria would be whether there are government incentives in place that encourage habitat protection by private landowners and communities and incentives to local communities to reduce the incursion of livestock into protected areas or to actively manage livestock to reduce conflicts with lions" (USFWS 2017, p. 5). The Service states, "Co-existence of lions and people is promoted through giving value to lions, through tourism and hunting in CAMPFIRE areas" (USFWS 2017, p. 8).

First, the evidence before the Service demonstrates that the government of Zimbabwe is not actively mitigating human-lion conflict. Although one of the Outputs of Zimbabwe's lion management plan is "Mitigation - Human-lion related conflicts minimized and, where possible, eliminated," and this includes the target of "Incidents of human-lion conflict reduced by at least 30% in 5 years while also reducing retaliatory killing," this output and target have not been met. In its analysis of this output and target, the Service copies and pastes information from ZPWMA's (2016) that "approaches to mitigate livestock losses and lion attacks on humans are in the process of being tested and implemented in Hwange and methods to mitigate lion attacks on livestock are being implemented as appropriate at selected sites (e.g. Tsholotshe)" (USFWS 2017, p. 11; and ZPWMA 2016, p. 12). Further, the Service states, "Additionally, to mitigate human-lion conflict, the "Long Shields Guardian Programme" was initiated whereby communities are notified of movements of collared lions into their areas via cell phone, and then have the opportunity to take appropriate action, such as moving cattle. In 2013 alone, 1,850 warnings were passed to the "Long Shields"" (USFWS 2017, p. 12).

However, as explained in ZPWMA (2016), human-lion conflict mitigation being conducted in the country is limited to an Oxford University WildCru Lion Research project in the Hwange area, which includes the aforementioned Long Shields Guardian Programme and efforts to improve livestock husbandry to avoid lion attacks; this is not a government program and it is not implemented in all lion areas in Zimbabwe. The program is limited to the Hwange area and is the only such program noted in ZPWMA (2016) despite their acknowledgement that "The main source of illegal killing of lions is a result of Human-Lion conflict" (ZPWMA 2016, p. 44). Indeed, as noted previously, the number of lions killed as a result of human-lion conflict exceeds the number killed by trophy hunters. ZPWMA states, "The exact number of lions killed in this way is difficult to assess, but may number over 50/year" (ZPWMA 2016, p. 44); this compares to 49 lions trophy hunted in 2015, and 33 in 2016 (ZPWMA 2016, p. 38).

It must also be noted that the government of Zimbabwe does not compensate farmers for livestock lost to lions. According to a May 2017 news article by Jeffrey Moyo,[16] "Villagers in this Southern African nation say despite the threat the lions pose to their livestock, national parks and wildlife authorities here are doing nothing to help them, as stray lions roam freely, and it takes park officials too much time to round them up. "Our lives are in danger. We can't kill the lions even if we see them attacking our livestock because the law doesn't let us; if you do it they put you in jail," said Ezra Ncube, 37, a local villager. "But if our cows are eaten by lions, no one goes to jail and nobody even bothers to compensate us, yet the lions stray from parks and some private safaris."

One human-lion conflict mitigation effort conducted by a foreign university research team is not evidence that the government of Zimbabwe is making a serious effort to address human-lion conflict.

Second, there is no evidence that there is flow of money from American lion trophy hunting in CAMPFIRE areas. According to ZPWMA (2016), "The potential and real loss of habitat and the fragmentation of range and conflicts with people in the absence of effective incentive mechanisms to maintain such habitat is probably the second greatest threat to lions after retaliatory killings" and "integrating income from lions into rural economies, and demonstrating that lions contribute to the welfare and development of people is regarded as one strategy to mitigate against this" (ZPWMA 2016, p. 44). ZPWMA states that 2010-2015, eight lions were hunted on CAMPFIRE land per year on average, and this generated US$ 40,000 per year (ZPWMA 2016, p. 31). Although it is stated that American hunters contribute 51% of all revenue generated by hunting in CAMPFIRE areas (not lion hunting specifically) (ZPWMA 2016, p. 31), the Service admits "While hunting is allowed in CAMPFIRE areas, it is unclear if American sport hunters conduct lion hunts in these areas" (USFWS 2017, p. 14). Consequently, the Service cannot reasonably conclude that U.S. hunter revenue is contributing to lions or their habitat on CAMPFIRE land.

Third, there is no evidence that financial flow from lion hunting in CAMPFIRE areas has increased people's tolerance of lions and has resulted in enhancement of the survival of lions. ZPWMA asserts that "The involvement and empowerment of rural people in natural resource management through the CAMPFIRE programme that strives to provide economic and financial incentives through sustainable use, is one of the main driving forces behind changes in attitudes towards wildlife in communities where lion-livestock conflicts occur" (ZPWMA 2016, p. 44). The Service similarly claims, citing to ZPWMA, that "co-existence of lions and people is promoted through giving value to lions, through tourism and hunting in CAMPFIRE areas" (USFWS 2017, p. 8). The Service further claims that "the participation of communities in CAMPFIRE has heralded a reversal in wildlife declines on private land. When the benefits of CAMPFIRE were extended to RDCs, it further aided in the equitable distribution of benefits from trophy hunting to local communities, which incentivizes them to conserve the African lion" (USFWS 2017, p. 15).

[16] http://aa.com.tr/en/africa/stray-zimbabwe-lions-pit-villagers-vs-conservationists/818598

Harrison et al. (2014) provided a recent analysis of the CAMPFIRE program. The theory behind CAMPFIRE is to empower community members at a village level to control wildlife and its revenue, and to thus create an economic incentive for communities to conserve wildlife. But, according to Harrison et al., this is not actually happening. According to Harrison et al., although CAMPFIRE had a reputation of success in its early days, over time this perception eroded and by the late 1990s it was criticized for lack of participation, lack of empowerment and lack of participation of local communities in management of natural resources. The main problem with the way that CAMPFIRE was designed is that it established the rural district council, which represents numerous local communities, as the 'local' body in charge of natural resource management, rather than the local communities themselves. Harrison et al. state, "Failure to provide benefits to the local communities and to successfully devolve management are just two of the many common criticisms" (p. 8). Among these criticisms is "insufficient action to tackling problems of elite-capture of resources and wildlife-based tourist revenues within RDCs" (p. 9).

Harrison et al. (2014) studied the CAMPFIRE program in the Binga district, which is part of Sebungwe, and the Chiredzi district, which is part of Gonarhezou; as noted previously, the elephant populations of both Sebungwe and Gonarhezou have experienced dramatic elephant population declines in recent years. The authors found that CAMPFIRE failed as a governance system for community involvement and empowerment and that the "community-based" terminology is merely rhetoric. They warn that new "community-based" natural resource management projects need to "be aware of the disconnect between the local citizens (as their key stakeholders) and what the RDC may believe and be happy to approve" (p. 30). They conclude "The lack of understanding and attention paid to the sub-district governance system for natural resource management has meant that project implementation has negatively affected the system as a whole, including the people within it, as well as the project outcomes" (p. 31). They said, "CAMPFIRE has continued to try and operate in a system it increasingly did not understand and thus its structures did not map appropriately onto those operating at the sub-district level. As a partial result of this, the programme has largely collapsed in many parts of the country" … "including in the four case study villages. The benefits experienced by the communities involved over the projects' lifespans have been negligible" (p. 32).

Two news reports by Debra Patta looked at local perspectives in Zimbabwe on the claim that trophy hunting benefits local communities. One news report quoted Emmanual Fundira, who heads Safari Operators Association of Zimbabwe as saying that although part of the hunting fees paid by trophy hunters is supposed to go to conservation and community projects, in fact it rarely does.[17] In another article, Fundira stated, "If you talk to communities today and say 'Campfire' they don't

[17] http://www.cbsnews.com/news/zimbabwe-corruption-trophy-hunting-cecil-lion-conservation/ (viewed 9 August 2017)

want to hear. They say Campfire is not benefitting them at all and that in itself is a disaster."[18] The article also quoted a CAMPFIRE rural district council CEO named Phindile Ncube as saying that his community earned $158,000 in a year for infrastructure and "feeding schemes." However, the article quoted a villager named Edward Ngwenya who said he hadn't received anything from the RDC. This was confirmed in another report which said that, while money from trophy hunting is promised to poor communities, they are only getting poorer.[19] Another news article quoted a local chief, Victor Nekatambe, commenting on the fact that local rural district councils manage CAMFIRE and that communities do not receive funding: "They are getting nothing, absolutely nothing."[20]

Indeed, most wildlife poachers are from local communities that are receiving financial benefits from trophy hunting. Gandiwa et al. (2014) studied law enforcement in Gonarezhou NP by interviewing law enforcement staff from Feb-May 2011. They found "Nearly all respondents (95%; n = 40) reported that most poachers were residents of villages adjacent to GNP (≤ 20 km); whereas about 5 % (n = 2) reported that only the commercial poachers were those living far away from GNP (> 20 km)" (p. 122-123). The Service ignored these readily available sources of pertinent information in making its October 2017 enhancement finding.

Therefore, it is erroneous for the Service to conclude that revenue generated through trophy hunting of lions actually provides an incentive to local communities to conserve lions. Simply, lion hunting revenue cannot be found to enhance the survival of lions when lion hunting is being poorly managed in Zimbabwe.

Conclusion

The Service's enhancement finding for lions taken as hunting trophies in Zimbabwe during 2016, 2017 and 2018 is the result of a lack of critical analysis of information contained in documents submitted to the Service by the government of Zimbabwe and others (and the Service failed to solicit comment from knowledgeable stakeholders, contrary to its assertion in the October 2017 finding). The Service repeatedly cites to information contained in ZPWMA (2016) and du Preez et al. (2016), often copying and pasting the text from these documents in the finding, although the original documents lack evidence to support the claims made. As a result, the finding is the product of a lack of scientific rigor, in violation of the Endangered Species Act.

[18] https://zimbabwe-today.com/corrupt-government-officials-and-cabals-profit-from-trophy-hunting-riches-in-zimbabwe/ (viewed 9 August 2017)
[19] https://zimbabwe-today.com/corrupt-government-officials-and-cabals-profit-from-trophy-hunting-riches-in-zimbabwe/ (viewed 9 August 2017)
[20] https://zimbabwe-today.com/corrupt-government-officials-and-cabals-profit-from-trophy-hunting-riches-in-zimbabwe/ (viewed 9 August 2017)

Further, there are numerous, inexplicable internal inconsistencies in the Service's finding. For example, the Service concludes that "Based on the information available to the Service, the funds generated by hunting trophies contribute to the ZPWMA's ability to manage the country's lion populations as well as the success of CAMPFIRE" (p. 16, emphasis added); but earlier in the finding, the Service states, "While hunting is allowed in CAMPFIRE areas, it is unclear if American sport hunters conduct lion hunts in these areas" (p. 14). Thus, the facts found by the agency do not match the conclusions drawn and the finding is therefore arbitrary and capricious.

Numerous recent studies in the Service's possession have demonstrated that Zimbabwe has poorly managed lion trophy hunting. For ecample, Groom et al. (2014) found that unsustainably high trophy hunting quotas in the concessions, mostly CAMPFIRE areas, around Gonarezhou in 2009-2010 caused the population to collapse; and, similarly, Loveridge et al. (2016) provided quantitative evidence that uncontrolled trophy hunting of lions in areas around Hwange National Park in 2000-2012 was a cause of population decline. Thus, information provided to the Service from Zimbabwe must be subject to scrutiny and carefully examined for veracity, but the Service failed to do so in issuing its finding.

An objective analysis of this information must lead to conclusions that:

- Unfenced lion populations in Zimbabwe have declined over the past decade and today fewer than 300 truly wild adult male lions remain in the country.
- Zimbabwe's lion hunting quotas are not science-based, and age restrictions are poorly implemented and do not apply to all lion hunting areas in the country.
- Zimbabwe's 11-year-old lion management plan still has not been substantially implemented.
- ZPWMA lacks funding to enforce existing laws.
- There is no evidence that revenue from American lion hunting enhances the survival of lions.

For these reasons, we strongly urge the Service to rescind its determination that the import of lions taken in Zimbabwe in 2016, 2017 and 2018 would meet the issuance criteria under 50 C.F.R. § 17.32. Issuing any import permits for lion trophies from Zimbabwe pursuant to this finding would violate the Endangered Species Act and FWS regulations. This letter serves as formal opposition to any application for an import permit for a lion trophy from Zimbabwe and HSUS, HSI, and HSLF request that FWS provide ten days advance notification (via email, afrostic@humanesociety.org) prior to the issuance of any such permits. *See* 50 C.F.R. §§ 17.22(e), 17.32.[21]

[21] HSUS has previously called on FWS to publish notice in the Federal Register of threatened species permit applications, and we reassert that such action is essential to create transparency in FWS' enhancement analysis for African lion activities, consistent with the intent of ESA Section 10. Similarly, it is arbitrary

Respectfully,



Anna Frostic
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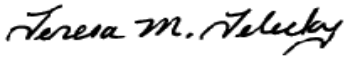

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for the Service to explicitly apply the notification requirements of 50 C.F.R. § 17.22(e) to certain types of threatened species permits (i.e., those for Safe Harbor Agreements and Candidate Conservation Agreements with Assurances) but not to other threatened species permits (i.e., for incidental take and import).

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
International Affairs
5275 Leesburg Pike, MS-IA
Falls Church, VA 22041-3803

In Reply Refer To:
FWS/AIA/DMA

Memorandum

To: Principal Deputy Director, U.S. Fish and Wildlife Service

From: Chief, Branch of Permits

Date: 11/24/2017

Subject: Supplemental Finding to October 18, 2017, Enhancement Finding for Lions Taken as Sport-hunted Trophies in Zimbabwe During 2016, 2017 and 2018.

On October 18, 2017, the U.S. Fish and Wildlife Service (Service), determined that permits for the importation of sport-hunted trophies of wild lions (*Panthera leo melanochaita*), which are threatened under the Endangered Species Act (ESA), taken in Zimbabwe during the 2016, 2017, and 2018 calendar years met the enhancement criteria under the Service's regulations at 50 CFR 17.32. As detailed in the finding, this determination was based on a careful review of the information available to the Service as of the date of the finding as to lion hunting in Zimbabwe in 2016, 2017, and 2018, specifically including information from the Government of Zimbabwe about lion status and management in Zimbabwe.

The information provided to the Service demonstrates that Zimbabwe has made strides in the management of their lion populations over the last 5 years. Although prior to 2011 Zimbabwe allowed the hunting of lionesses and males under 5 years old, they made significant changes to ensure their hunting program is now sustainable. That is, in 2013, they proposed an adaptive, age-based quota-setting process. Then, in 2015, Zimbabwe developed a range of steps to better monitor permitting and hunting, including: implementing TRAS2, a financial tracking system, to allow the country to assess regional price differentials of similar hunts and the reasons for variations; effectively engaging with international marketing agents of sport hunting to reduce the possibility of overbooking of hunts; obtaining insights on governance from the hunting sector; and devising an effective mechanism to fully account for proceeds generated by foreign hunters.

Further, the Service determined that the management efforts of the Government of Zimbabwe provide community-based conservation programs, private landholders and Rural District Councils with the opportunity to benefit from the wildlife on their land, including lions, and also incentivizes local communities to conserve the species. Sport hunting of lions by U.S. hunters supports these programs in Zimbabwe, which in turn demonstrate to those local communities the value in conserving lions for the long term.

As noted above, in 2013 the Government of Zimbabwe established a science-based, adaptive management system for lion hunting based on the ages of lions hunted. This system has not only led to a reduced national lion hunting quota, but has also resulted in a significant increase in the age of harvested lions. Such age restrictions restrict offtake to the limited number of individuals that meet the age criteria.

Evaluating the information provided by the Zimbabwe Government and other sources, it appeared that the hunting program addressed the three main threats that were identified by the Service when making the determination that the species was threatened with the possibility of extinction. The hunting areas are maintaining habitat for lions and ensuring that there is no further loss, provided that the hunting areas can remain economically viable. In order to maintain a viable population of lions, the parks, safari, and local communities must maintain biodiversity and a sustainable prey base. Finally, Zimbabwe is actively working to reduce human-lion conflicts and the number of lions killed in retaliation for killing livestock. Therefore, the management of lions in Zimbabwe and the limited hunting of lions contribute to the on-going survival of the species in Zimbabwe.

In our finding, we identified several areas that we would continue to closely monitor to ensure that our finding continued to reflect current lion management and control in Zimbabwe and to ensure that our determination that the offtake of trophy lions in Zimbabwe would enhance the survival of the species. In this regard, there are certain documents and data the Service needs to evaluate further with respect to future hunting seasons. The Service expects to be able to review data from previous and current hunting seasons to assess the lion populations and ensure that management efforts are enhancing the propagation and survival of lions within Zimbabwe. Given that Zimbabwe's last management plan for lion was produced in 2006, the Service would like to see an updated plan established. Local management plans, such as the Management Plan for Hwange National Park will be sought. Although Zimbabwe has made progress on their 2006 *Strategy and Action Plan*, the Service will seek updates on further progress of the outputs or targets not yet fully accomplished. Lastly, the Service will also seek an update on the quota setting process. Specially, we will need further information on the establishment and implementation of precautionary quotas.

On the evening of November 14, 2017, the Zimbabwe military placed President Robert Mugabe under house arrest with a call for his resignation, creating substantial uncertainty with regard to governance in the country. Zimbabwe Defense Forces seized control of the Zimbabwe Broadcasting Corporation, several areas of Harare, and the Presidential palace. On November 21, 2017, after negotiations between President Mugabe, the Ruling Party, and the Zimbabwe military, President Mugabe resigned. Although the action was largely peaceful, the situation has created uncertainty over the ability of the Zimbabwe government to continue to fulfill the wildlife management activities identified as the basis for our positive finding. At this time, we are simply

unable to assess the extent to which the conditions that led to our positive finding may have changed. As we are able, we will seek further information from Zimbabwe and other credible sources.

Until such time as there is greater certainty regarding governance in Zimbabwe, particularly with regard to the stability of lion management, so that we can re-affirm the conditions that led to our positive finding, the Service is suspending our enhancement finding for any lion taken on or after November 14, 2017. The Service may reconsider this finding at any time, through the permitting process, and replace it by determining that it no longer reflects the available information consistent with the regulatory requirements. As part of the permitting process, the Service reviews each application received for import of such specimens and evaluates the information provided in the application as well as other information available to the Service as to the status of the lion population and the total management program to ensure that the program is promoting the conservation of Zimbabwe lions. Each application to import sport-hunted lion trophies must also meet all other applicable permitting requirements before it may be authorized, including the issuance criteria in 50 CFR 13.21.

United States Court of Appeals
FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 16-5358 **September Term, 2017**
FILED ON: DECEMBER 22, 2017

SAFARI CLUB INTERNATIONAL AND NATIONAL RIFLE ASSOCIATION OF AMERICA,
APPELLANTS

v.

RYAN ZINKE, IN HIS OFFICIAL CAPACITY AS SECRETARY OF THE U.S. DEPARTMENT OF THE INTERIOR, ET AL.,
APPELLEES

Consolidated with 16-5362

Appeals from the United States District Court
for the District of Columbia
(No. 1:15-cv-01026)
(No. 1:14-cv-00670)

Before: GARLAND, *Chief Judge*, TATEL, *Circuit Judge*, and EDWARDS, *Senior Circuit Judge*

J U D G M E N T

These causes came on to be heard on the record on appeal from the United States District Court for the District of Columbia and were argued by counsel. On consideration thereof, it is

ORDERED and **ADJUDGED** that the judgment of the District Court appealed from in these causes be affirmed in part, reversed in part, and the case is hereby remanded to the District Court with instructions to remand the case to the Service so that it may initiate rule making to address enhancement findings for the time periods at issue in this case, in accordance with the opinion of the court filed herein this date.

Per Curiam

FOR THE COURT:
Mark J. Langer, Clerk

BY: /s/

Ken Meadows
Deputy Clerk

Date: December 22, 2017

Opinion for the court filed by Senior Circuit Judge Edwards.

United States Court of Appeals

FOR THE DISTRICT OF COLUMBIA CIRCUIT

Argued October 13, 2017 Decided December 22, 2017

No. 16-5358

SAFARI CLUB INTERNATIONAL AND NATIONAL RIFLE ASSOCIATION OF AMERICA,
APPELLANTS

v.

RYAN ZINKE, IN HIS OFFICIAL CAPACITY AS SECRETARY OF THE U.S. DEPARTMENT OF THE INTERIOR, ET AL.,
APPELLEES

Consolidated with 16-5362

Appeals from the United States District Court
for the District of Columbia
(No. 1:15-cv-01026)
(No. 1:14-cv-00670)

Douglas S. Burdin argued the cause for appellants. With him on the briefs were *Anna M. Seidman*, *Christopher A. Conte*, and *Michael T. Jean*. *Jeremy E. Clare* entered an appearance.

Avi Kupfer, Attorney, U.S. Department of Justice, argued the cause for federal appellees. With him on the brief were

Jeffrey H. Wood, Acting Assistant Attorney General, and *Andrew C. Mergen*, and *Matthew Littleton*, Attorneys.

Michael Ray Harris and *Jennifer E. Best* were on the brief for appellees Friends of Animals, et al. *Courtney R. McVean* entered an appearance.

Tanya Sanerib, *Sarah Uhlemann*, and *Anna Frostic* were on the brief for *amici curiae* The Humane Society of the United States, et al. in support of defendants-appellees.

Before: GARLAND, *Chief Judge*, TATEL, *Circuit Judge*, and EDWARDS, *Senior Circuit Judge*.

Opinion for the Court filed by *Senior Circuit Judge* EDWARDS.

EDWARDS, *Senior Circuit Judge*: By regulation issued pursuant to the Endangered Species Act ("ESA"), sport-hunted African elephant trophies may only be imported into the United States if, among other things, the U.S. Fish and Wildlife Service ("Service") makes "[a] determination . . . that the killing of the trophy animal will enhance the survival of the species." 50 C.F.R. § 17.40(e)(6)(i)(B) ("Special Rule"). On April 4, 2014, the Service issued a press release stating that the agency lacked sufficient information to support a positive enhancement determination with respect to elephant trophies hunted in Zimbabwe during the 2014 hunting season. The finding, which was subsequently published in the Federal Register, banned the importation of such trophies going forward from the date of the finding. The Service also made negative enhancement findings in July of 2014 and March of 2015, each time concluding that information concerning the size of the Zimbabwean elephant population and status of conservation efforts in Zimbabwe did not support a conclusion

that killing the animal "will enhance the survival of the species." *Id.*

Safari Club International ("Safari Club") and the National Rifle Association ("NRA") (collectively, "Appellants") filed suit in District Court to challenge the 2014 and 2015 findings. Appellants claimed that the agency's actions were arbitrary and capricious under the Administrative Procedure Act ("APA") and violated the ESA because, *inter alia*, in its determinations to ban the elephant imports, the Service impermissibly relied on standards that are more stringent than the statutory requirements in the ESA. The District Court denied Appellants' motion for summary judgment on these claims and granted judgment for the Service. For the reasons explained below, we affirm judgment for the Service on these claims.

Appellants also contended that the Service erred in adopting the 2014 and 2015 enhancement findings without adhering to the notice-and-comment rule-making requirements of the APA. *See* 5 U.S.C. § 553. The District Court rejected this claim on the ground that the enhancement findings were the product of adjudications and, therefore, not covered by the APA's rule-making requirements. The District Court erred on this point. Under the APA, a "rule" is "the whole or a part of an agency statement of general or particular applicability and future effect designed to implement, interpret, or prescribe law or policy." *Id.* § 551(4). And as the Supreme Court has explained, rule-making procedures are "used in the formulation of a basically legislative-type judgment, for prospective application only, rather than in adjudicating a particular set of disputed facts." *United States v. Fl. E. Coast Ry. Co.*, 410 U.S. 224, 246 (1973). The enhancement findings in this case fit these definitions of "rule" to a tee. Therefore, the Service erred in adopting the findings without first following the notice-and-comment rule-making requirements of the APA. Accordingly,

we reverse the District Court's grant of summary judgment in favor of the Service on the § 553 claim. The case will be remanded to the District Court with instructions to remand to the Service so that it may initiate rule making to address enhancement findings for the time periods at issue in this case.

I. BACKGROUND

A. Statutory and Regulatory Background

1. The CITES Treaty

The United States and Zimbabwe are parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora, Mar. 3, 1973, 27 U.S.T. 1087 ("CITES" or "Convention"). *See* 16 U.S.C. § 1538(c)(1) (incorporating the Convention into U.S. domestic law through the ESA). The Convention regulates the international trade of imperiled species that are listed in its appendices, which include African elephants, or *Loxodonta africana*, from Zimbabwe. *See, e.g.*, *id.* §§ 1537a–1539; 50 C.F.R. § 17.11.

As relevant here, Appendix I lists species that are "threatened with extinction which are or may be affected by trade," CITES art. II(1), 27 U.S.T. at 1092, and Appendix II lists species that may become threatened with extinction unless their trade is regulated, *id.* art. II(2), 27 U.S.T. at 1092. Parties to the Convention may not allow trade in species listed in the appendices except in accordance with the treaty's provisions. *Id.* art. II(4), 27 U.S.T. at 1092.

Appendix I species may be shipped internationally only if both the importing and exporting countries grant permits, which are subject to certain conditions. *Id.* art. III, 27 U.S.T. at 1093–95. Among the requirements for a permit to issue, both

countries must make a "non-detriment" finding, certifying that the trade in threatened species "will not be detrimental to the survival of that species." *Id.* art. III(2)(a), 27 U.S.T. at 1093; *id.* art. III(3)(a), 27 U.S.T. at 1093. Until 1994, the Convention also required an importing country to make an "enhancement finding," a determination that "the killing of the animal . . . would enhance the survival of the species." Retention of Threatened Status for the Continental Population of the African Elephant, 57 Fed. Reg. 35,473, 35,485 (Aug. 10, 1992). The parties to the Convention removed the enhancement finding requirement from the treaty by resolution in 1994.

For Appendix II species, the Convention requires a permit from the exporting country only. CITES art. IV, 27 U.S.T. at 1095–97. While subject to the non-detriment finding requirement, permits for Appendix II species have never been conditioned on the exporting country making an enhancement finding. In 1997, over opposition from the United States, the parties to the Convention transferred African elephants in Zimbabwe from Appendix I to Appendix II. Changes in List of Species in Appendices to the [CITES], 62 Fed. Reg. 44,627, 44,628–29 (Aug. 22, 1997).

It is undisputed that the proscriptions in the Convention are a floor, not a ceiling, for protection of Appendix II species. The treaty "in no way affect[s] the right of Parties to adopt . . . stricter domestic measures regarding the conditions for trade, taking possession or transport of specimens of species included in Appendices I, II, and III, or the complete prohibition thereof." CITES art. XIV(1), 27 U.S.T. at 1108.

2. The Endangered Species Act

Congress passed the Endangered Species Act ("ESA"), 16 U.S.C. §§ 1531–44 (2000), to provide for the conservation of

"endangered" and "threatened" species, *id.* § 1531(b); *see id.* § 1532(6) (defining "endangered species" as "any species which is in danger of extinction throughout all or a significant portion of its range"); *id.* § 1532(20) (defining "threatened species" as "any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range"). Except in narrow circumstances, the Act generally prohibits the importation of *endangered* species into the United States. *Id.* § 1538(a)(1)(A); 50 C.F.R. § 17.21(b).

For threatened species, section 4(d) requires the Service to "issue such regulations as [it] deems necessary and advisable to provide for the[ir] conservation." 16 U.S.C. § 1533(d). Pursuant to this authority, the Service has promulgated a regulation extending the general import prohibition on endangered species to threatened species. *See* 50 C.F.R. § 17.31(a). The Service reserved the right, however, to create "special rule[s]" regarding threatened species, which "contain all the applicable prohibitions and exceptions" regarding import of that species. *Id.* § 17.31(c). In other words, "the [Service] has, with this regulation, established a regime in which the prohibitions established for endangered species are extended automatically to all threatened species by a blanket rule and then withdrawn as appropriate, by special rule for particular species and by permit in particular situations." *Sweet Home Chapter of Cmtys. for a Great Or. v. Babbitt*, 1 F.3d 1, 5 (D.C. Cir. 1993).

Since 1978, the Service has listed the African elephant as a threatened species under the ESA, *see* Listing of the African Elephant as a Threatened Species, 43 Fed. Reg. 20,499, 20,503 (May 12, 1978); 50 C.F.R. § 17.11(h), and maintained a Special Rule governing its importation, *see* 50 C.F.R. § 17.40(e) ("Special Rule"). In 1992, the Service added a

provision to the Special Rule providing that sport-hunted African elephant trophies may only be imported into the United States under certain conditions, including that the Service must make "[a] determination . . . that the killing of the trophy animal will enhance the survival of the species." *Id.* § 17.40(e)(6)(i)(B). This means that, in the United States, the enhancement finding requirement continues to apply in accordance with the Special Rule under the ESA. The 1994 removal of the enhancement finding requirement from the Convention for the issuance of import permits for Appendix I species "d[id] not supersede import or export requirements pursuant to [the ESA]." 62 Fed. Reg. at 44,633.

The Service maintains the right to make nation-wide enhancement findings *sua sponte*, "on a periodic basis upon receipt of new information on the species' population or management." *Id*. Current findings "remain in effect until the Service finds, based on new information, that the conditions of the special rule are no longer met and has published a notice of any change in the Federal Register." *Id.*

Finally, section 9(c)(2) of the ESA provides that "[a]ny importation into the United States" of non-endangered, Appendix II species such as Zimbabwean elephants "shall," where certain conditions are satisfied, "be presumed to be an importation not in violation of any provision of [the ESA] or any regulation issued pursuant to [the ESA]." 16 U.S.C. § 1538(c)(2).

3. The Enhancement Findings

In 1997, the Service made a positive enhancement finding for sport hunting of African elephants in Zimbabwe. Memorandum, Enhancement Finding for African Elephants Taken as Sport-hunted Trophies in Zimbabwe, U.S. Fish and

Wildlife Service (July 2, 1997), *reproduced at* Joint Appendix ("J.A.") 373–76. The Service explained that revenues generated by sport hunting benefited rural communities and elephant conservation programs in Zimbabwe. In addition, Zimbabwe's government had in place conservation and anti-poaching programs to protect the elephants. And "one of the best sets of elephant population data in Africa" indicated that Zimbabwe's elephant population was growing at "about 5% per annum," from 46,000 elephants in 1980 to 66,000 in 1997. J.A. 373–74. Thus, "[b]ased on available information," the Service found that "the import of sport-hunted elephant trophies from Zimbabwe enhances the survival of the species." J.A. 373.

Those findings remained in effect until April 4, 2014, when the Service made an interim negative enhancement finding and suspended the importation of sport-hunted elephant trophies from Zimbabwe. Memorandum, Enhancement Finding for African Elephants Taken as Sport-hunted Trophies in Zimbabwe during 2014, U.S. Fish and Wildlife Service (Apr. 17, 2014), *reproduced at* J.A. 496–501. The Service noted that publicly available survey information suggested that "the elephant population in Zimbabwe has declined from 84,416 elephants in 2007 to 47,366 elephants in 2012." J.A. 500. But the Service explained that "[t]he most significant aspect of [its] analysis is the lack of recent data on what is occurring in Zimbabwe." J.A. 501. The Service had not received any information in writing from the Zimbabwean Government since 2007, when it had received three undated and unsigned papers that relied on dated information. And the Service had gained little new information from the occasional meetings it had with Zimbabwean officials since 2007. Lacking current data from the Zimbabwean government regarding its conservation programs and the status of the elephant population, the Service determined that it was not possible "to

make a positive finding that sport-hunting is enhancing the survival of the species." *Id.* It therefore temporarily banned imports of sport-hunted trophies of elephants from Zimbabwe until better information could be obtained from the Zimbabwean government, and sent a letter to authorities in Zimbabwe requesting more information. J.A. 468–69.

The Service announced the negative enhancement finding in a press release on its website on April 4, 2014, but did not publish notice of the finding in the Federal Register until May 12, 2014. Interim Suspension of Imports of Elephant Trophies from Zimbabwe, 79 Fed. Reg. 26,986 (May 12, 2014). Without expressly inviting public comment, the notice stated that the Service was "actively pursuing additional information" from Zimbabwe and "other sources" to "make a final [enhancement] determination" for 2014. *Id.* at 26,987.

Over the next several months, the Service received and considered information submitted by the Zimbabwean government, safari outfitters, including Safari Club, and conservation and hunting associations. Based on the submitted information, the Service issued a final negative enhancement finding on July 17, 2014. Memorandum, Enhancement Finding for African Elephants Taken as Sport-hunted Trophies in Zimbabwe during 2014, U.S. Fish and Wildlife Service (July 22, 2014), *reproduced at* J.A. 520–32; *see also* Notice of Suspension of Imports of Zimbabwe Elephant Trophies Taken in 2014 on or After April 4, 2014, 79 Fed. Reg. 44,459 (July 31, 2014). The Service explained that Zimbabwe's population estimates for its elephants were "clearly based on outdated information." J.A. 525. The few recent surveys provided by Zimbabwe exhibited a number of faults that rendered them prone to double counting. *Id.* The submissions similarly lacked reliable information regarding Zimbabwe's management plans, anti-poaching efforts, and regulation of elephant hunting. *Id.* at

524–28. Unable to make a positive enhancement finding on the basis of the new information, the Service forbid the importation of elephants harvested in Zimbabwe from April 4, 2014 through the end of the year.

On March 26, 2015, the Service made yet another negative enhancement finding, banning the importation of trophies of "elephants taken in Zimbabwe during the 2015 hunting season and *future* hunting seasons." Memorandum, Enhancement Finding for African Elephants Taken as Sport-hunted Trophies in Zimbabwe On or After January 1, 2015, U.S. Fish and Wildlife Service (Mar. 26, 2015), *reproduced at* J.A. 588–605; *id.* at 588; *see also* Notice of Continued Suspension of Imports of Zimbabwe Elephant Trophies Taken On or After April 4, 2014, 80 Fed. Reg. 42,524 (July 17, 2015). Once again, the finding was "due to the Service being unable to make [a positive] enhancement finding even after receiving additional materials from Zimbabwe's Parks and Wildlife Management Authority and others," including Safari Club. 80 Fed. Reg. at 42,525.

B. Procedural Background

On April 21, 2014, Safari Club, later joined by the NRA, filed a complaint in the District Court, challenging the Service's April 4, 2014 enhancement finding pertaining to importation of African elephant trophies from both Zimbabwe and Tanzania. *Safari Club Int'l v. Jewell*, 47 F. Supp. 3d 29, 31 (D.D.C. 2014). The District Court granted the federal defendants' motion to dismiss the Tanzanian claims on the grounds that the plaintiffs had not exhausted their administrative remedies, since no member of the Safari Club or NRA had applied for an import permit for any Tanzanian elephant. *Safari Club Int'l v. Jewell*, 76 F. Supp. 3d 198, 206–09 (D.D.C. 2014). The court also allowed the plaintiffs to

amend their complaint to add claims challenging the July 2014 enhancement finding. *Id*. at 205–06. The Court of Appeals reversed the dismissal of the Tanzanian claims, holding that Safari Club and the NRA had standing, the April and July findings were final agency actions, and Safari Club did not need to seek a permit in order to exhaust its administrative remedies. *Safari Club Int'l v. Jewell*, 842 F.3d 1280, 1285–90 (D.C. Cir. 2016).

In June 2015, Safari Club and the NRA ("Appellants") filed a separate action alleging that the Service's March 26, 2015 enhancement finding violated the ESA, 16 U.S.C. § 1531 *et seq.*, and the APA, 5 U.S.C. § 706. Complaint for Declarative and Injunctive Relief, ¶¶ 88–125 (June 30, 2015); *see also Safari Club Int'l v. Jewell*, 213 F. Supp. 3d 48, 51 (D.D.C. 2016). Members of both organizations had harvested elephants in Zimbabwe in 2014 and 2015. However, as a result of the challenged enhancement findings, the members were barred from importing the trophies into the United States. Complaint, ¶¶ 18, 24; Appellants' Br. 57–58. The District Court consolidated the two Zimbabwe-related cases and granted leave to Friends of Animals and the Zimbabwe Conservation Task Force to intervene as defendants. That consolidated case is the subject of this appeal.

The plaintiffs made four principal ESA and APA claims before the District Court. First, they claimed that the Service's reasoning was arbitrary and capricious, in part because the findings imposed a standard greater than "enhancement." Second, they argued that by resting on the absence of evidence that sport hunting enhances the survival of the African elephant in Zimbabwe, the findings violated the presumption of legality established in section 9(c)(2) of the ESA. Third, they claimed that the removal of the enhancement-finding requirement from the Convention in 1994 required the Service to initiate rule

making with respect to the Special Rule's enhancement condition. Finally, the plaintiffs contended that the three enhancement findings were rules subject to notice-and-comment rule-making procedures under § 553 of the APA. *See Safari Club*, 213 F. Supp. 3d at 61.

Safari Club and the NRA moved for summary judgment on February 18, 2016. The Service and intervenors opposed that motion and cross-moved for summary judgment in their favor.

On September 30, 2016, the District Court entered summary judgment for the government on every claim but one, which the Service has not appealed. *Safari Club*, 213 F. Supp. 3d at 51. The court held that (1) none of the three findings were arbitrary and capricious, *id.* at 73–81; (2) it was reasonable for the Service "to interpret the Special Rule as rebutting [section 9(c)(2) of the ESA's] statutory presumption," *id.* at 66; (3) the Service was not required to initiate rule-making proceedings under the ESA when the enhancement condition was removed from CITES in 1994, *id.* at 66–67; and (4) the enhancement findings resulted from adjudications and therefore were not subject to the APA's rule-making requirements, *id.* at 62–64.

Safari Club and the NRA have now appealed the denial of their motion for summary judgment and the entry of judgment for Appellees.

II. ANALYSIS

A. Standard of Review

"We review an order granting summary judgment *de novo*, viewing the evidence and drawing all reasonable inferences in favor of the nonmoving party." *Chenari v. George Washington Univ.*, 847 F.3d 740, 744 (D.C. Cir. 2017). "In a case like the

instant one, in which the District Court reviewed an agency action under the APA, we review the administrative action directly, according no particular deference to the judgment of the District Court." *Holland v. Nat'l Mining Ass'n*, 309 F.3d 808, 814 (D.C. Cir. 2002).

The APA requires that we "hold unlawful and set aside agency action" that is "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law." 5 U.S.C. § 706(2)(A). A disputed action also may be set aside as arbitrary and capricious if the agency has acted "without observance of procedure required by law." *Id.* § 706(2)(D); *see Meister v. U.S. Dep't of Agric.*, 623 F.3d 363, 371 (6th Cir. 2010) (noting that "even in cases arising under § 706(2)(D), the arbitrary-and-capricious standard frequently governs"). In applying the arbitrary and capricious standard, we consider whether the agency "has relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, [or] offered an explanation for its decision that runs counter to the evidence before the agency." *Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983). The court may "not . . . substitute its [own] judgment for that of the agency," *id.*, and deference is especially warranted where the decision at issue "requires a high level of technical expertise," *Marsh v. Or. Nat. Res. Council*, 490 U.S. 360, 377 (1989). Nonetheless, we must determine whether the Service "examine[d] the relevant data and articulate[d] a . . . rational connection between the facts found and the choice made." *State Farm*, 463 U.S. at 43 (internal quotation marks omitted).

The APA also provides that a reviewing court shall "hold unlawful and set aside agency action, findings, and conclusions found to be . . . in excess of statutory jurisdiction, authority, or limitations, or short of statutory right." 5 U.S.C. § 706(2).

In considering whether an agency's construction of its authorizing statute is permissible, we apply "the ordinary tools of statutory construction" to "determine 'whether Congress has directly spoken to the precise question at issue.'" *City of Arlington v. FCC*, 569 U.S. 290, 296 (2013) (quoting *Chevron U.S.A. Inc. v. Nat. Res. Def. Council, Inc.*, 467 U.S. 837, 842 (1984)). "If the intent of Congress is clear, that is the end of the matter; for the court, as well as the agency, must give effect to the unambiguously expressed intent of Congress." *Chevron*, 467 U.S. at 842–43. If the statute is ambiguous and the agency has acted pursuant to congressionally delegated authority to make law and with the intent to act with the force of law, we will defer to the agency construction so long as it is reasonable. *United States v. Mead Corp.*, 533 U.S. 218, 226–27, 229 (2001). "[T]he question in every case is, simply, whether the statutory text forecloses the agency's assertion of authority, or not." *City of Arlington*, 569 U.S. at 301.

Finally, "[w]e must give substantial deference to an agency's interpretation of its own regulations. Our task is not to decide which among several competing interpretations best serves the regulatory purpose. Rather, the agency's interpretation must be given controlling weight unless it is plainly erroneous or inconsistent with the regulation." *Castlewood Products, L.L.C. v. Norton*, 365 F.3d 1076, 1082 (D.C. Cir. 2004) (*quoting Thomas Jefferson Univ. v. Shalala*, 512 U.S. 504, 512 (1994)).

B. The Meaning of "Enhance" in the Service's Regulation

Appellants first argue that the disputed enhancement findings should be overturned because the Service failed to apply the correct standard in determining whether to ban

elephant imports. As noted above, the Special Rule forbids the importation of sport-hunted elephant trophies absent a "determination" by the Service "that the killing of the trophy animal will *enhance* the survival of the species." 50 C.F.R. § 17.40(e)(6)(i)(B) (emphasis added). Appellants claim that the Service banned elephant imports on the ground that there was no evidence to support findings that sport hunting would "ensure" the survival of the elephants. Appellants' Br. 32–36. Appellants thus contend that the Service erred because it applied a standard that is more stringent than the "*enhance*" standard in the Service's regulation.

Appellants appear to assume that 50 C.F.R. § 17.40(e)(6)(i)(B) requires the Service to make a positive enhancement determination if it finds *any* potential benefit to the survival of elephants from sport hunting. In Appellants' view, it does not matter whether the benefits of sport hunting are outweighed by its risks to the threatened species. Thus, according to Appellants, the Service was obliged to make a positive enhancement finding once it found that there were some benefits from hunting.

In particular, Appellants argue that it was error for the Service to consider whether the overall elephant population had declined, and to take into account non-sport-hunting related threats to the elephants, such as poaching. Appellants consider these matters irrelevant with respect to whether sport hunting will "mak[e] the situation better" for elephants than the absence of hunting. Appellants' Reply Br. 3; *see* Appellants' Br. 34. Appellants also point out that in both the July 2014 and March 2015 findings, the Service acknowledged that "scattered around Zimbabwe" are "'bright spots' of elephant conservation efforts," but concluded that "there are not enough of these 'bright spots' to overcome the problems currently facing Zimbabwe elephant populations and to support a finding that

sport hunting is enhancing the survival of the species." J.A. 532, 605. Appellants insist that requiring conservation efforts to "overcome" threats to the elephants amounts to a requirement that sport hunting guarantee, not merely "enhance," elephant survival. Appellants' position is specious.

The Service reasonably interpreted the Special Rule to require a holistic inquiry into whether hunting enhances the species' survival on net, taking into account the sustainability of the existing elephant population in light of the obvious detriments hunting poses to elephant survival. As the Service explained in its March 2015 finding, the enhancement determinations, among other things, "look[] to determine [1] if a country has sufficient numbers of elephants to support a hunting program, [2] if the country has a management plan and adequate laws and regulations to effectively implement a hunting program, and [3] if the participation of U.S. hunters in the program provides a clear benefit to the species to meet the [Special Rule's] requirements for . . . import." J.A. 589. Appellants would have the Service focus exclusively on the last consideration – the benefits of hunting – in isolation from information about the viability of the elephant population being hunted and Zimbabwe's ability to regulate the hunting program.

Nothing in the Special Rule supports Appellants' reading of "enhance." The sustainability of Zimbabwe's elephant population and the status of the government's elephant management plan bear directly on the effects of hunting on elephant survival. For example, one of the Service's concerns is that the current level of offtake from sources other than sport hunting, such as poaching, culling, or problem animal control, might be higher than appropriate to maintain a healthy population of elephants. *See, e.g.*, Memorandum, July 22, 2014 Enhancement Finding, J.A. 524; *see also* 80 Fed. Reg. at

42,526; 79 Fed. Reg. at 44,460. In these circumstances, sport hunting might on net decrease the number of elephants in the wild if the existing population is simply too sparse to support reductions by hunting.

The Service's interpretation of its regulation is entirely consistent with the definition of "enhance" and perfectly reasonable. Appellants define "enhance" as to "heighten, increase." Appellants' Br. 32 (*citing* Merriam-Webster.com, "Enhance" (Dec. 5, 2017), http://www.merriam-webster.com/dictionary/enhance). That definition in no way forecloses the Service from requiring hunting to "increase" elephant survival on the whole, taking into account the full biological and institutional context bearing on the health of the species. The Service's interpretation of its Special Rule easily passes muster under the applicable standard of review. *See Thomas Jefferson Univ.*, 512 U.S. at 512 (holding that "the agency's interpretation must be given controlling weight unless it is plainly erroneous or inconsistent with the regulation").

C. Appellants' Claim that the Enhancement Findings Are Foreclosed by Section 9(c)(2) of the ESA

Appellants additionally argue that the Service's negative enhancement findings are improper because they rest on the *absence* of evidence that sport hunting enhances the survival of the species, rather than on an affirmative finding that sport hunting *fails* to enhance the survival of the African elephant in Zimbabwe. Appellants assert that the Service's approach is based on an impermissible construction of the ESA because section 9(c)(2) of the act provides that "[a]ny importation into the United States" of non-endangered, Appendix II species "shall" (where certain conditions not at issue here are satisfied) "be presumed to be an importation not in violation of any provision of [the ESA] or any regulation issued pursuant to [the

ESA]." 16 U.S.C. § 1538(c)(2). Given that the Special Rule is a "regulation issued pursuant to [the ESA]," *id.*, Appellants insist that section 9(c)(2) applies to its terms. Accordingly, because the Service found the evidentiary record inadequate to make an affirmative determination as to whether sport hunting was a net positive for Zimbabwe's African elephant population, Appellants contend that the statutory presumption required the Service to authorize importation. We find no merit in this claim. We also find that the Service's interpretation of the ESA is reasonable and entitled to deference. *See City of Arlington*, 569 U.S. at 296.

"To establish a 'presumption' is to say that a finding of the predicate fact . . . produces a required conclusion *in the absence of explanation*." *St. Mary's Honor Ctr. v. Hicks*, 509 U.S. 502, 506 (1993) (internal quotation marks omitted) (emphasis added). Thus, a presumption is generally rebuttable by the presentation of contrary evidence. *See* FED. R. EVID. 301; *Tex. Dep't of Cmty. Affairs v. Burdine*, 450 U.S. 248, 254 (1981). Indeed, Appellants acknowledge that the presumption is not conclusive. *See* Oral Arg. Recording 1:52–2:09 ("We[, the Appellants,] are not arguing . . . that section 9(c)(2) . . . creates a conclusive presumption of importability.").

In this case, there is no serious dispute over the fact that the regulatory criteria for import were not satisfied. Therefore, the section 9(c)(2) presumption was overcome by the combination of the Special Rule, the administrative record underlying the Special Rule, and the fact-finding in this case with respect to the current status of Zimbabwe's elephant population and management program. The Special Rule says that "sport-hunted trophies may be imported into the United States provided . . . [a] determination is made that the killing of the trophy animal will enhance the survival of the species." 50 C.F.R. § 17.40(e)(6)(i). No such determination was made here.

Any "presumption" that this precondition was satisfied is easily rebutted by the self-evident fact that it was not.

The principal problem with Appellants' argument is that it mischaracterizes the Special Rule and the Service's application of the rule. The Special Rule does not require the Service to affirmatively find that killing the species does *not* enhance species survival in order to ban importation of sport-hunted elephant trophies. The Special Rule allows such imports only if, among other things, the Service can find that hunting enhances survival. Given that an affirmative enhancement finding is a regulatory precondition to the lawful importation of Zimbabwean elephants, so too, by necessary extension, is an adequate evidentiary basis for making such a finding. Therefore, the Service's conclusion that it lacked evidence to make a positive enhancement finding, together with the Special Rule's affirmative enhancement condition and the underlying administrative record that led to the rule's adoption, rebuts any presumption that the importation of African elephants complies with the Special Rule.

Section 9(c)(2) in no way constrains the Service's section 4(d) authority to condition the importation of threatened Appendix II species on an affirmative enhancement finding. Under section 4(d) of the ESA, the Service "shall issue such regulations as [it] deems necessary and advisable to provide for the conservation of [threatened] species" and may "prohibit with respect to any threatened species any act prohibited . . . with respect to endangered species." 16 U.S.C. § 1533(d). Because the Service may generally bar imports of endangered species, *see id.* § 1538(a)(1)(A), it may do the same with respect to threatened species under section 4(d), *see id.* § 1533(d). Appellants do not dispute that the promulgation of a blanket ban would be permissible and rebut the presumptive legality of Zimbabwean elephant imports. If the Service has the

authority to completely ban imports of African elephants by regulation under section 4(d), it logically follows that it has authority to allow imports subject to reasonable conditions, as provided in the Special Rule. Therefore, even assuming that section 9(c)(2) applies to the Special Rule, it merely establishes a presumption that the regulation's conditions have been met, absent a finding to the contrary. It does not dictate the content of the conditions.

In fact, Appellants have conceded that the Special Rule's enhancement condition is consistent with section 9(c)(2). At oral argument, counsel for Appellants repeatedly disavowed any argument that the Service lacked the authority to require a positive enhancement finding as a condition of importation of African elephant trophies. *See* Oral Arg. Recording 1:30–2:16 ("We are not arguing that section 9(c)(2) prevents the Service from enacting a special rule under Section 4(d). We are not arguing that [section] 9(c)(2) overrides any such special rule. We are not arguing that section 9(c)(2) conflicts with section 4(d) of the ESA. And we are not arguing . . . that section 9(c)(2) . . . preempts section 4 or creates a conclusive presumption of importability."); *see also id.* at 12:25–16:06 ([Question:] "Are you saying that the regulation with the elephant rule is unlawful under the statute?" [Answer:] "No.").

In sum, Appellants do not dispute that the Service has authority under the ESA to promulgate regulations that restrict the importation of African elephant trophies. The Service has chosen to exercise this authority by requiring an affirmative demonstration that sport hunting enhances the survival of the African elephant as a precondition to import. Even if Appellants are correct that the statutory presumption applies to this precondition, the presumption has been rebutted by an affirmative finding of a lack of evidence of enhancement.

D. The Removal of the Enhancement Requirement from the Convention

Appellants additionally contend that the 2014 and 2015 enhancement findings should be overturned on the ground that they cannot be squared with the 1994 amendment to the Convention. We find no merit in Appellants' arguments resting on this claim.

As noted above, before 1994, both the Convention and the Special Rule required the Service to make an enhancement determination before issuing a permit to import the trophy of an Appendix I species. *See* 57 Fed. Reg. at 35,485 (adding the enhancement requirement to the Special Rule in 1992). The Convention was amended to remove this requirement in 1994. However, the United States retained the requirement in its African elephant Special Rule issued under the ESA. *See* 50 C.F.R. § 17.40(e)(6)(i)(B); 62 Fed. Reg. at 44,633 (explaining that the enhancement condition "continue[d] to apply" after African elephants were transferred to Appendix II of the Convention). Appellants argue that the Special Rule cannot stand now that the enhancement requirement has been eliminated from the Convention. This claim is meritless.

First, Appellants allege that the Service "violated [§ 553 of] the APA by changing a regulation—retaining an enhancement finding requirement although the reason for it disappeared—without going through a proper rulemaking process." Appellants' Br. 52. Appellants are mistaken. The fact that the Service continued to apply the enhancement condition *after* the 1994 amendment of the Convention did not in any way alter the Special Rule.

Second, Appellants argue that the sole reason the Service added the enhancement condition to the Special Rule was to

comply with the Convention. Appellants' Br. 54. Thus, according to Appellants, once the provision was removed from the Convention, the only justification for the Special Rule's enhancement condition disappeared and the agency was obligated to explain its continued reliance on the provision. Appellants' view of the Special Rule and its purposes is off base.

One purpose of the enhancement condition was to implement the Convention. However, another purpose was to promote the conservation of African elephants by authorizing only those imports of sport-hunted trophies that enhance elephants' survival. In the preamble to the Special Rule, the Service stated that sport hunting "provide[s] financial support programs for elephant conservation." 57 Fed. Reg. at 35,485. In response to a comment, the Service explained that the Special Rule "supports . . . carefully regulated consumptive uses of African elephants" like sport hunting "as mechanisms for attaining revenues to enhance elephant and wildlife management throughout the African continent." *Id.* at 35,476. And in 1997, the Service reiterated that the enhancement condition "ensure[s]" that each country's management program "is promoting the conservation of the species." 62 Fed. Reg. at 44,633. The 1994 amendment of the Convention did not change the pro-conservation purpose of the Special Rule's enhancement condition. Therefore, the Service had no obligation to reconsider the Special Rule or explain its failure to do so.

Third, "if a significant factual predicate of a prior decision . . . has been removed," an agency may be petitioned to pursue rule making to "reconsider" its approach. *WWHT, Inc. v. FCC*, 656 F.2d 807, 819 (D.C. Cir. 1981). However, judicial review of an agency's denial of a petition to initiate rule making "is extremely limited and highly deferential." *Massachusetts v.*

EPA, 549 U.S. 497, 527–28 (2007); *see also WildEarth Guardians v. EPA*, 751 F.3d 649, 653 (D.C. Cir. 2014); *New York v. U.S. Nuclear Regulatory Comm'n*, 589 F.3d 551, 554 (2d Cir. 2009) (citing *Massachusetts v. EPA* and noting that review of a denial of rule making has been said to be "akin to non-reviewability" and falls "at the high end of the range of deference and an agency refusal is overturned only in the rarest and most compelling of circumstances," "typically involv[ing] plain errors of law").

In this case, Appellants did not petition the Service to pursue rule making, so there is no denial of any such petition for the court to review. Furthermore, it is clear that, because some of the principal justifications for the Special Rule have not changed, the Service had no obligation to act *sua sponte* to revisit the conditions contained in the rule. Indeed, the Special Rule is perfectly consistent with section 4(d) of the ESA, which authorizes the Service to promulgate rules that are "necessary and advisable to provide for the conservation of [threatened] species." 16 U.S.C. § 1533(d).

Fourth, Appellants' reliance on *FCC v. Fox Television Stations, Inc.*, 556 U.S. 502 (2009), is misplaced. It is true that when an agency changes its position regarding a regulatory matter, it must "provide reasoned explanation for its action." *Id.* at 515. As noted above, however, the Service did not change course when it retained the Special Rule after the Convention was amended. The Service was fully within its rights to retain its regulatory approach because the Convention expressly allows signatories to enforce stricter regulations than provided in the treaty. *See* CITES art. XIV(1)(a), 27 U.S.T. at 1108.

Finally, if Appellants' complaint in this case was meant to raise a facial challenge to the Special Rule, the challenge comes too late. The window to challenge the validity of the regulation

has long passed. *See* 28 U.S.C. § 2401(a) (barring civil claims against the United States "unless the complaint is filed within six years after the right of action first accrues"); *Mendoza v. Perez*, 754 F.3d 1002, 1018 (D.C. Cir. 2014); *see also Sierra Club de Puerto Rico v. EPA*, 815 F.3d 22, 26–28 (D.C. Cir. 2016) (holding that petitioners' challenge to the application of an old regulation to a new situation was untimely under the Clean Air Act, 42 U.S.C. § 7607(b)(1)).

E. The Service's Failure to Engage in Notice-and-Comment Rule Making Before Adopting the Enhancement Findings

The APA provides that when an agency proposes to promulgate a rule, it must follow the procedures set out in 5 U.S.C. § 553. Among other things, the agency must publish a notice "of proposed rule making" in the Federal Register. 5 U.S.C. § 553(b). It must then "give interested persons an opportunity to participate in the rule making through submission" of comments, which the agency must consider. *Id.* § 553(c). A final rule must contain a statement of its basis and purposes, *id.*, and be published in the Federal Register "not less than 30 days before its effective date," *id.* § 553(d).

At oral argument before this court, the Service conceded that it did not comply with the requirements of § 553 of the APA in issuing its enhancement findings. The Service maintained that it was under no obligation to do so, because, as the District Court found, the findings were the product of informal adjudications and, therefore, not subject to notice-and-comment requirements. We disagree. The enhancement findings reflect a final rule and, therefore, the Service was required to adhere to the notice-and-comment procedures under 5 U.S.C. § 553.

1. "Rule Making" Versus "Adjudication" Under the APA

When agencies have the statutory authority to engage in rule making and adjudication, they have broad discretion to choose which route to pursue. *NLRB v. Bell Aerospace Co.*, 416 U.S. 267, 291–94 (1974); *SEC v. Chenery Corp.*, 332 U.S. 194, 203 (1947). But when an agency chooses to issue a rule, and "formal" procedures are not required, it must follow the procedures indicated in § 553. *NLRB v. Wyman-Gordon Co.*, 394 U.S. 759, 763–66 (1969) (plurality opinion). An agency may not escape the requirements of § 553 by labeling its rule an "adjudication." *See, e.g.*, *id.*; *Nat'l Ass'n of Home Builders v. U.S. Army Corps of Eng'rs*, 417 F.3d 1272, 1284–85 (D.C. Cir. 2005) (finding that the Corps' issuance of nationwide dredge-and-fill permits was rule making and not adjudication, and stating that "'rules is rules,' no matter their gloss"); *Appalachian Power Co. v. EPA*, 208 F.3d 1015, 1024 (D.C. Cir. 2000) ("It is well-established that an agency may not escape the notice and comment requirements . . . by labeling a major substantive legal addition to a rule a mere interpretation."); *Thomas v. New York*, 802 F.2d 1443, 1447 (D.C. Cir. 1986) (explaining that if EPA's endangerment finding was binding, then it was a "rule" that "could not be promulgated without notice-and-comment procedures"); *Batterton v. Marshall*, 648 F.2d 694, 710 (D.C. Cir. 1980) ("[W]here, as here, the agency action satisfies the APA's definition of a rule and eludes exemptions to § 553, it is procedurally defective unless promulgated with the procedures required by law.").

The APA defines "rule making" as the "agency process for formulating, amending, or repealing a rule." 5 U.S.C. § 551(5). A "rule" is defined "very broadly," *Sugar Cane Growers Coop. of Fla. v. Veneman*, 289 F.3d 89, 95 (D.C. Cir. 2002), to mean

"the whole or a part of an agency statement of general or particular applicability and future effect designed to implement, interpret, or prescribe law or policy." 5 U.S.C. § 551(4). On the other hand, an "adjudication" is the "agency process for the formulation of an order," *id.* § 551(7), and an "order" is "the whole or a part of a final disposition . . . of an agency in a matter other than rulemaking but including licensing," *id.* § 551(6).

The Supreme Court has explained that "[t]he basic distinction between rulemaking and adjudication is illustrated by [the] Court's treatment of two related cases under the Due Process Clause of the Fourteenth Amendment." *Fl. E. Coast*, 410 U.S. at 244. In *Londoner v. City and County of Denver*, 210 U.S. 373 (1908), the Court held that it violated the Due Process Clause for an agency to tax property that fronted particular streets without providing a hearing for the property owners. But in *Bi-Metallic Inv. Co. v. State Bd. of Equalization*, 239 U.S. 441 (1915), the Court upheld a state agency's decision to increase the valuation of all taxable property in Denver without providing any type of hearing for those affected. Central to the distinction was that the agency's action in *Bi-Metallic* was generally applicable to an open class of all Denver property owners while *Londoner* involved a particularized order affecting particular owners "in each case upon individual grounds." *Bi-Metallic*, 239 U.S. at 446; *see also Fl. E. Coast*, 410 U.S. at 245.

Judicial constructions of a "rule" under the APA follow these precepts. Two principles stand out. First, most legislative rules are generally applicable. *E.g.*, *Bell Aerospace*, 416 U.S. at 293–94 (characterizing rules as framing "generalized standard[s]" and orders as "individual" and "case-by-case"); *Neustar, Inc. v. FCC*, 857 F.3d 886, 893 (D.C. Cir. 2017) ("Rulemaking scenarios generally involve broad applications

of more general principles rather than case-specific individual determinations.").

Second, rules generally have only "future effect" while adjudications immediately bind parties by retroactively applying law to their past actions. *E.g.*, *Wyman-Gordon Co.*, 394 U.S. at 763–66 (plurality opinion); *see also id.* at 775–81 (Harlan, J. and Douglas, J., agreeing with the plurality on this point); *Bowen v. Georgetown Univ. Hosp.*, 488 U.S. 204, 216–17 (1988) (Scalia, J., concurring) (stating that the "central distinction between rulemaking and adjudication" is that "rules have legal consequences only for the future"); *Neustar*, 857 F.3d at 895 (stating that while "it may be proper to enter an adjudicatory order without retroactive effect," "adjudication is by its nature retroactive"); *Catholic Health Initiatives Iowa Corp. v. Sebelius*, 718 F.3d 914, 922 (D.C. Cir. 2013) (stating that "an adjudication *must* have retroactive effect, or else it would be considered a rulemaking").

Thus, in *United States v. Florida East Coast Railway Co.*, 410 U.S. 224 (1973), the Supreme Court explained that the agency's action resulted in a rule, not an order, because it was "generalized [in] nature" in that it "[was] applicable across the board to all of [a class of] common carriers," and it was intended "for prospective application only, rather than [used to] adjudicate[e] a particular set of disputed facts." *Id.* at 246. In this case, the 2014 and 2015 enhancement findings had all of the qualities of a legislative rule, so the Service was obligated to follow the APA's notice-and-comment procedures before promulgating the findings.

2. The 2014 and 2015 Enhancement Findings Reflect a Final Rule

The disputed enhancement findings in this case applied to all potential imports of sport-hunted elephant trophies from Zimbabwe, not to any individual parties. *See, e.g.*, April 2014 Finding, J.A. 501 ("[T]he Service . . . will not allow the import of sport-hunted elephant trophies taken in Zimbabwe after April 4, 2014."); July 2014 Finding, J.A. 532 ("[N]o elephants harvested during 2014," except for those harvested before the announcement of the temporary suspension on April 4, 2014, "may be imported into the United States."); March 2015 Finding, J.A. 605 ("[N]o elephants harvested in Zimbabwe on or after January 1, 2015 may be imported into the United States."). The findings did not adjudicate any dispute between specific parties.

Furthermore, the Service's ban on imports was only meant to bind hunters in future permitting adjudications and enforcement actions, regardless of when they actually harvested their elephant trophy. The April 4, 2014 interim finding, as revised on April 17, 2014, banned importation of sport-hunted elephants from Zimbabwe after the date of the finding, April 4, 2014. J.A. 501. The District Court revised the effective date of that finding to May 12, 2014, the date notice was published in the Federal Register, *Safari Club*, 213 F. Supp. 3d at 73, and the Service has not appealed that decision. The July finding, which superseded the April finding, likewise applied only to future imports of elephants hunted after April 4, 2014. J.A. 532. And the March 2015 finding applied to "elephants harvested in Zimbabwe on or after January 1, 2015." J.A. 605. The latter two findings covered harvests that took place several months before the date of the findings, but they only banned the importation of sport-hunted elephants from Zimbabwe going forward, throughout the rest of the

relevant year. Those findings were not retroactive because their issuance resulted in no immediate legal consequences for any specific parties.

This is not a case in which the agency made its findings in the course of denying an application for an import permit, as was true in *Franks v. Salazar*, 816 F. Supp. 2d 49, 54 (D.D.C. 2011) and *Marcum v. Salazar*, 810 F. Supp. 2d 56, 64 (D.D.C. 2011), *vacated and remanded on other grounds by* 694 F.3d 123 (D.C. Cir. 2012). And the Service has not argued that the enhancement findings were "licensing" actions. Rather, the 2014 and 2015 enhancement findings simply established a standard binding on the agency – a negative enhancement finding and ban on imports – to be applied to future requests to import certain sport-hunted elephants, until such time as the Service decides to issue a new rule based on different information.

National Biodiesel Board v. EPA, relied on by the Service, actually illustrates this point. 843 F.3d 1010, 1018 (D.C. Cir. 2016). In that case, the EPA certified that the compliance plan of a single entity, an Argentinian association of biofuel producers ("CARBIO"), satisfied the EPA's regulations. *See id.* at 1013–15. Domestic biofuel producers alleged the EPA's approval of CARBIO's application was a rule making. We held that "EPA's approval of the . . . plan was a straightforward instance of adjudication." *Id.* at 1017–18. Unlike the findings in this case, the application's approval was highly particularized, binding one entity. We emphasized that "[t]he approval, by its own terms, applies only to the CARBIO program; indeed, [the petitioner] never even suggests that an entity other than CARBIO or its producer-members could avail itself of the program without making a separate application to EPA." *Id.* at 1018. It would have been a different situation entirely had the EPA suddenly issued a press release, without

any application before it, that bound the agency to approving all future certification applications submitted from Argentinian biofuel producers.

Furthermore, the fact that the negative enhancement findings applied, and did not change, the enhancement standard established in the Special Rule did not make them adjudications. The APA's definition of "rule" includes certain statements that "implement" and "interpret" law. 5 U.S.C. § 551(4). Here, the three findings on review "implement[ed]" and "interpret[ed]" the Special Rule's enhancement requirement by issuing negative enhancement determinations for African elephants. *Id.* And, of course, they also "prescribe[d]" law in the form of enacting new, binding import bans. *Id.*

The District Court read *Safe Extensions, Inc. v. FAA*, 509 F.3d 593 (D.C. Cir. 2007) as holding that an agency action could be an adjudication in the absence of "a pending matter before the agency." *Safari Club*, 213 F. Supp. 3d at 63. That case involved an arbitrary and capricious challenge to the FAA's imposition of testing requirements on certain companies but not others, through the publication of "advisory circulars." *Safe Extensions*, 509 F.3d at 595. However, *Safe Extensions* did not consider whether the circulars were rules, and if so, whether they were subject to notice and comment. The decision is therefore inapposite.

Finally, the Service claims that any challenges to the April finding are moot because the July finding superseded it. However, the Service admits it did not engage in notice-and-comment rule making for any of the disputed enhancement findings, including the July finding. Therefore, the dispute over the April finding is not moot.

3. Harmless Error

Finally, the Service argues that any error resulting from its failure to use notice-and-comment rule making was not prejudicial to Appellants. We reject this claim.

The court's decision in *Sugar Cane Growers Cooperative of Florida v. Veneman*, 289 F.3d 89 (D.C. Cir. 2002), is controlling. That case involved a similar failure to follow notice-and-comment procedures. The Department of Agriculture ("USDA") implemented a "payment-in-kind program" for sugar in 2001 without proceeding by notice and comment. *Id.* at 91–92. In January 2001, before implementing the program, the government met with interested persons to hear their concerns about the program. *Id.* at 92. Before announcing the program, "Department employees had approximately a dozen contacts with sugar industry representatives regarding the possibility of a 2001 program." *Id.* The USDA announced the program by press release and subsequently published notice in the Federal Register in September of 2001. *Id.* Despite these attempts to provide public notice in the Federal Register and solicit comments from interested persons, the court held that the failure to conduct notice-and-comment rule making was not harmless. *Id.* at 96.

The court explained that "an utter failure to comply with notice and comment cannot be considered harmless if there is any uncertainty at all as to the effect of that failure." *Id.* The court went on to reject the notion that complainants must indicate "additional considerations they would have raised in a comment procedure," had they been given the opportunity. *Id.* at 97. The court explained:

> Here the government would have us virtually repeal section 553's requirements: if the government could

> skip those procedures, engage in informal consultation, and then be protected from judicial review unless a petitioner could show a new argument—not presented informally—section 553 obviously would be eviscerated. The government could avoid the necessity of publishing a notice of a proposed rule and perhaps, most important, would not be obliged to set forth a statement of the basis and purpose of the rule, which needs to take account of the major comments—and often is a major focus of judicial review.

Id. at 96–97.

So, too, in this case. The Service insists that it effectively complied with § 553 because in May 2014 it published notice of its interim finding in the Federal Register. However, that notice never invited comment from the public. It merely stated that the agency was "actively pursuing additional information" from Zimbabwe and "other sources" to "make a final determination" for 2014. 79 Fed. Reg. at 26,987. This phrasing makes it far from clear that the May notice was soliciting comments from all interested parties. Indeed, while Safari Club submitted comments, the NRA did not. Nor did the July 2014 or March 2015 findings invite public comment. Quite to the contrary, they presented their negative enhancement findings as conclusions at which the Service had already arrived—as the culmination, in other words, rather than the initiation, of the decisionmaking process. *See* 79 Fed. Reg. at 44,461 ("[T]he Service is unable to make a finding that sport hunting in Zimbabwe is enhancing the survival of the species."); 80 Fed. Reg. at 42,524 ("[T]he suspension on the import of sport-hunted African elephant trophies taken in Zimbabwe on or after April 4, 2014, [will] be continued until further notice."). On the record before us, we hold that *Sugar Cane Growers* controls.

Accordingly, we reject the Service's contention that any error was harmless.

III. CONCLUSION

For the reasons set forth above, we affirm in part and reverse in part. The case will be remanded to the District Court with instructions to remand the case to the Service so that it may initiate rule making to address enhancement findings for the time periods at issue in this case.

So ordered.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

In Reply Refer To:
AIA/DMA/BOP/Animal Species

Memorandum

To: Assistant Director, International Affairs, U.S. Fish and Wildlife Service

From: Principal Deputy Director, U.S. Fish and Wildlife Service

Date: March 1, 2018

Subject: Withdrawal of Certain Findings for ESA listed Species Taken as Sport-hunted Trophies.

In response to the D.C. Circuit Court's opinion in Safari Club Int'l, et al. v. Zinke, et al., No. 16-5358 (D.C. Cir., Dec. 22, 2017), the Service hereby withdraws, effective immediately, the 2014 and 2015 Endangered Species Act (ESA) enhancement findings for trophies of African elephants taken in Zimbabwe. The findings are no longer effective for making individual permit determinations for imports of sport-hunted African elephant trophies. Consistent with this approach, the Service hereby also withdraws, effective immediately, the following findings: ESA enhancement findings for trophies of African elephants taken in Zimbabwe signed in 1997 and 2017; ESA enhancement finding for trophies of lions taken in Zimbabwe signed in 2017; ESA enhancement findings signed in 1997, 2014, and 2015, and CITES non detriment findings signed in 2014, 2015, and 2017 for trophies of African elephants taken in Tanzania; ESA enhancement finding for trophies of African elephants taken in South Africa signed in 1995; ESA enhancement finding for trophies of bontebok taken in South Africa signed in 1997; ESA enhancement findings for trophies of lions taken in South Africa signed in 2016 and 2017; ESA enhancement finding for trophies of African elephants taken in Botswana signed in 1997; ESA enhancement finding for trophies of African elephants taken in Namibia signed in 1995; ESA enhancement finding for trophies of African elephants taken in Zambia signed in 2012; ESA enhancement finding for trophies of lions taken in Zambia signed in 2017; and the ESA enhancement and CITES non-detriment findings for trophies of African elephants taken in Zambia signed in 2017.

All of the above referenced findings are no longer effective for making individual permit determinations for imports of those sport-hunted ESA listed species. However, the Service intends to use the information cited in these findings and contained in its files as

appropriate, in addition to the information it receives and has available when it receives each application, to evaluate individual permit applications.

The Service is continuing to monitor the status and management of these species in their range countries. At this time, when the Service processes these permit applications, the Service intends to do so on an individual basis, including making ESA enhancement determinations, and CITES non-detriment determinations when required, for each application. The Service intends to grant or deny permits to import a sport-hunted trophy on a case-by-case basis pursuant to its authorities under the ESA and CITES. As part of the permitting process, the Service reviews each application received for import of such trophies and evaluates the information provided in the application as well as other information available to the Service as to the status of and management program for the species or population to ensure that the program is promoting the conservation of the species. Each application must also meet all other applicable permitting requirements before it may be authorized.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
International Affairs
5275 Leesburg Pike, MS: IA
Falls Church, VA 22041-3803

In Reply Refer To:
FWS/AIA/DMA

AUG 30 2017

Memorandum

To: The File

From: Chief, Branch of Permits

Subject: Enhancement Finding for Wild and Wild-managed Lions Taken as Sport-hunted Trophies in South Africa for 2017 - 2019

After evaluating the available information from the Government of South Africa, other information available to the Service, and comments received from interested parties, the U.S. Fish & Wildlife Service (Service) has determined that permits for the importation of sport-hunted trophies of wild and wild-managed lions (*P. l. melanochaita*) from South Africa taken during the 2017, 2018, and2019 calendar years **meet** the enhancement criteria under 50 CFR 17.32. Therefore, applications received for import of such specimens will be considered to have met this requirement. In accordance with the 4(d) rule for *P. l. melanochaita*, 50 CFR 17.40(r), the Service will review each application for import of such specimens on a case-by-case basis and each application will also need to meet all other applicable permitting requirements before it may be authorized. If the basis for this finding changes or the situation in South Africa in regards to wild and wild-managed lions changes before the end of 2019, the Service will re-evaluate this finding and may alter the finding to reflected new information available on wild and wild-managed lions in South Africa.

Governance of the Lion in the United States:

On October 29, 2014, the Service published in the Federal Register a finding that listing the African lion subspecies (*Panthera leo leo*) as a threatened species under the Endangered Species Act (Act) was warranted and proposed a rule under section 4(d) of the Act to provide conservation measures for the African lion. 79 Fed. Reg. 64472. On December 23, 2015, after fully considering the comments from the public and the peer reviewers on the proposed rule, the Service published in the Federal Register the final rule in which the taxonomic classification of the Asiatic lion (previously classified as *P. l. persica* and listed as an endangered species under the Act) was changed to *P. l. leo* (Asia and western, central and northern Africa) and listed as an endangered species, and the *P. l. melanochaita* (southern and eastern Africa) subspecies was listed as a threatened species with a rule under section 4(d) of the Act, which is set forth at 50 CFR 17.40(r) (USFWS 2015; 80 Fed. Reg. 79999). The effective date of this listing is January 22, 2016. Therefore, as of January 22, 2016,

the lion subspecies *Panthera leo melanochaita*, whose range includes South Africa, is listed as threatened under the ESA and is regulated under an ESA section 4(d) special rule [50 CFR 17.40(r)].

Section 9 of the Act and our implementing regulations at 50 CFR 17.21 and 50 CFR 17.31 set forth a series of general prohibitions that apply to all endangered and threatened wildlife, respectively, except where a 4(d) rule applies to threatened wildlife, in which case the 4(d) rule contains all the applicable prohibitions and exceptions. Under the 4(d) rule for *P. l. melanochaita*, all of the prohibitions under 50 CFR 17.31 apply to *P. l. melanochaita* specimens. These prohibitions, at 50 CFR 17.21 and 17.31, in part, make it illegal for any person subject to the jurisdiction of the United States to "take" (includes harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or to attempt any of these) within the United States or upon the high seas; import or export; deliver, receive, carry, transport, or ship in interstate or foreign commerce, by any means whatsoever, in the course of commercial activity; or sell or offer for sale in interstate or foreign commerce any lion specimens. It also is illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken in violation of the Act. Permits may be issued to carry out otherwise prohibited activities involving endangered and threatened wildlife species under certain circumstances. Regulations governing permits for endangered species, such as *P. l. leo*, are codified at 50 CFR 17.22. Regulations governing permits for threatened species, such as *P. l. melanochaita*, are codified at 50 CFR 17.32.

In sum, under paragraph 50 CFR 17.40(r)(1), all the prohibitions and exceptions under 50 CFR 17.31 and 50 CFR 17.32 apply to *P. l. melanochaita*. Accordingly, the Service may authorize the import of a sport-hunted lion trophy from South Africa, but only if it first makes a finding that permitting the import of a trophy would enhance the survival of the species in the wild.

As we explained when finalizing the 4(d) rule for *P. l. melanochaita*, any person wishing to conduct an otherwise prohibited activity, including all imports of *P. l. melanochaita* specimens, must first obtain a permit under 50 CFR 17.32. As with all permit applications submitted under 50 CFR 17.32, the individual requesting authorization to import a sport-hunted trophy of *P. l. melanochaita* bears the burden of providing information in their application showing that the activity meets the requirements for issuance criteria under 50 CFR 17.32. In some cases, such as for import of sport-hunted trophies, it is not always possible for the applicant to provide all of the necessary information needed by the Service to make a positive determination under the Act to authorize the activity. In such cases, the Service may consult with the range country and other interested parties to the extent practicable to obtain necessary information. The Service has the discretion to make the required findings on sport-hunted trophy imports of *P. l. melanochaita* on a countrywide basis, although individual import permits will be evaluated and issued or denied for each application. While the Service may make enhancement findings for sport-hunted trophy imports of *P. l. melanochaita* on a countrywide basis, the Service encourages the submission of information from individual applicants. We rely on the information available to the Service and may rely on information from sources other than the applicant when making a permitting decision.

In evaluating the available data on lion hunting in South Africa, the Service is treating wild and wild-managed lions separately from lions that are not identified/confirmed as wild or wild-managed or are identified as captive-bred animals raised for hunting purposes since the management and oversight of these specimens is different within South Africa and, therefore, information relevant to the Service's consideration of whether permitting the import of sport-hunted trophies of lions may

enhance the survival of the species in the wild is different between wild and wild-managed lions, and captive-bred lions in South Africa. A separate determination will be made for lions that are not identified as wild or wild-managed.

General considerations:

As we also explained when finalizing the 4(d) rule, our threatened species permitting regulations at 50 CFR 17.32 provide issuance criteria for threatened species permits (50 CFR 17.32(a)(2)), but do not specify what would constitute the enhancement of propagation or survival with regard to authorizing the import of parts or products of *P. l. melanochaita,* including sport-hunted trophies. Therefore, when making a determination of whether an otherwise prohibited activity enhances the propagation or survival of *P. l. melanochaita,* the Service examines the overall conservation and management of the subspecies in the country where the specimen originated and whether that management of the subspecies addresses the threats to the subspecies (*i.e.,* that it is based on sound scientific principles and that the management program is actively addressing the current and longer term threats to the subspecies). In that review, we evaluate whether the import contributes to the overall conservation of the species by considering whether the biological, social, and economic aspects of a program from which the specimen was obtained provide a net benefit to the subspecies and its ecosystem.

The Service will evaluate any application received that involves *P. l. melanochaita* in the context of enhancement of propagation or survival permitting in accordance with our threatened species permitting regulations at 50 CFR 17.32 and issuance criteria for threatened species permits (50 CFR 17.32(a)(2)). These include, in addition to the general permitting criteria in 50 CFR 13.21(b):

> (i) Whether the purpose for which the permit is required is adequate to justify removing from the wild or otherwise changing the status of the wildlife sought to be covered by the permit;
>
> (ii) The probable direct and indirect effect that issuing the permit would have on the wild populations of the wildlife sought to be covered by the permit;
>
> (iii) Whether the permit, if issued, would in any way, directly or indirectly, conflict with any known program intended to enhance the survival probabilities of the population from which the wildlife sought to be covered by the permit was or would be removed;
>
> (iv) Whether the purpose for which the permit is required would be likely to reduce the threat of extinction facing the species of wildlife sought to be covered by the permit;
>
> (v) The opinions or views of scientists or other persons or organizations having expertise concerning the wildlife or other matters germane to the application; and
>
> (vi) Whether the expertise, facilities, or other resources available to the applicant appear adequate to successfully accomplish the objectives stated in the application.

In addition to these factors, particularly in relation to sport hunting, we find the *IUCN Species Survival Commission (SSC) Guiding Principles on Trophy Hunting as a Tool for Creating Conservation Incentives, Ver. 1.0* (IUCN SSC 2012), to provide useful principles, which, considered in conjunction with our threatened species issuance criteria, will aid the Service when

making an enhancement finding for importation of sport-hunted trophies of *P. l. melanochaita.* This document sets out guidance from experts in the field on the use of trophy hunting as a tool for "creating incentives for the conservation of species and their habitats and for the equitable sharing of the benefits of use of natural resources" (IUCN SSC 2012, p. 2) and recognizes that recreational hunting, particularly trophy hunting, can contribute to biodiversity conservation and more specifically, the conservation of the hunted species.

The SSC document lays out five guiding principles that, considered in conjunction with our threatened species issuance criteria, will aid the Service when making an enhancement finding for importation of sport-hunted trophies of *P. l. melanochaita:*

(a) *Biological sustainability:* The hunting program cannot contribute to the long-term decline of the hunted species. It should not alter natural selection and ecological function of the hunted species or any other species that share the habitat. The program should not inadvertently facilitate poaching or illegal trade in wildlife by acting as a cover for such illegal activities. The hunting program should also not manipulate the ecosystem or its component elements in a way that alters the native biodiversity.

(b) *Net Conservation Benefit:* The biologically sustainable hunting program should be based on laws, regulations, and scientifically based quotas, established with local input, that are transparent and periodically reviewed. The program should produce income, employment, and other benefits to create incentives for reducing the pressure on the target species. The program should create benefits for local residents to co-exist with the target species and other species. It is also imperative that the program is part of a legally recognized governance system that supports conservation.

(c) *Socio-Economic-Cultural Benefit:* A well-managed hunting program can serve as a conservation tool when it respects the local cultural values and practices. It should be accepted by most members of the community, involving and benefiting local residents in an equitable manner. The program should also adopt business practices that promote long-term economic sustainability.

(d) *Adaptive Management: Planning, Monitoring, and Reporting:* Hunting can enhance the species when it is based on appropriate resource assessments and monitoring (*e.g.*, population counts, trend data), upon which specific science-based quotas and hunting programs can be established. Resource assessments should be objective, well documented, and use the best science available. Adaptive management of quotas and programs based on the results of resource assessments and monitoring is essential. The program should monitor hunting activities to ensure that quotas and sex/age restrictions of harvested animals are met. The program should also generate reliable documentation of its biological sustainability and conservation benefits.

(e) *Accountable and Effective Governance:* A biologically sustainable trophy-hunting program should be subject to a governance structure that clearly allocates management responsibilities. The program should account for revenues in a transparent manner and distribute net revenues to conservation and community beneficiaries according to properly agreed decisions. All necessary steps to eliminate corruption should be taken and to ensure compliance with all

relevant national and international requirements and regulations by relevant bodies such as administrators, regulators and hunters.

This approach to enhancement findings for the importation of sport-hunted trophies of *P. l. melanochaita* is consistent with the purpose and intent of the Endangered Species Act. As such, before the Service will authorize the importation of a sport-hunted trophy, we must determine that the trophy-hunting program is managed to ensure the long-term survival of the species. As part of this evaluation, we recognize that in many parts of the world, wildlife exists outside of protected areas and must share the same habitat and compete with humans living in these areas for space and resources. As identified in the *IUCN SSC Guiding Principle on Trophy Hunting as a Tool for Creating Conservation Incentives*, if communities that share these resources with wildlife do not perceive any benefits from the presence of wildlife, they may be less willing to tolerate the wildlife. However, under certain circumstances, trophy hunting can address this problem by making wildlife more valuable to the local communities and encourage community support for managing and conserving the hunted species, as well as other species.

When evaluating whether the importation of a trophy of *P. l. melanochaita* would be authorized pursuant to 50 CFR 17.32, in accordance with our threatened species issuance criteria, we will examine how a country's management program for lions addresses the three main threats that have led to the decline of the subspecies: habitat loss, loss of prey base, and human-lion conflict. When examining a management program and whether trophies taken as part of that program meet the issuance criteria, we study a number of factors. Some of the factors we consider include whether the program is based on sound scientific information and identifies mechanisms that would arrest the loss of habitat or increase available habitat (*i.e.*, by establishing protected areas and ensuring adequate protection from human encroachment). We consider whether the management program actively address the loss of the lion's prey base by addressing poaching or unsustainable offtake within the country. A component of a management plan from which trophy imports would meet the issuance criteria would be whether there are government incentives in place that encourage habitat protection by private landowners and communities and incentives to local communities to reduce the incursion of livestock into protected areas or to actively manage livestock to reduce conflicts with lions. We examine if the hunting component of the management program supports all of these efforts by looking at whether hunting concessions/tracts are managed to ensure the long-term survival of the lion, its prey base, and habitat. Hunting, if properly conducted and well managed, can generate significant economic benefits that may contribute to the conservation of lions. In looking at whether we are able to authorize the import of a trophy under the issuance criteria of 50 CFR 17.32, we will examine if the trophy hunting provides financial assistance to the wildlife department to carry out elements of the management program and if there is a compensation scheme or other incentives to benefit local communities that may be impacted by lion predation. We will also consider how a U.S. hunter's participation in the hunting program contributes to the overall management of lions within a country.

Management programs for *P. l. melanochaita* are expected to address, but are not limited to, evaluating population levels and trends; the biological needs of the species; quotas; management practices; legal protection; local community involvement; and use of hunting fees for conservation. In evaluating these factors, we will work closely with the range countries and interested parties to obtain the information. By allowing entry into the United States of *P. l. melanochaita* trophies from range countries that have science-based management programs, we anticipate that other range

countries would be encouraged to adopt and financially support the sustainable management of lions that benefits both the species and local communities. In addition to addressing the biological needs of the subspecies, a scientifically based management program would provide economic incentives for local communities to protect and expand *P. l. melanochaita* habitat.

Basis for Finding for Wild and Wild-managed lions in South Africa:

On January 12, 2016, the Service sent a letter to South Africa's Department of Environmental Affairs (DEA) with a list of questions that would aid the Service in evaluating the overall conservation and management of the subspecies, *P. l. melanochaita*, in South Africa and whether that management addresses the three main threats that have been identified as to the decline of the species: habitat loss, loss of prey base, and human-lion conflict. Additionally, in the letter the Service referenced the IUCN Species Survival Commission (SSC) Guiding Principles on Trophy Hunting as a Tool for Creating Conservation Incentives, Ver. 1.0 (IUCN SSC 2012), as it provides useful principles, which when considered in conjunction with the Service's permit issuance criteria, would aid when making the required enhancement finding for permitting importation of sport-hunted lion trophies.

In response to our January 12, 2016, letter, the South African Department of Environmental Affairs (DEA) provided four documents. In addition, the Service has met with representatives of DEA during the 17th Meeting of the Parties to the Convention in Johannesburg in late September 2016. Further, since those meetings, there have been several written exchanges with DEA discussing the DEA's evaluation of reserves with lions and how these animals confirm to DEA's lion management plan. The four documents provided to the Service in January 2016, along with the Service's own final rule on the lion listing under the Act, relevant information obtained separately through open sources such as IUCN documents, and relevant information from DEA and received through comments from interested parties, were the basis of this finding.

South Africa has defined three populations of lions that exist within the country through their Biodiversity Management Plan for the Lion (*Panthera leo*) in South Africa for 2015 to 2019 (BMP; December 2015): *Wild lions,* who completely fulfill their role in biodiversity processes and are largely unmanaged, and exist only in formally proclaimed national parks and game reserves. This population's vital rates and demographics are not actively manipulated. *Wild-managed lions,* which include all lions that have been re-introduced into smaller fenced reserves (<1000km^2), and are managed to limit population growth and maintain genetic diversity. Some of the vital rates and demographics of these lions are actively manipulated. *Captive lions*, bred for financial gain, where all vital rates and demographics of these populations are actively manipulated.

Governance of Lions in South Africa: The lion is listed as vulnerable in the South African list of Threatened and Protected Species (ToPS) under Section 56(1) of the National Environmental Management Biodiversity Act, 2004 (South Africa 2004; NEMBA; BMP pg. 1). NEMBA further regulates a permit system regarding restricted activities involving specimens of listed threatened or protected species (NEMBA; Chapter 7). Regulated activities in need of registration include, among others, captive breeding facilities, sanctuaries, scientific institutions, game farms, wildlife traders, wildlife product traders, taxidermists, wildlife translocators, and freight agents (NEMBA, pg. 25).

NEMBA gives effect to the Convention on Biological Diversity (CBD), of which South Africa is a party, and Section 24 in the Bill of Rights of the Constitution of the Republic of South Africa (1996). Under Section 24(b): "everyone has the right to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that: (i) prevent pollution and ecological degradation; (ii) promote conservation; and (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development" (BMP pg. 15).

In addition to South Africa's domestic laws, it is also a Party to CITES. The lion is listed in Appendix II of the Convention. As an Appendix-II species, certain criteria must be met before such species can be exported, including a finding from the exporting country's CITES Scientific Authority that the proposed activity will not be detrimental to the survival of the species in the wild. In their reply to our inquiry, South Africa provided a copy of their CITES non-detriment finding for lions. Their finding, while focusing only on wild and wild-managed lions, applied to all lion exports from South Africa, including the captive lion population. In personal communication with the SA Management Authority, the Service was informed that the finding might be amended to better clarify that the finding applies to all lions within South Africa.

South Africa is also a member of the Southern African Development Community (SADC). Under the SADC Treaty, Article 5(g) establishes objectives to, among other aspects, promote the sustainable use of wildlife, harmonization of legal instruments governing wildlife use and conservation, promote the conservation of shared wildlife resources through the establishment of transfrontier conservation areas, and facilitate community-based natural resources management practices. To implement the SADC Treaty, member states are required to establish management programs for the conservation and sustainable use of wildlife.

In 1991, South Africa legalized private ownership of wildlife, leading to a significant rise on game ranches and farms. In 2010, private lands with wildlife covered approximately 16.8% of South Africa, compared to national and provincial protected areas accounting for only 6% (Cousins *et al.* 2010). It has been stated that this expansion of private lands and the wildlife industry resulting from the private ownership of wildlife is responsible for significantly increasing South Africa's large mammal populations (Crowley and Mokhema 2014). According to Crowley and Mokhema (2014), South Africa's game ranching industry is worth $1.1 billion a year and is growing at 10 percent annually. Under the ToPS regulation, permits can be obtained to carry out activities that may negatively affect the survival of a listed species, such as possession or hunting, provided the applicant meets specific criteria, such as having a biodiversity management plan for the species protected by ToPS. This permitting regime generates funds for national conservation efforts, while allowing landowners to profit from maintaining wildlife on their property. The landowners can then reinvest in the property by funding conservation efforts, managing wildlife, and carrying out anti-poaching efforts (Cousins *et al.* 2010).

Current Lion Status in South Africa: The lion was almost extirpated in South Africa by the early 1900s, remaining only in small numbers in what is now Kruger National Park (NP) and the Kgalagadi Transfrontier Park (TP). With the formation of Kruger NP in the 1920s, wild lion numbers slowly recovered, growing to the current population of approximately 1,700 lions (BMP, pg. 40). Kgalagadi TP has a stable, albeit smaller, population of approximately 400 lions, but is considered a lion stronghold in southern Africa. Lions recolonized Hluhluwe-iMfolozi Park (HiP) in the 1950/1960s and that population is currently stable at approximately 120 lions. Along with

small groups of lions in Addo Elephant National Park, Karoo National Park, Marakele National Park, there are approximately 2,200 wild lions in South Africa. In addition, there are approximately 800 wild-managed lions separated among 45 fenced reserves of less than 1,000 square kilometers each (BMP pg. 40) It should be noted, however, that DEA is evaluating each of these fenced reserves to confirm that the lions maintained on the reserve can be classified as wild-managed. As such, the Service will evaluate applications for imports based on DEA's evaluation of the reserve where the lion was taken.

When the Service listed the lion in southern and eastern Africa as threatened under the ESA, three primary threats to the species throughout its range were identified: loss of habitat, loss of prey base, and human-lion conflict. These three threats led to the shrinking of lion populations and their range from pre-Colonial South Africa, to the current situation of lions being found predominantly on a limited number of national parks and fenced reserves. However, given the current focus of wildlife management practices of South Africa on fencing protected areas, additional habitat loss has been minimized. Further, due to more intensive management of the fenced reserves to maintain biodiversity, more stable prey bases and limited human-lion conflict are observed.

According South Africa's Scientific Authority's non-determent finding (NDF) published in September 2015, there are no specific official figures on the illegal trade in lions and lion products in South Africa besides what are reported in the media or by annual reports on seizures and prosecutions. Most of the reports refer to illegal translocations of animals or trade in lions and their body parts for which offenders were not in possession of a permit to breed, keep, hunt, catch, sell, convey, or export a live animal or parts thereof. According to the NDF, and supported by information in the Service's final listing rule, the illegal local and international trade in lions poses a moderate, but non-detrimental risk to the species in South Africa (BMP pg. 14; USFWS 2015, 80 Fed Reg. 79999).

To manage any population to ensure an appropriate population level and determine whether sport hunting is having a positive effect, it is vital to have sufficient data on population numbers and population trends of which to base management decisions. According to Riggio et al. 2013 (pg.32), and Bjorklund in Riggio et al 2013 (p.32), the minimum number estimated to constitute a viable population is 500 individuals. Kruger National Park, with approximately 1,200 lions, has a stable population of wild lion and is considered a stronghold for lions in South Africa. Kgalagadi Transfrontier Park, with a stable population of approximately 400 lions, is considered a potential stronghold and conserves the genetic diversity within the Kalahari ecosystem [Bauer et al. 2008; Bjorkland 2003 (pg. 515, 518)]. Wild lions in HiP, Addo Elephant National Park, Karoo National Park, and Marakele National Park, albeit smaller in size, appear to be stable, but would need to grow to be considered potential strongholds or maintain genetic diversity. All of these populations receive very little direct management and hunting is not allowed within the National Parks (BMP).

Lion Management in South Africa: In 2015, in response to the requirements under NEMBA and the SADC Treaty, and after stakeholder workshops in 2013 and 2014, South Africa published the Biodiversity Management Plan for the Lion (*Panthera leo*) in South Africa for 2015 to 2019 (BMP) and stated that the "BMP for African lion will be regarded as the national strategy for African lions in South Africa" (pg. 2). The BMP was created in response to the Regional Strategy for Lions in East and Southern Africa in 2005 (IUCN SSC Cat Specialist Group 2006), which encouraged the development of national strategies aligned with national strategies of neighboring countries. The BMP was developed jointly by South Africa's Department of Environmental Affairs, Council for

Scientific and Industrial Research (CSIR), and Dr. Paul Funston (Panthera). The current BMP is the first in a series of five-year iterations, as required under NEMBA, where the success of the preceding five years will be measured, and adaptations made to ensure that the plan for the following five–year period is appropriate for the circumstances at the time.

The BMP has identified the vision that "…lions will provide key opportunities for biodiversity conservation, economic development, social benefits, and improved management capacity." The BMP lays out five specific objectives for the conservation of wild and wild-managed lions within South Africa:

- Improve the conservation status of lions within the broader conservation context
- Develop and implement effective communication tools that are informed by scientific research (communication, education, and public awareness).
- Ensure that existing legal instruments are compatible and complementary at national and provincial levels, and improve the capacity to implement these laws.
- Establish a lion forum or working group.
- Collaborate the alignment of this BMP with lion conservation plans in neighboring countries and link with international working groups

All five of these objectives are stepped down to specific action items with intended 5-year outcomes, indicators on how the action plan is succeeding, and the party responsible for implementation. The BMP will be re-evaluated in 2019 to assess the success of the plan and to modify the BMP for 2020-2025 accordingly. As such, unless substantive information becomes available in the interim, the Service will re-evaluate whether the import of sport-hunted trophies of lions from South Africa continues to enhance the propagation or survival of the species after the management actions taken during the previous five years under the BMP are evaluated for the following iteration of the management plan.

While these five objectives appear to serve a valuable role in lion management in South Africa, two are most relevant to determining if the implementation of the BMP enhances the propagation or survival of the species, as required by the ESA for the issuance of import permits. The first objective, "Improve the conservation status of lions," has been broken down into three sub-objectives for wild and wild-managed lions: maintain current protection status of lions; reassess the conservation status of lions; and enhance the conservation status of wild lions. The intended 5-year outcomes of these sub-objectives are to have stable wild lion populations in all protected areas with no illegal trade in wild lions, have more than 80% of all reserves with wild-managed lions integrated into a managed meta-population approach for genetic management, publish norms and standards for the management of wild-managed lions, and obtain a stronger understanding of wild-managed lion population size and trends. To achieve these sub-objects, South Africa has already begun population surveys of wild lions in 2015 and will census every 3 years. They have also started implementing the managed meta-population plan with the goal of over 80% of reserves included by 2019. The norms and standards for the management of wild-managed lions was to be completed by the end of 2016 and the first audits to obtain a stronger understanding of wild-managed lion population trends were completed in 2015 and will be continue annually thereafter. One of the first outcomes of these evaluations was the apparent tightening of how DEA assessed whether a reserve held "wild-managed" lions or if the lions on a reserve will be considered "captive-bred." As such, the Service will consult with DEA on whether the reserve identified in an application where the trophy was taken is considered to maintain wild-managed lions.

The second objective, "Ensure that existing legal instruments are compatible and complementary at national and provincial levels, and improve the capacity to implement these laws," identifies two actions: ensure alignment on permitting decisions at the national and provincial legislation; and address and implement training needs for all aspects of legislations regarding lions. The intended 5-year outcomes of these two actions is to have well-trained managers that make better management decisions and effective legislation to support lion conservation and sustainable utilization of lions.

The BMP has two additional objectives focusing specifically on wild-managed lions. As with the objectives discussed above, these objectives are stepped down to specific action items with intended 5-year outcomes, indicators on how the action plan is succeeding, and the party responsible for implementation. The first is to maintain the wild-managed lion as a key population that contributes to socio-economic-ecological opportunities through mimicking "natural" ecological functions (e.g., wild lion survival rates, fecundity, litter sizes, and mortality rates). This objective is broken down to a number of action items ranging from mimicking survival changes through legal and non-lethal removals, mimicking required immigration/emigration into an area, and measuring demographic responses by determining age- and sex-structure through ranger observations, to informing stakeholders on progress of management efforts. These action items predominately have target dates that are on-going, annual, or bi-annual, with outcomes that can be used in adaptive management efforts.

The second wild-managed lion objective is "To maintain lion genetic integrity by inducing social limitations through management-assisted dispersal and changes in dominance hierarchies," which focuses primarily on ensuring that lions within smaller fenced areas (<1,000 sq. km.) mimic natural biological processes such as natural dominance hierarchies and female dispersal to ensure genetic diversity. The action items for this objective include modeling genetic diversity within reserves, mimicking male dispersal from and into a social unit through removal (e.g., culling/hunting or translocation) and introduction (translocation) of males at appropriate ages, and mimicking occasional female dispersal into social units through removal and introductions.

The BMP has information on the lion's biology, habitat requirements, threats, and relevant legislation, as well as an extensive chapter on wild-managed lions. This chapter explores the history of wild-managed lions, particularly how lions had been managed in the past and what actions are needed to move forward in establishing a meta-population through connecting the reserves and allowing for genetically viable populations that can contribute to the overall wild lion population. According to the BMP, the wild lion populations are complemented by a fragmented population of wild-managed lions in South Africa found on fenced areas or reserves typically less than 1,000 square kilometers in size. This largely results from private property as well as wildlife ownership rights enforced by fencing as required by South African law. According to the BMP, even though opinions vary on the pros (Packer et al. 2013) and cons (Creel et al. 2013) of fencing as an essential component of range-wide lion conservation in the future, the use of fences is likely to increase as human land use continues to expand into lion ranges. The expanded use of fencing, particularly in areas where fencing is currently not widely utilized, could lead to continued fragmentation of lion habitats (Riggio et al. 2013, Dolrenry et al. 2014). Therefore, wild- managed lions of South Africa provides a key example in how to achieve integrated lion conservation goals in a changing African context that would enhance the survival of the species.

In the 1990s, the number of public and private game reserves started to increase in South Africa and many of them reintroduced lions, mostly as a tourist draw. Lions from these populations were then used for yet more reintroductions leading to a current number of about 800 lions on over 45 fenced reserves (Miller et al 2013). Many of these reserves only have one or two prides of lions, with the largest (Pilanesberg National Park and Madikwe Game Reserve) having four or five prides. Historically, most managers of the reserves had the tendency to manage their lion populations in isolation, although there was some movement of 'excess' lions.

Because of fragmented and isolated management of these populations, the conservation value of these lions has been questioned in the past (Hunter et al 2007, Slotow & Hunter 2009). Because of this, the BMP sets out management criteria within the reserves that maintains ecological processes and creates a meta-population (BMP pg. 41 and 42). Researchers noted indicators of inbreeding in two reserves (Trinkel et al. 2008, 2010), while several reserves experienced increased lion population growth rates with subsequent high lion densities (Miller & Funston 2014). The combination of high lion densities and restricted size of the reserves disrupts predator-prey relationships – often with prey dramatically declining (Tambling & du Toit 2005, Slotow & Hunter 2009). In addition, managers increasingly find it hard to locate new areas for 'excess' lions (Kettles & Slotow 2009). The Lion Management Forum (LiMF), founded in 2010, provides a platform for concerned managers to discuss the unique issues surrounding small, fenced lion populations. LiMF members recognize that many of the natural processes characteristic of large naturally functioning lion populations have been disrupted on these small reserves. Given the small sizes of these reserves, limited opportunities exist for restoration of these natural processes. Therefore, LiMF, and the BMP, has put forward management interventions that would mimic the outcomes of natural processes that are showing great success (Miller et al. 2013; Ferreira & Hofmeyr 2014).

The BMP recognizes that the managed lion meta-population is slightly contradictory to the theory of meta-population dynamics, as meta-populations are those with spatio-temporally variable subpopulation dynamics, variable dispersal, and availability of empty habitats that are largely connected (Oliveier et al. 2009). That is not the case with most wild-managed lion populations on small reserves in South Africa. Thus, in essence, the managed meta-population is a unique product of the South Africa response to manage and conserve large carnivores on isolated small reserves. The approach essentially recognizes a single population with social groups spatially isolated over vast areas. Some of these challenges can be reconciled through identifying regional nodes.

The lions for the reintroductions into South Africa's small reserves were initially sourced from Etosha National Park, as well as Sabi Sand Game Reserve, adjacent to the Kruger National Park. Recently, SANParks relocated some animals from the South African park of Kgalagadi Transfrontier Park (Slotow & Hunter 2009). Managers applied minimal genetic management throughout the history of lion reintroductions (Slotow & Hunter 2009, Trinkle et al. 2010). As a result, geographic genetic structure in the wild-managed lion meta-population reflect mixed origins, with few reserves having lions of only one origin. The South African wild-managed lions thus represent a novel lion genetic diversity not associated with a single origin. Maintaining the origin of the base genetic stock is thus, according to the BMP, a low priority (BMP pg. 45).

Hunting and Utilization:

Hunting: According to the 2015 NDF (the last assessment available to the Service), hunting of wild lions is not allowed within national parks and only limited hunting is allowed in some provincial reserves, effectively ensuring protection of the majority of wild lions. There is some harvest of wild

lions for the control of problem animals (e.g., stock raiding) and, in very limited cases, population management within the national parks. In addition, a small number of wild lions from Kruger NP have dispersed out of the park into some of the reserves surrounding the park and may be harvested. According to the BMP, fewer than 2 wild lions and only approximately 10 wild-managed lions are taken off of private reserves annually.

South Africa has not set a specific annual quota for wild-managed lions. Instead, according to information provided to the Service, authorizations for hunting wild-managed lions are addressed on a case-by-case basis. Reserves maintaining wild-managed lions must submit an application to the provincial authorities requesting a permit. Professional Hunters are obliged to record all completed hunts in a professional hunting register and this register is used to compile provincial reports on the number of lions taken annually. The level of off-take is also evaluated in the management of the meta-population to ensure that only those animals that no longer meet management goals are removed from the population. These animals therefore are typically older lions that have successfully bred and raised several litters of kittens. Most experts consider the recommendation by Packer *et al.* (2011, p. 151) to limit offtake to no more than one lion per 2,000 km^2 to be a sustainable offtake of lions. The BMP (pg. 29) has established more restrictive limits for areas of less than 1000 km^2 to not exceed 0.5 lions/1000 km^2.

Utilization: An active lion bone trade from South Africa to several Asian countries for traditional medicinals is primarily supplied from captive-bred lions taken as hunting trophies, as well as captive-bred lionesses and juvenile lions (BMP pg. 30). Lion bones are being used as a substitute for tiger bones, which is highly valued in Asia, primarily in China and Vietnam (Williams et al. 2015, pg. 1; Gratwicke et al. 2008, pg. 2–5; Graham-Rowe 2011, pg. s101–s102). In 2008, South Africa began issuing CITES permits for the export of skeletons of captive-bred lions to Asia. The number of lion skeletons for which South Africa issued permits for export to Asia (China, Viet Nam, Thailand and Lao PDR) increased tenfold from 2008 to 2011, from about 50 to about 573 skeletons, respectively, representing a total of 1,160 skeletons or about 10.8 metric tons (11.9 US tons) of lion bone in 4 years (Williams 2015, pp. ix–x, 46). With respect to meeting demand for lion bone, Lindsey et al. (2012, p. 20) state that there are likely to be large numbers of lion bones available for export from game farms, from lionesses and non-trophy males, and as byproducts from animals shot as trophies. In addition, Williams et al. (2015, p. 41) report that there may be between 1,400 and 6,200 lion skeletons from past trophy hunts on South African game farms that could potentially be used to supply demand for lion bone. Further, at the 17th Meeting of the Conference of Parties, the Appendix II listing for P. leo was amended to include an annotation establishing an export quota for lion bones. The annotation states that "[A] zero annual export quota is established for specimens of bones, bone pieces, bone products, claws, skeletons, skulls and teeth removed from the wild and traded for commercial purposes. Annual export quotas for trade in bones, bone pieces, bone products, claws, skeletons, skulls and teeth for commercial purposes, derived from captive breeding operations in South Africa will be established and communicated annually to the CITES Secretariat." Although the Service is aware of a press release from the Endangered Wildlife Trust in which they state the DEA has established a quota of 800 skeletons (with or without skulls) of captive bred lions for international trade, as of this finding, the Service is not aware of South Africa communicating an export quota for 2017 to the CITES Secretariat.

The BMP suggests that the value of bones, whether wild or captive-bred, is not high enough to stimulate the illegal harvest of lions solely to sell the bones into the bone trade. However, there is the potential that if the value of bones increases due to increasing demand from Asian markets, that

captive-bred lions could be a legal source of bones that masks the illegal harvest of wild lions. According to Williams et al. (2015, p. x), the 2013 price paid to South African game farmers and landowners for lion bones was $1,260–2,100 USD per skeleton. In many lion range states, this exceeds per capita GDP (gross domestic product) (World Bank 2015, unpaginated). Thus, the current price paid for lion bone may provide incentive in some countries to poach wild lions. While the lion bone trade appears to currently be based primarily in South Africa's captive-bred lion hunting industry, the trade appears to be having little or no impact on wild lion populations in South Africa at this time—lion populations in South Africa are stable or increasing and there is little poaching of wild lions in the country (BMP 2015, pp. 1, 26; Williams et al. 2015, pp. 79–80).

Evaluation:

As stated earlier, the Service will evaluate any application in accordance with our threatened species permitting regulations at 50 CFR 17.32 and issuance criteria for threatened species permits (50 CFR 17.32(a)(2)). In evaluating each of these criteria on the basis of information available to the Service, and seeing that the BMP is based on a five year review process, we have been able to determine that the import of wild and wild-managed lions would qualify for the issuance of the required import permit for wild and wild-managed lions taken in 2017, 2018, and 2019.

17.32(a)(2)(i): Whether the purpose for which the permit is required is adequate to justify removing from the wild or otherwise changing the status of the wildlife sought to be covered by the permit:

While there is habitat available to lions on the national parks and within the smaller, fenced reserves, much of South Africa has been converted into agricultural uses, managed plantation forests, human developments, or extractive industries. With the legalization of private ownership of wildlife in the early 1990s, there has been a significant increase in private land set aside for wildlife. This has led to a boost in South Africa's wildlife, particularly large mammals. South Africa laws, such as ToPS, were put into place to ensure that utilization of this wildlife is sustainable and provides for long-term incentives to maintain these areas for wildlife protection. The national parks and fenced reserves are natural areas surrounded by development. It is only through the on-going management of these remaining natural areas that lions survive in South Africa. South Africa's management of wild and wild-managed lion population as a meta-population, and using human intervention (e.g., translocation) as a substitute for natural occurrences (e.g., dispersal), is ensuring that lion populations are genetically healthy and viable.

While it has been stated that South Africa's hunting industry generates $1.1 billion annually, not all of this is connected to lion hunting or to U.S. hunters. However, lions are a key component of the hunting industry since they are part of the "Big 5" trophies and draw U.S. hunters to South Africa. Based on the information available to the Service, the presence of private reserves has increased the number and diversity of wildlife in South Africa, thus fueling the hunting industry, which funds the on-going success of private reserves. It appears that without the hunting industry, these reserves, which have become islands of wilderness in a sea of civilization in much of South Africa, would not be economically viable, and therefore would not exist. With an annual harvest of approximately 10 wild-managed lions and 2 wild lions annually, U.S. hunter participation in lion hunts, in and of its own, is not enough to make or break the industry and lead to the decline of reserves. However, U.S. hunters do play a significant role in the industry and the removal of their participation could have a long-term impact.

Further, ToPS and the BMP have put into place mechanisms to adequate oversee the harvest of wild and wild-managed lions in South Africa. With an annual harvest of approximately 10 wild-managed lions, South Africa is not exceeding the limits identified in the BMP of 0.5 lions/1,000 sq. km. The objectives of the BMP and the actions and monitoring activities that have been put into place to achieve these objectives should support the adaptive management approach that South Africa has established for managing lions. The Service will, of course, need to and will continue to monitor the effectiveness of the BMP in accordance with the BMP's five-year iterations and corresponding evaluations, and modify the determination of whether the issuance of import permits remains appropriate in response to these evaluations. Acknowledging, however, that if substantive information is made available to the Service, we will re-evaluate our finding at that time.

Therefore, based on the information available to the Service and provided that the reserve where the lion was taken was properly permitted and in compliance with national and provincial regulations, the purpose for which a permit being requested is adequate to justify removing lions from the wild or otherwise changing their status.

17.32(a)(2)(ii): The probable direct and indirect effect that issuing the permit would have on the wild populations of the wildlife sought to be covered by the permit:

As the national management plan, the BMP for lions is extensive and addresses many aspects of lion conservation and management. As reviewed above, the BMP provides a history of the relevant legislation in regards to lion conservation and puts the current efforts into context. The BMP also reviews the species' biology, population status, habitat requirements, and threats to lion populations. Objectives for conservation of the species as well as a plan to develop a meta-population for wild-managed lions are also included. Additionally, the monitoring plans have scientifically sound methodologies. Lastly, but equally importantly, are the monitoring and evaluation of efforts laid out in the BMP.

Evaluating the information provided by the South African government and other sources, it appears that the hunting program in South Africa is addressing the three main threats that were identified by the Service when making the determination that the species was threatened with the possibility of extinction. The fenced reserves and national parks are maintaining habitat for lions and ensuring that there is no further loss, provided that the reserves can remain economically viable. In order to maintain a viable population of wild and wild-managed lions, the parks and reserves must maintain biodiversity and a sustainable prey base. Finally, while there is still controversy over the extensive utilization of fencing in South Africa, it does reduce human-lion conflicts and the number of lions killed in retaliation for killing livestock. Therefore, the management of lions on these reserves and, as part of this management, the limited hunting of lions, contributes to the on-going survival of the species in South Africa.

Provided that the off-take of wild and wild-managed lions continues to be monitored and the actions identified in the BMP continue to be implemented, the participation of U.S. hunters in lion hunts would provide an indirect benefit to wild populations by helping to support the reserves where lions are found. Therefore, based on the information available to the Service, the probable direct and indirect effect that issuing an import permit for a legally hunted lion would have on the species would be positive.

17.32(a)(2)(iii): Whether the permit, if issued, would in any way, directly or indirectly, conflict with any known program intended to enhance the survival probabilities of the population from which the wildlife sought to be covered by the permit was or would be removed:

As stated above, South Africa is closely monitoring and controlling the harvest of wild and wild-managed lions through permitting under ToPS and through the BMP. The issuance of import permits for lions legally hunted under these authorities would not conflict with any programs intended to enhance the survival probability of the species in South Africa. As with all aspects of an adaptive management approach to managing a species, the Service will need to continue to monitor the effectiveness of the hunting program in coordination with the BMP iterations to ensure that it continues to provide the stated benefits to lions.

Therefore, based on the information available to the Service, the issuance of import permits for legally hunted lions would not conflict with any known conservation programs.

17.32(a)(2)(iv): Whether the purpose for which the permit is required would be likely to reduce the threat of extinction facing the species of wildlife sought to be covered by the permit:

As stated, wild lions only occur in a limited number of national parks in South Africa and wild-managed lions are currently found on 45 reserves of less than 1,000 sq. km. While the wild lions on the national parks receive only limited direct management activities, the reserves require management that is more intensive in order to mimic natural biological and ecological roles of lions. All indication show, that given the threats that were identified by the Service when listing the species as threatened under the ESA, the presence of these reserves, as well as the parks, is actively addressing the three causes of lion decline: loss of habitat, loss of prey base, and lion-human conflicts. While the concept of lions behind fences has both benefits and drawbacks, it appears to be a major contributor to the on-going survival of lions in the wild in South Africa. Without a doubt, while having open, unmanaged habitat that is not actively impacted by human intervention would be the ideal condition for lions in South Africa and throughout its range, this is not a viable option within South Africa.

With limited, controlled off-take of lions in a manner that would mimic natural processes, the legal hunting activities that U.S. hunters would be involved in would contribute to reducing the threat of extinction of lions. This off-take must be monitored to ensure that it is sustainable and that, to the extent possible, normal lion behavior and ecology is not negatively impacted. It appears that the permitting activities under ToPS and CITES, as well as the implementation of the BMP will ensure the long-term survival of lions. The utilization of hunters to manage the populations on the reserves is an important element of the success of lion management in South Africa.

Therefore, based on the information available to the Service, the purposes for which import permits would be issued would likely reduce the threat of extinction facing lions in South Africa.

17.32(a)(2)(v): The opinions or views of scientists or other persons or organizations having expertise concerning the wildlife or other matters germane to the application:

As with any discussion of hunting, there are numerous opinions on the impact it would have on a species. From reviewing comments made during the listing process for lions, as well as

information obtained through personal conversations and literature, there is a general agreement that hunting, done properly and well managed, would not have an adverse effect on lion populations. Mimicking natural process within the management program, such as maintaining pride hierarchy for as long as possible by leaving the alpha male in place, will better ensure the long-term survival of the species. Numerous researchers have stated that, while they may not support hunting in general, see that benefits that can be received through a scientifically based hunting program for lions. There have been a large number of comments from some NGOs and the public opposing hunting any lions, but particularly captive-bred lions. This opposition, however, is primarily based on the perceived ethics of hunting. While these comments are an indication of concerns from some members of the public over hunting, they are not germane to our review process.

Therefore, based on the information available to the Service, there is general support by scientists and other persons or organizations having expertise concerning lions that the legal harvest of lions, and the subsequent import of these trophies, would not have an adverse effect on the species, but would further efforts to conserve the species in the wild into the future.

17.32(a)(2)(vi): Whether the expertise, facilities, or other resources available to the applicant appear adequate to successfully accomplish the objectives stated in the application:

Based on our understanding of the permitting process under ToPS, reserves that maintain wild-managed lions must establish biodiversity plans for managing the reserve that take into consideration the long-term survival of all species on the reserve, including large predators. This oversight by DEA and the implementation of the BMP establishes a framework in which reserves manage their wildlife. The long-term survival of lions in South Africa, is tied directly to the success, both ecologically and economically, of the reserves. The reserves that have been permitted to maintain wild-managed lions and, as part of the management program, carry out limited hunting, have the expertise and facilities to maintain lions successfully.

Therefore, based on the information available to the Service, that applicants that are hunting on properly permitted reserves that carry out their management practices in accordance with national and provincial regulations, have the expertise, facilities, or other resources available to them to successfully accomplish the objective stated in their application; i.e., the long-term survival of lions in South Africa.

Conclusion

Given the current status of wild and wild-managed lions within South Africa and the level of management and oversight provided to them, it appears that the harvest and import of sport-hunted trophies of these lions meet the purposes of the ESA. As stated earlier, each application received by the Service for the import of a sport-hunted trophy lion from South Africa will be evaluated on a case-by-case basis. The applicant must have hunted on a properly licensed reserve that is actively managing lions in a manner that will maintain the species on the reserve in a manner that mimics natural processes. The Government of South Africa must continue to implement the BMP in the manner identified in the document. The on-going adaptive management and limited off-take of lions is important to the survival of lions in South Africa and the Service will reassess lion management within South Africa and whether the importation of sport-hunted trophies enhance the

survival of the species either during the next iteration of the 2015-2019 BMP or at which time substantive information becomes available to the Service in the interim.

Therefore, with the information currently available that would enable the Service to make such a finding in accordance with the general considerations laid out above, the Service is able to make a determination that the import of wild and wild-managed lions would meet the issuance criteria under 50 CFR 17.32. Therefore, in accordance with the time scale of the 2015-2019 BMP, , the Service **is able to authorize the import of wild and wild-managed lion trophies from South Africa taken during the 2017, 2018, and 2019 hunting seasons.** In accordance with the 4(d) rule for *P. l. melanochaita*, 50 CFR 17.40(r), the Service will review each application received for import of such specimens on a case-by-case basis and each application will also need to meet all other applicable permitting requirements before it may be authorized.

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
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In Reply Refer To:
FWS/AIA/DMA

OCT 18 2017

Memorandum

To: The File

From: Chief, Branch of Permits

Subject: Enhancement for Lions Taken as Sport-hunted Trophies in Zambia – 2016, 2017, and 2018 Calendar Years.

After evaluating the available information from the Government of Zambia, other information available to the U.S. Fish and Wildlife Service (Service), and comments received from interested parties, the Service has determined that permits for the importation of sport-hunted trophies of wild lions (*Panthera leo melanochaita*), which are threatened under the ESA, taken in Zambia during the 2016, 2017, and 2018 calendar years **meet** the enhancement criteria under the Service's regulations at 50 CFR 17.32. Therefore, applications received for import of such specimens will be considered to have met this requirement. In accordance with the 4(d) rule for *P. l. melanochaita*, 50 CFR 17.40(r), the Service will review each application for import of such specimens on a case-by-case basis and each application will also need to meet all other applicable permitting requirements before it may be authorized. The Service will reassess the situation in Zambia towards the end of the 2018 season to determine if hunts conducted in 2019 and beyond continue to meet the enhancement criteria under 50 CFR 17.32.

Governance of the Lion in the United States:

On October 29, 2014, the Service published in the Federal Register a finding that listing the African lion subspecies (*Panthera leo leo*) as a threatened species under the ESA was warranted and proposed a rule under section 4(d) of the ESA to provide conservation measures for the African lion. 79 Fed. Reg. 64472. On December 23, 2015, after fully considering the comments from the public and the peer reviewers on the proposed rule, the Service published in the Federal Register the final rule in which the taxonomic classification of the Asiatic lion (previously classified as *P. l. persica* and listed as an endangered species under the ESA) was changed to *P.*

l. leo (Asia and western, central and northern Africa) and listed as an endangered species, and the *P. l. melanochaita* (southern and eastern Africa) subspecies was listed as a threatened species with a rule under section 4(d) of the ESA, which is set forth at 50 CFR 17.40(r) (USFWS 2015; 80 Fed. Reg. 79999). The effective date of this listing is January 22, 2016. Therefore, as of January 22, 2016, the lion subspecies *Panthera leo melanochaita*, whose range includes Zambia, is listed as threatened under the ESA and is regulated under section 4(d) special rule [50 CFR 17.40(r)].

Section 9 of the ESA and our implementing regulations at 50 CFR 17.21 and 50 CFR 17.31 set forth a series of general prohibitions that apply to all endangered and threatened wildlife, respectively, except where a 4(d) rule applies to threatened wildlife, in which case the 4(d) rule contains all the applicable prohibitions and exceptions. Under the 4(d) rule for *P. l. melanochaita*, all of the prohibitions under 50 CFR 17.31 apply to *P. l. melanochaita* specimens. These prohibitions, at 50 CFR 17.21 and 17.31, in part, make it illegal for any person subject to the jurisdiction of the United States to "take" (includes harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or to attempt any of these) within the United States or upon the high seas; import or export; deliver, receive, carry, transport, or ship in interstate or foreign commerce, by any means whatsoever, in the course of commercial activity; or sell or offer for sale in interstate or foreign commerce any lion specimens. It also is illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken in violation of the ESA. Permits may be issued to carry out otherwise prohibited activities involving endangered and threatened wildlife species under certain circumstances. Regulations governing permits for endangered species, such as *P. l. leo*, are codified at 50 CFR 17.22. Regulations governing permits for threatened species, such as *P. l. melanochaita*, are codified at 50 CFR 17.32.

In sum, under paragraph 17.40(r)(1), all the prohibitions and exceptions under 50 CFR 17.31 and 50 CFR 17.32 apply to *P. l. melanochaita*. Accordingly, the Service may authorize the import of a sport-hunted lion trophy from Zambia, but only if it first makes a finding that permitting import of a trophy would enhance the survival of the species in the wild.

As we explained when finalizing the 4(d) rule for *P. l. melanochaita*, any person wishing to conduct an otherwise prohibited activity, including all imports of *P. l. melanochaita* specimens, must first obtain a permit under 50 CFR 17.32. As with all permit applications submitted under 50 CFR 17.32, the individual requesting authorization to import a sport-hunted trophy of *P. l. melanochaita* bears the burden of providing information in their application showing that the activity meets the requirements for issuance criteria under 50 CFR 17.32. In some cases, such as for import of sport-hunted trophies, it is not always possible for the applicant to provide all of the necessary information needed by the Service to make a positive determination under the ESA to authorize the activity. In such cases, the Service may consult with the range country and other interested parties to the extent practicable to obtain necessary information. The Service has the discretion to make the required findings on sport-hunted trophy imports of *P. l. melanochaita* on a country-wide basis, although individual import permits will be evaluated and issued or denied for each applicant. While the Service may make enhancement findings for sport-hunted trophy imports of *P. l. melanochaita* on a country-wide basis, the Service encourages the submission of information from individual applicants. We rely on the

information available to the Service and may rely on information from sources other than the applicant when making a permitting decision.

General considerations:

As we also explained when finalizing the 4(d) rule, our threatened species permitting regulations at 50 CFR 17.32 provide issuance criteria for threatened species permits (50 CFR 17.32(a)(2)), but do not specify what would constitute the enhancement of propagation or survival with regard to authorizing the import of parts or products of *P. l. melanochaita,* including sport-hunted trophies. Therefore, when making a determination of whether an otherwise prohibited activity enhances the propagation or survival of *P. l. melanochaita,* the Service examines the overall conservation and management of the subspecies in the country where the specimen originated and whether that management of the subspecies addresses the threats to the subspecies (*i.e.,* that it is based on sound scientific principles and that the management program is actively addressing the current and longer term threats to the subspecies). In that review, we evaluate whether the import contributes to the overall conservation of the species by considering whether the biological, social, and economic aspects of a program from which the specimen was obtained provide a net benefit to the subspecies and its ecosystem.

The Service will evaluate any application received that involves *P. l. melanochaita* in the context of enhancement of propagation or survival permitting in accordance with our threatened species permitting regulations at 50 CFR 17.32 and issuance criteria for threatened species permits (50 CFR 17.32(a)(2)). These include, in addition to the general permitting criteria in 50 CFR 13.21(b):

(i) Whether the purpose for which the permit is required is adequate to justify removing from the wild or otherwise changing the status of the wildlife sought to be covered by the permit;

(ii) The probable direct and indirect effect that issuing the permit would have on the wild populations of the wildlife sought to be covered by the permit;

(iii) Whether the permit, if issued, would in any way, directly or indirectly, conflict with any known program intended to enhance the survival probabilities of the population from which the wildlife sought to be covered by the permit was or would be removed;

(iv) Whether the purpose for which the permit is required would be likely to reduce the threat of extinction facing the species of wildlife sought to be covered by the permit;

(v) The opinions or views of scientists or other persons or organizations having expertise concerning the wildlife or other matters germane to the application; and

(vi) Whether the expertise, facilities, or other resources available to the applicant appear adequate to successfully accomplish the objectives stated in the application.

In addition to these factors, particularly in relation to sport hunting, we find the *IUCN Species Survival Commission (SSC) Guiding Principles on Trophy Hunting as a Tool for Creating Conservation Incentives, Ver. 1.0* (IUCN 2012), to provide useful principles, which, considered in conjunction with our threatened species issuance criteria, will aid the Service when making an enhancement finding for importation of sport-hunted trophies of *P. l. melanochaita.* This document sets out guidance from experts in the field on the use of trophy hunting as a tool for "creating incentives for the conservation of species and their habitats and for the equitable sharing of the benefits of use of natural resources" (IUCN SSC 2012, p. 2) and recognizes that recreational hunting, particularly trophy hunting, can contribute to biodiversity conservation and more specifically, the conservation of the hunted species.

The SSC document lays out five guiding principles that, considered in conjunction with our threatened species issuance criteria, will aid the Service when making an enhancement finding for importation of sport-hunted trophies of *P. l. melanochaita:*

(a) *Biological sustainability:* The hunting program cannot contribute to the long-term decline of the hunted species. It should not alter natural selection and ecological function of the hunted species or any other species that share the habitat. The program should not inadvertently facilitate poaching or illegal trade in wildlife by acting as a cover for such illegal activities. The hunting program should also not manipulate the ecosystem or its component elements in a way that alters the native biodiversity.

(b) *Net Conservation Benefit:* The biologically sustainable hunting program should be based on laws, regulations, and scientifically based quotas, established with local input, that are transparent and periodically reviewed. The program should produce income, employment, and other benefits to create incentives for reducing the pressure on the target species. The program should create benefits for local residents to co-exist with the target species and other species. It is also imperative that the program is part of a legally recognized governance system that supports conservation.

(c) *Socio-Economic-Cultural Benefit:* A well-managed hunting program can serve as a conservation tool when it respects the local cultural values and practices. It should be accepted by most members of the community, involving and benefiting local residents in an equitable manner. The program should also adopt business practices that promote long-term economic sustainability.

(d) *Adaptive Management: Planning, Monitoring, and Reporting:* Hunting can enhance the species when it is based on appropriate resource assessments and monitoring (*e.g.*, population counts, trend data), upon which specific science-based quotas and hunting programs can be established. Resource assessments should be objective, well documented, and use the best science available. Adaptive management of quotas and programs based on the results of resource assessments and monitoring is essential. The program should monitor hunting activities to ensure that quotas and sex/age restrictions of harvested animals are met. The program should also generate reliable documentation of its biological sustainability and conservation benefits.

(e) *Accountable and Effective Governance:* A biologically sustainable trophy-hunting program should be subject to a governance structure that clearly allocates management responsibilities. The program should account for revenues in a transparent manner and distribute net revenues to conservation and community beneficiaries according to properly agreed decisions. All necessary steps to eliminate corruption should be taken and to ensure compliance with all relevant national and international requirements and regulations by relevant bodies such as administrators, regulators and hunters.

The Service's approach to enhancement findings for the importation of sport-hunted trophies of *P. l. melanochaita* is consistent with the purpose and intent of the ESA. Before we will authorize the importation of a sport-hunted trophy, we must determine that the trophy hunting program is managed to ensure the long-term survival of the species. In many parts of the world, wildlife exists outside of protected areas and must share the same habitat and compete with humans living in these areas for space and resources. If communities that share these resources with wildlife do not perceive any benefits from the presence of wildlife, they may be less willing to tolerate the wildlife. However, under certain circumstances, trophy hunting can address this problem by making wildlife more valuable to the local communities and encourage community support for managing and conserving the hunted species, as well as other species.

When evaluating whether the importation of a trophy of *P. l. melanochaita* would be authorized pursuant to 50 CFR 17.32, in accordance with our threatened species issuance criteria, we will examine how a country's management program for lions addresses the three main threats that have led to the decline of the subspecies: habitat loss, loss of prey base, and human-lion conflict. When examining a management program and whether trophies taken as part of that program meet the issuance criteria, we study a number of factors. Some of the factors we consider include whether the program is based on sound scientific information and identifies mechanisms that would arrest the loss of habitat or increase available habitat (*i.e.*, by establishing protected areas and ensuring adequate protection from human encroachment). We consider whether the management program actively addresses the loss of the lion's prey base by addressing poaching or unsustainable offtake within the country. A component of a management plan from which trophy imports would meet the issuance criteria would be whether there are government incentives in place that encourage habitat protection by private landowners and communities and incentives to local communities to reduce the incursion of livestock into protected areas or to actively manage livestock to reduce conflicts with lions. We examine if the hunting component of the management program supports all of these efforts by looking at whether hunting concessions/tracts are managed to ensure the long-term survival of the lion, its prey base, and habitat. Hunting, if properly conducted and well managed, can generate significant economic benefits that may contribute to the conservation of lions. In looking at whether we are able to authorize the import of a trophy under the issuance criteria of 50 CFR 17.32, we will examine if the trophy hunting provides financial assistance to the wildlife department to carry out elements of the management program and if there is a compensation scheme or other incentives to benefit local communities that may be impacted by lion predation. We will also consider how a U.S. hunter's participation in the hunting program contributes to the overall management of lions within a country.

Management programs for *P. l. melanochaita* are expected to address, but are not limited to, evaluating population levels and trends; the biological needs of the species; quotas; management practices; legal protection; local community involvement; and use of hunting fees for conservation. In evaluating these factors, we will work closely with the range countries and interested parties to obtain the information. By allowing entry into the United States of *P. l. melanochaita* trophies from range countries that have science-based management programs, we anticipate that other range countries would be encouraged to adopt and financially support the sustainable management of lions that benefits both the species and local communities. In addition to addressing the biological needs of the subspecies, a scientifically based management program would provide economic incentives for local communities to protect and expand *P. l. melanochaita* habitat.

Basis for Finding for lions taken in Zambia:

On February 2, 2016, the Service sent a letter to Zambia's Wildlife Authority with a list of questions that would aid the Service in evaluating the overall conservation and management of the species in Zambia and whether that management addresses the three main threats that have been identified as contributing to the decline of the species: habitat loss, loss of prey base, and human-lion conflict. Additionally, in the letter the Service referenced the IUCN Species Survival Commission (SSC) Guiding Principles on Trophy Hunting as a Tool for Creating Conservation Incentives, Ver. 1.0 (IUCN SSC 2012), as it provides useful principles, which when considered in conjunction with the Service's permit issuance criteria, would aid when making the required enhancement finding for importation of sport-hunted trophies.

In response to our February 2, 2016, letter, documentation outlining the status of lions in Zambia was provided by Zambia's Department of National Parks and Wildlife (DNPW), herein referred to as DNPW (DNPW 2016). Information obtained from Zambia's DNPW, along with the Service's own final rule on the lion listing under the ESA, relevant information obtained separately through open sources such as IUCN documents, and relevant information contained in comments received from interested parties, were the basis of this finding.

Governance of Lions in Zambia

The responsibility for implementing wildlife conservation laws in Zambia dates back to the 1930s or 1940s with the establishment of the Department of Tsetse, Fisheries, and Wildlife. In the late 1950s, this agency became the Department of Game and Fisheries and operated under this designation until the mid-1970s, when it became the Department of National Parks Wildlife Service (DNPWS) who was responsible for the protected area network. In 1999, the Government of Zambia transformed this agency into Zambia's Wildlife Authority (ZAWA), creating a semi-autonomous agency responsible for the management and protection of this network, with statutory powers derived through the Zambia Wildlife Act No. 12 of 1998. However, this agency, due partly to its semi-autonomy, had a low funding capability, relying primarily on revenue from tourism, which also included sport hunting. Between 1999 and 2005, ZAWA struggled with their law enforcement capabilities due to inadequate resources. The costs associated with transforming DNPWS to ZAWA continued to affect the financial and staff

allocations for law enforcement activities. Large sums of money that could have been utilized by law enforcement were apparently channeled into tasks involved in the transformation process.

Since 2005, in partnership with the Zambia Lion Project (ZLP), ZAWA (now DNPW) established a voluntary program to assess and age lions taken as trophies (DNPW 2016). From 2006 through 2012, DNA samples were taken from teeth of both live and trophy lions in order to estimate the age of lions taken as trophies (DNPW 2016). The results from these past sampling efforts helped demonstrate the performance of the hunting sector during this time. It has also provided a baseline for comparing future performance.

By 2010, Zambia developed a ten-year Conservation Strategy and Action Plan for the African lion. Since the approval of this strategy, research has begun and management actions have been taken to address local community benefits, human-lion conflict, land use planning and zoning, trade, and monitoring (DNPW 2016). Some of the lion-related studies that were initiated are the Zambia Carnivore Programme (ZCP), Kafue Lion Project, and Zambia Lion Project (ZLP) (DNPW, 2106). The development of this strategy also led to the employment of 12 ecologists, with three committed to spending 70% of their work time on lion-related issues (DNPW 2016).

In 2015, ZAWA was disbanded and reincorporated as a government department, the Department of National Parks and Wildlife (DNPW). In addition, the Zambia Wildlife Act No. 12 of 1998 was repealed. However, the Wildlife Act No. 14 of 2015 (Wildlife Act) is still the principle legislation guiding the management of wildlife in Zambia through a system implemented and enforced by DNPW with assistance from stakeholders (DNPW 2016).

The Wildlife Act is administered by DNPW under the Ministry of Tourism. DNPW is headed by a Director, with assistant directors who command 4 elements of the department: Principal Warden-Operations Wildlife Law Enforcement Unit, Principal Warden-Conservation Unit, Principal Engineer Infrastructure Development Unit, and Principal Natural Resource Management Officer Community-based Natural Resource Management Unit. *The Wildlife Law Enforcement Unit* is comprised of 1,250 Wildlife Police Officers who are responsible for investigating and enforcing wildlife crimes within 236,376 km^2 of wildlife area (average 189 km^2 per officer). The Zambian government has also committed to adding an additional 850 officers by 2018 (600 new officers were reportedly added in 2016). *The Wildlife Conservation Unit* is responsible for mitigating human-wildlife conflict, facilitating wildlife officer trainings, regulating private wildlife estate operations, managing ecosystems, managing landscape conservation of certain species, and both developing and implementing park regulations. *The Infrastructure Development Unit* is responsible for construction and maintenance of infrastructures and machinery within protected areas. *The Community-based Natural Resource Management Unit* is responsible for co-managing Game Management Areas (GMAs) with local communities. Duties include providing technical support to Community Resource Boards regarding the management of human-natural resources in GMAs and open areas. This unit facilitates the election of the Community Resources Board members and the election of Village Action Groups. Responsibilities also include monitoring the use of funds disbursed to Community Resources Boards and training village scouts and Community Resources Board members.

The lion is a protected species under the Wildlife Act. It is a criminal offense to hunt, kill, capture, or possess a lion without a license. The lion is also protected under private wildlife estate legislation and statutory instruments implemented with the (now repealed) Wildlife Act of 1998 and carried over to the Wildlife Act. Additionally, in 2016, four new statutory regulations were reportedly enacted to address various aspects of lion management to complement the operation of the new Wildlife Act. They included the Zambia wildlife regulations for granting of hunting concessions, lion sport hunting, keeping of big cats in captivity, and conducting ecological or research wildlife assessments (DNPW 2016).

In addition to Zambia's domestic laws, it is also a Party to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The lion is listed in Appendix II of the Convention. As an Appendix-II species, certain criteria must be met before such species can be exported, including a findings from the exporting country's CITES Management Authority that the specimen was legally acquired and the country's Scientific Authority that the export will not be detrimental to the survival of the species in the wild. In their reply to our inquiry, Zambia provided a copy of their May 5, 2016, non-detriment finding for lions. This finding states that "(t)he CITES Scientific authority of Zambia has considered the population of lion in Zambia; the quota-setting system and current precautionary quota of only 24 lions; the newly implemented age-based harvest policy; the limited offtake; the adaptive management of lion; and the substantial revenues generated for DNPW operations, anti-poaching, and community development." They further explain that their positive finding was based on three pillars that include a "precautionary" quota, age-based harvesting, and community benefits.

Current Lion Status in Zambia

Lion Range:

According to DNPW, the lion range in Zambia covers about 63% of Zambia's protected areas, which is about 145,000 km^2 (DNPW 2016). Historically, lions occurred in the West Lunga complex, although, recently, populations have not been found in this complex (DNPW 2016). The majority of lions are found in three main clusters throughout Kafue, Luangwa, and the Lower Zambezi region. Luangwa and Lower Zambezi are connected through GMAs. Smaller populations of lions are also present in Liuwa Plains, Sioma Ngwezi, Nsumbus, and the Lavushi Manda National Parks. In addition, Kazungula and Siavonga open areas have lion populations that roam between Zambia and other countries (DNPW 2016).

The 2016 IUCN Red List Assessment stated that lions are now extinct in 15 countries in Africa (including Western Sahara, which is technically a disputed territory), are possibly extinct in another seven countries, and now occur in only 24 countries (Macdonald 2016). The latest IUCN estimates suggest a population of 23,000 - 39,000 lions throughout their current range on the African continent (IUCN 2016), representing a decline of at least 43% between 1993 and 2014. Lions are now considered to have been extirpated from at least 92% of their historic range (Macdonald 2016). Therefore, in assessing the population of lions in Zambia, we must also consider the significance of the diminishing total population of lions remaining in the wild. This is in part because the Southern and Eastern African lion populations include Zambia (DNPW 2016). DNPW presented a study conducted by the Zambia Lion project (ZLP) in which DNA

analysis of Zambian lions was undertaken during 2004 - 2012. The study concluded that Southern African and East African lions were integrated among the Zambian lions. The study also determined that the genetic diversity of Zambian lions is much greater than comparable areas in Southern and Eastern Africa.

Population Status:

Data provided by Macdonald (2016) indicate that Zambia contains approximately 1,200 free-ranging lions in an estimated range of 135,000 km^2 (approximately 10,000 km^2 less range than identified by the Zambian government). DNPW explains that previous lion estimates were determined, in large part, through expert opinion (DNPW 2016). They also confirm that no intensive research has been conducted in the corridor area, consisting of West Petauke, Chisomo and Luano GMAs, and surrounding Open Areas (DNPW 2016).

In addition to the population status determined by Macdonald (2016), the Zambian Carnivore Programme (ZCP) studied the population of lions in Zambia. In 2013, the ZCP monitored 13 prides and 13 coalitions, comprised of 141 lions with 3 adjacent sites of 20 lions each, totaling over 200 lions. In 2014, the ZCP monitored 15 prides and 13 coalitions, with a total of 166 individual lions. In 2015, the ZCP's partial data indicated that 15 prides and 15 coalitions of lions exist throughout Zambia.

In acknowledging their need for more complete and current lion population data, DNPW has begun working with partners on monitoring studies in the Luangwa and Kafue ecosystems. Surveys were conducted in the later part of 2016 (DNPW 2016). The Service has not seen the results, but will request them for consideration of future enhancement determinations. In addition, dependent on funding availability, DNPW has identified that a survey would be conducted of the corridor between South Luangwa National Park and Lower Zambezi National Park and the GMAs surrounding the eastern part of North Luangwa National Park.

A report by the Democratic staff of the House Committee on Natural Resources concludes that Zambia lion populations may show signs of stabilizing or even recovery, but strict controls on additional mortality are necessary to prevent further decline (Grijalva 2016).

Threats:

Habitat Loss, Population Growth, and Human-Lion Conflicts:

Lion populations throughout Africa have decreased in correlation with their habitat and currently only 10 stable populations with more than 500 lions still exist throughout the continent of Africa (Creel *et al.* 2016). Africa has the fastest human population growth rate in the world, with projections estimating a population tripling across 27 African states by 2100, leading to a continental estimate of 4 billion. Eight lion range states are estimated to have a five-fold increase in human population by 2100 (Macdonald 2016) and Zambia has not steered clear of Africa's population and development growth (DNPW 2016). Human population growth has increased in Mfuwe, the gateway town to South Luangwa National Park, largely due to increased infrastructure development and an increasing number of economic opportunities created through tourist lodges (DNPW 2016). Habitat loss, population growth, human-lion conflicts, poverty,

poaching, diseases, uncontrolled hunting, and the importation of captive-bred lions into Zambia are all threats to the long-term survival of lion populations in Zambia.

DNPW stated that human-lion conflicts are not uncommon in Zambia. From the years 2008 through 2015, a total of 327 livestock animals were recorded as being killed by lions; since 2002, at least 70 lions were reported killed as a result of human lion conflicts (DNPW 2016). The number of Zambian lions killed as a result of human-lion conflict is shown in the table below.

Year	Lions Killed
2002	2
2003	4
2004	1
2005	0
2006	5
2007	8
2008	2
2009	5
2010	3
2011	8
2012	5
2013	10
2014	14
2015	1
2016	2

Poverty, Poaching, and Disease:

Prey base depletion is partly linked to habitat loss, but more importantly to poaching and bush meat trade (Becker *et al.* 2013). Poaching of lions for the trade in bones and other body parts for traditional medicine is an emerging threat within Africa (Macdonald 2016). Within Zambia, another more widely occurring threat believed to be facilitated by high levels of poverty is poaching of lions for bush meat (DNPW 2016). DNPW acknowledges that bush meat poaching occurs widely in Zambia (DNPW 2016). They also acknowledge that the amount of illegal use of lion parts in Zambia is currently unknown (DNPW 2016). However, DNPW has indicated it will establish an investigation into the illegal trade and use of lion parts.

Zambia has addressed the need to monitor the health of their lions by creating the Infrastructure Development Unit (IDU). The IDU subsequently established a veterinary unit of DNPW whose responsibility is to regularly sample lion specimens for diseases. This unit also assists law enforcement officers in the treatment of injured lions due to illegal activities such as snaring (DNPW 2016).

Trophy Hunting:

Di Minn *et al.* (2016) estimated that 37.8% of Zambia is covered by terrestrial protected areas, with 21.3% in Open Game Ranches. According to a 2012 article, lion hunting in Africa generates 5–17% of gross trophy hunting income on national levels with the proportional significance highest in Mozambique, Tanzania, and Zambia (Lindsey *et al.* 2012). A more recent paper published by Macdonald, however asserted that Zambia generated very little revenue from trophy hunting (Macdonald 2016). It should be noted, however, that Macdonald based the paper on data obtained in the years before 2016 (the moratorium was between 2013 and 2015) and the formation of DNPW and newer regulations were not implemented until after Zambia imposed a moratorium on lion hunting for the years 2013 through 2015. According to DNPW, Zambia's total hunting revenue (all hunting, not just lions) accounted for 32% of the revenue that ZAWA (now DNPW) received during the years 2010 through 2012 (DNPW 2016). They also affirm that the average revenue generated for hunting in Zambia was reduced to 4% during the lion hunting moratorium in 2013 and 2014 (DNPW 2016).

IUCN has only examined the lion population in Luangwa, Zambia. Their findings indicate that trophy hunting in Luangwa contributed to a decline in the lion population by 28% between 1993 and 2014 (Macdonald 2016). However, this assessment was done prior to Zambia's 2013-2015 hunting ban and therefore, it will need to be re-assessed now that Zambia's lion hunting ban has been lifted and new regulations have been implemented.

Importation of Captive-bred lions:

Captive-bred lions from South Africa and Zimbabwe are being imported into Zambia for lion walks (DNPW 2016). DNPW believes that the importation of captive-bred lions is a result of a growing photo tourism market in the Livingstone area of Southern Zambia (DNPW 2016). Since 2008, a total of 54 captive-bred lions have been imported into Zambia, but the Zambian government has imposed a condition that the captive-bred lions will not be introduced into the wild (DNPW 2016). In order to ensure that Zambia's captive-bred lions do not negatively impact their wild lion populations, Zambia is currently working on the preparation of a statutory instrument that will regulate the importation and captive uses of lions. Other than for temporary veterinary purposes, the holding of, breeding, and commercial use (i.e. walking and petting) of captive-bred lions will be banned (DNPW 2016). Lions that are currently held in captivity will be required to be castrated or spayed and eventually all commercial uses of captive-held lions will be phased out (DNPW 2016). DNPW, states that "particular care will be taken to avoid the dumping of captive-held cats into wild areas for any reason, especially for hunting or 'release' as means for the owners to avoid the penalties or costs associated with the authorized disposition of their animals (DNPW 2016)."

Partners/NGOs:

DNPW has partnered with several NGOs in an effort to obtain lion population survey data and other lion-related research studies. The Zambia Lion Project (ZLP) has conducted research on the presence/absence of lion surveys throughout Zambia (DNPW 2016). They have also assisted with DNA collection studies. The Zambia Carnivore programme (ZCP) has been documenting population trends and demographic vital rates of lions in the key areas of South Luangwa National Park, Kafue National Park, and Liuwa Plain National Park. Through their research

efforts, the ZCP has also contributed to aerial support that has assisted DNPW with enforcement actions.

Although their research focus has been on elephants, the Frankfurt Zoological Society has been active in North Luangwa ecosystem for over 20 years. Conservation South Luangwa (CLS) has been active in South Luangwa National Park and surrounding GMAs. Game Rangers International has been active in the Kafue ecosystem since 2010. Conservation Lower Zambezi (CLZ) is also active in the Lower Zambezi national park and surrounding GMAs.

Supplemental revenue sources are also gained with the support of several NGOs. NGOs can provide functions that include anti-poaching units and / or aerial support. One such example is the Frankfurt Zoological Society (FZS), which has been active in North Luangwa National Park for over 20 years. FZS established a partnership with DNPW in order to help preserve black rhino and elephant populations through the establishment of The North Luangwa Conservation Programme (NLCP).

Lion Management in Zambia

History of Lion trophy exports:

During 2008 - 2012, DNPW authorized the export of 289 lion trophies (50, 40, 89, 37, and 73 respectfully). During 2013 - 2015, the Zambian government established a lion hunting moratorium (some trophies apparently taken before the moratorium were exported during this time, however). The moratorium was established to allow time to restructure Zambia's governance of lions and to allow a period of time for lion recovery (DNPW 2016). Data comparing the lion population status before and after the moratorium are currently unavailable; hence, the success of the moratorium cannot be fully assessed.

Lion Hunting and Concessions:

Zambia lion hunting occurs in *Game Management Areas (GMAs)* and *Open Game Ranches (OGRs)*. OGRs are unfenced private lands reserved for the wildlife conservation management of an individual or local community. They are buffered by GMAs. DNPW issues annual non-resident hunting quotas to the OGRs in exchange for managing the wildlife; although all animals remain the property of the State (DNPW 2016).

All 20 of Zambia's national parks are surrounded by GMAs, but currently, lion hunting only occurs within hunting blocks located in the GMAs that surround the National parks in the Luangwa, Kafue, and Lower Zambezi ecosystems. GMAs are primarily designated for safari (tourist) and resident hunting, but some GMAs also include photographic tourism. All GMAs allow settlement. There are 36 GMAs in Zambia covering 177,404 km^2 (DNPW 2016). Most, but not all, GMAs have General Management Plans outlining basic management practices. Community-Based Natural Resource Management (CBNRM) is implemented within GMAs through Community Resource Boards (CRBs) (DNPW 2016). The CRBs focus on the economic and social well-being of local communities. There are currently 75 registered CRBs within Zambia that employ approximately 750 community scouts and 79 support staff.

DNPW, in consultation with the local community, is mandated to grant hunting concessions within specific hunting blocks within GMAs. Hunting concessions must be registered in Zambia, have a tourism enterprise license, have a valid tax clearance certificate, provide proof that the company is not bankrupt, and they must meet any additional conditions set by an evaluation committee (DNPW 2016). Leases are stated to range from 7 - 15 years, with the length of lease time dependent on the abundance of species classified within the individual hunting block (DNPW 2016). Prime hunting blocks have greater species abundance and are generally awarded shorter lease agreements in comparison to secondary hunting blocks. Secondary hunting blocks are generally given longer lease periods in an effort to provide incentives for the concessionaire to invest greater resources, allowing wildlife populations to increase before offering hunting (DNPW 2016).

Hunting block concessions are awarded through a bid process in accordance with the Zambia Public Procurement Act No 12 of 2008. Bids are taken from companies through a "two envelop system." The bids consist of a technical proposal and a financial proposal being placed in separate clearly marked envelopes. The technical bid is required to be evaluated by criteria outlined in Zambia's Wildlife Act before the envelope containing the financial bid is opened. Financial envelopes will only be opened for bidders that received meet a specific technical expertise (e.g., a score of over 80 on the established criteria). The lease is awarded to the bidder that qualified with a minimum technical rating of 80 and whom submitted the highest financial bid (DNPW 2016).

Successful bidders must address statutory obligations to communities and provide enforcement contributions when developing Concessionary Agreements. Concessionary Agreements are developed through a partnership between the communities, safari operators, professional hunters, and DNPW. As such, a hunting concession agreement is not valid without the signature of the Chief(s) or CRB associated with the hunting block (DNPW 2016). Concessionaires are required to use collected fees to support resource protection by providing community scouts, vehicles, fuel, patrols, and equipment. They must provide infrastructure development to local communities and also offer resource monitoring and fire management. Some concessionaires further benefit community development by supporting the employment of teachers and nurses, purchasing ambulances, building classrooms and clinics, and providing houses for teachers and health personnel. Moreover, they are mandated to provide 50% of the meat from hunted animals to the local community. Concessionaires are evaluated annually and those that do not comply with their obligations can have their concession terminated before the end of the agreement's term (DNPW 2016).

Hunting Quotas:

From 2005 - 2012, Zambia had quotas that totaled 683 lion in 21 GMAs and 5 OGRs, with the highest annual quota set at 117 lions and the lowest at 55 lions (DNPW 2016). The quotas were generally based on the previous year's lion quotas and, in some cases, the quotas were a fixed part of a concession agreement (DNPW 2016). However, DNPW did not completely identify the basis for these quotas or how they were distributed. Currently, quotas are based primarily on lion populations determined through aerial surveys (DNPW 2016). However, information obtained from ground counts, patrol sightings, local and expert opinion, and hunting monitoring

is also used. CRBs use the information they have collected to determine what the GMA quota should be. Their proposal is submitted to DNPW for approval. Once a proposal is received, DNPW accepts feedback from field staff and safari hunting outfitters, as well as the hunting guidelines (below), before the quotas are approved by the Wildlife Conservation and Management Unit and distributed by their Licensing Unit. The quotas are then distributed to the CRBs and hunting companies. DNPW is required to share the approved quotas with other government agencies, including the Auditors General Office and Anti-Corruption Commission. For 2016, Zambia established a quota of one lion per hunting concession, for a total quota of 24 lions (2 hunted on OGRs and 22 hunted in GMAs). Quotas are set for individual hunting blocks within the GMAs.

Hunting Guidelines:

The Zambia's Conservation Strategy and Action Plan for the African lion was developed in 2010 and designed with a 10-year plan (DNPW 2016). The purpose of the plan is to gain stakeholder participation while using adaptive management practices when addressing concerns regarding scientific management, habitat protection, and human-lion conflicts. Based on the principles of the Action Plan, following the three-year moratorium, in 2016, DNPW consulted independent lion experts and held a workshop that resulted in the creation of hunting guidelines (DNPW 2016). The guidelines are considered part of an adaptive process to manage lion hunting in Zambia. DNPW is in the process of transforming the guidelines into a statutory law that will include provisions for monitoring lion hunting through an age-based system (DNPW 2016). The lion hunting guidelines include, but are not limited to, the following recommendations:

1. No hunting of female lions.
2. No hunting of any lion born or held in captivity.
3. No use of pre-recorded sounds in lion hunting.
4. No lion hunting on fenced game ranches.
5. Lions should only be hunted in Prime and Secondary areas and Open Game Ranches known to be rich in lion and prey.
6. Establishment of a place for trophy measurements of hunted lions for exports should be established.
7. DNPW shall establish a lion aging evaluation committee that will include representatives from the Professional Hunters Association, the Safari Operator Association, the Wildlife Producers Association, and officers from DNPW that are nominated by the director. Prior to issuing CITES permits, the committee shall meet once a year to establish the age of hunted lions.

DNPW has established age-based categories that divide lion hunting into four age-based categories: Category 1 consists or male lions between five and six years old and above; Category 2 consists of male lions older than four years old, but younger than five years old; Category 3 consists of male lions that are younger than four years old; and Category 4 consists of male lions seven years old or older. DNPW has determined that only male lions that are five years and older should be hunted. However, DNPW may authorize the export of Category 2 male lions so as not to penalize the hunter. Lions that are less than four years old will be confiscated and may not be exported. In cases where lions under five years old are taken, however, the professional hunter and the safari outfitter may be penalized (Becker 2017 per. comm.).

Wildlife officers must also accompany hunters on all hunts (DNPW 2016). The officer is responsible for recording hunt activities on specified forms such as the Safari Hunting Monitoring form and Trophy Measurement form. The officer endorses licenses to ensure that they are not used more than once and the officer also ensures that all harvested trophies are registered (DNPW 2016).

Hunting-generated Revenue:

DNPW receives revenue by charging GMA fees per lion hunt. They also receive funds from annual professional hunter fees, certificate of valuation of trophies fees, certificate of ownership of trophies fees, permit fees, handling fees, and CITES security stamp fees. Hunting license fees in Zambia are statutory. The foreign hunter looking to take a lion must pay the fee directly to the outfitter, with the minimum amount currently set at $4,200. DNPW collects these fees from the outfitter/concession and does not deal with the foreign hunter directly. Therefore, the outfitter may choose to charge the foreign hunter any amount greater than $4,200. The revenue generated from license fees (also referred to as Animal fees by DNPW) is mandated to be shared with CRBs under the Zambia Wildlife Act No. 14 of 2015. The fees are shared with CRBs and DNPW as follows:

License fees (animal fees):

- 5% of funds go to the CRB chief/leader.
- 45% of funds go to CRB community funds.
    - According to Zambia's "Guideline on the use of Community funds accrued from wildlife management", 45% of these community funds should go to wildlife protections and patrols, 35% should go to community projects such as constructing clinics, roads, schools, and wells, and 20% of the funds should go towards CRB administration costs.
- 50% of funds go to DNPW (mandated under the Zambia Wildlife Act No. 12 of 1998 and continued in the Wildlife Act) in the form of conservation funds, including, but are not limited to: scout/wildlife officer salaries, resource protection, consultancy and legal fees, animal surveys, staff training, administrative and operational expenses, repair and maintenances, and other conservation expenses.

According to Zambia's hunting guidelines, hunts involving lions are required to be a minimum of 16 days (DNPW 2016). A daily conservation fee of $150 per hunter and $100 per observer is collected for monitoring purposes (DNPW 2016). These daily hunt fees typically cover combined hunt packages that include hunting lion, along with other species such as hippos and impalas. The fees are allocated by percentages to CRBs and DNPW as follows:

Daily fees (Concession fees):

- 5% of funds go to the CRB chief/leader.
- 15% of funds go to CRB community funds.
    - Based on recommended guidelines, 45% of these community funds go to wildlife protections and patrols, 35% goes to community projects such as constructing

clinics, roads, schools, and wells, and 20% of the funds go to CRB administration costs.

- 80% of funds go to DNPW in the form of conservation funds, including, but are not limited to: scout/wildlife officer salaries, resource protection, consultancy and legal fees, animal surveys, staff training, administrative and operational expenses, repair and maintenances, and other conservation expenses.

Hunting fees for all species accounted for 32% of revenues that DNPW received during 2010 - 2012. However, that amount was reduced to about 4% during the 2013 and 2014 moratorium (DNPW 2016). Safari hunting also creates other revenue for Zambia, through activities such as tipping, eating in restaurants, staying at lodges, purchasing souvenirs, and paying for taxidermy.

Evaluation:

As stated earlier, the Service will evaluate any application in accordance with our threatened species permitting regulations at 50 CFR 17.32 and issuance criteria for endangered species permits (50 CFR 17.32(a)(2)). In evaluating each of these criteria on the basis of information available to the Service, we have been able to determine if the import of sport-hunted lions from Zambia would meet the Service's enhancement criteria necessary to issue the required import permit.

17.32(a)(2)(i): Whether the purpose for which the permit is required is **adequate to justify removing from the wild** or otherwise changing the status of the wildlife sought to be covered by the permit:

In evaluating this criterion, the Service assesses whether the hunting program established for lions has demonstrated the ability to contribute toward positive conservation outcomes that mitigate or improve the status of lions throughout their range within Zambia, while addressing the main threats of habitat loss, human-lion-livestock conflict, and prey depletion.

The IUCN's 2012 Guiding principles on trophy hunting support the concept that hunting can provide a conservation benefit if it is part of a governance system that provides both implementation and enforcement at a level that adequately supports conservation. The Service also believes that conservation hunting can assist the wild lion populations if managed well. Lion hunting, if managed properly, could meet the Service's enhancement criteria under the Act. There must be adequate information and data clearly showing that removing lions from the wild for trophy hunting will be done at a level and with sufficient oversight such that it improves the current status of lions in the wild (50 CFR 17.32).

Zambia has demonstrated their desire to maintain the long-term conservation of their lion population with their 2013-2015 moratorium on lion hunting. When the Zambian government realized that population numbers were declining to an unstainable level, they applied the moratorium for 3 years, until they determined that their lion population increased enough to tolerate a limited offtakes (DNPW 2016).

As mentioned in the sections above, the Zambian government has clarified that they have established block quotas by surveying lion populations through a combination of aerial surveys and information obtained from ground counts, patrol sightings, local and expert opinion, and hunting monitoring. However, because surveys are continually being carried out on the current population status of lions in Zambia, future analysis may need to be conducted in subsequent years. Therefore, the Service will need to continue to monitor the effectiveness of new lion surveys that contribute to determining the population status of lions in correlation with hunting block quotas.

The difference in male turnover between hunting/non-hunting periods is apparent from cub survival rate. Macdonald (2016) reports that in the absence of hunting, 80% of cubs survived to one year of age, during the trophy hunting period, only 66% of cubs survived to one year of age. The principle behind restricting trophies to older males is that their tenure in the pride should have been long enough to raise at least one generation of cubs to adulthood. However, lion experts have come to varying conclusions regarding the minimum age recommended for sustainable lion hunting. Creel *et al.* (2016), not only state that the minimum hunting age should be 7-8 years old, but they also conclude that age-restricted harvesting is not sufficient to yield sustainability by itself. However, other experts believe that the sustainable age of lions is five years and older, provided that proper identification/aging can occur before the animal is harvested. Nonetheless, lion experts are in consensus that hunting lions younger than five years old may not be sustainable. Zambia's recommended hunting guidelines are in line with the minimum age of five-year-old lions, but the Service is concerned that allowing for the export of lions under this age (Zambia allows export of four-year-old lions, but not less than four years old) may not be sustainable. Zambia will need to closely monitor the number of exports of "under age" trophies to determine if there are sufficient disincentives to discourage taking such animals.

The Zambian government has done a good job of identifying how resources from hunting-generated revenue would be shared with communities. The local communities receive funds from concessions and license (animal) hunting fees. As outlined in the license fee distribution above, 35% of the funds allocated to CRBs help support community projects such as constructing clinics, roads, schools, and wells, thereby providing incentives for the local community to ensure the long-term conservation of the lions. In addition, 45% of the CRB license fees go to wildlife management, including resource protection and patrols.

Zambia's human population growth has contributed to conflicts within the GMAs. As clarified in detail on pages 17 and 18 of this document, DNPW contributes 50% of the license fees (animal fees) and 20% of the Concession fees to local communities. These financial benefits received from living in a GMA have provided incentives for newcomers to illegal squat in the GMAs looking to capitalize on the financial benefits. Consequently, the illegal squatting has caused enough conflict with local people to trigger action to be taken by the Zambian government. In August of 2015, over 2,000 squatter households within the Mumbwa GMA were evicted so that the registered local communities could receive the full benefits of living within a conservation area (DNPW 2016). The long-term results of the eviction will need to be addressed in future analysis of Zambia's trophy hunting.

Therefore, based on the information available to the Service and provided that hunted lions are properly permitted and in compliance with national and provincial regulations, we conclude that the purpose for which a permit being requested is adequate to justify changing the status (i.e., exporting trophy lions) of animals taken in accordance to Zambian laws and regulations.

17.32(a)(2)(ii): The probable direct and indirect effect that issuing the permit would have on the wild populations of the wildlife sought to be covered by the permit:

As described in the lion status above, Zambia has taken great strides to address the major threats facing lions through their hunting program and updated regulations. In 2010, Zambia developed a ten-year Conservation Strategy and Action Plan for the African lion. Since the establishment of the Action Plan, the Zambian government has cooperated with partners to implement the strategy (DNPW 2016). Monitoring, local community benefits, human lion-conflict, and land use planning are only some of the benefits of the Action Plan (DNPW 2016). The development of the Community-Based Natural Resource Management Unit has helped facilitate Zambia's economic and social well-being by providing technical support to CRBs, training of village scouts and CRB members, and monitoring the use of funds disbursed to the CRBs. An investigative unit also carries out investigations related to wildlife crimes. Furthermore, the President of the Republic of Zambia has also directed the Defense san security wings in the country to join in the fight against poaching.

Provided that the off-take of wild lions continues to be monitored, that most, if not all, trophy lions are five years of age or older that quotas continue to be conservative, and the lion management recommendations continue to be implemented, the participation of U.S. hunters in lion hunts would provide an indirect benefit to wild populations by helping to support the reserves where lions are found. Therefore, based on the information available to the Service, the probable direct and indirect effect that issuing an import permit for a legally hunted lion would have on the species would be positive.

17.32(a)(2)(iii): Whether the permit, if issued, would in any way, directly or indirectly, conflict with any known program intended to enhance the survival probabilities of the population from which the wildlife sought to be covered by the permit was or would be removed:

We are not aware of any programs intending to enhance the survival of lions in Zambia that would conflict with Zambia's management plan. However, we are aware of the Zambian Carnivore Programme (ZCP), which is a non-profit Zambian registered trust that is dedicated to conserving large carnivore species and the ecosystems they reside in. The program works to build capacity within local Zambian organizations and government bodies for the sustainable conservation of large carnivores and herbivores, their ecological functions, and their habitats. Therefore, provided efforts remain in place to work with ZCP to ensure that its research and monitoring efforts are not impacted by the hunting program, there does not appear to be any conflicts that would arise if import permits were to be issued for wild lion trophies.

17.32(a)(2)(iv): Whether the purpose for which the permit is required would be likely to reduce the threat of extinction facing the species of wildlife sought to be covered by the permit:

In evaluating this criterion, the Service assesses whether the hunting program established for lions is subject to a governance structure that clearly allocates management responsibilities and supports regulatory pathways in support of positive conservation outcomes. Zambia's lion management program is based on a precautionary quota, an age-based harvest with monitoring off-takes, and direct community benefits (DNPW 2016).

Currently, per Zambia's approved budget, DNPW retains all revenue from sport hunting. 50% of animal fees and 80% of concession fees are allotted to DNPW as conservation funds. This funding source is vital to lion conservation because it supports on-the-ground conservation, protected area management, and enforcement efforts. Additionally, 45% of animal fees and 15% of concession fees go to communities where the hunts take place. As long as communities continue to benefit from the sport hunting of lions through job opportunities, funded community projects, and sharing of meat derived from hunting, they may have the incentive to protect it.

With limited, controlled off-take of lions in a manner that would mimic natural processes and continued community support, the legal hunting activities of U.S. hunters would contribute to reducing the threat of extinction of lions. However, this off-take must be monitored to ensure that it is sustainable and that, to the extent possible, normal lion behavior and ecology is not negatively impacted. The utilization of hunters to manage the lion populations in GMAs and OGRs is an important element of the success of lion management in Zambia.

Therefore, based on the information available to the Service, the purposes for which import permits would be issued would likely reduce the threat of extinction facing lions in Zambia.

17.32(a)(2)(v): The opinions or views of scientists or other persons or organizations having expertise concerning the wildlife or other matters germane to the application:

As with any discussion of hunting, there are numerous opinions on the impact that hunting has on a species. From reviewing comments made during the listing process for lions, as well as information obtained through personal conversations and literature, there is a general agreement that hunting, done properly and well managed, would not have an adverse effect on lion populations. Mimicking natural processes within the management program, such as maintaining pride hierarchy for as long as possible by leaving the alpha male in place, will better ensure the long-term survival of the species. Numerous researchers have stated that, while they may not support hunting in general, they see that benefits can be obtained through a science-based hunting program for lions. There have been a large number of comments from some NGOs and the public opposing hunting any lions, but particularly captive-bred lions. This opposition, however, is primarily based on the perceived ethics of hunting. While these comments are an indication of concerns from some members of the public over hunting, they are not germane to our review process.

Therefore, based on the information available to the Service, there is general support for scientists and other persons or organizations having expertise concerning lions that the legal well managed, science-based harvest of lions, and the subsequent import of these trophies, would not have an adverse effect on the species, but would further efforts to conserve the species in the wild into the future

17.32(a)(2)(vi): Whether the expertise, facilities, or other resources available to the applicant appear adequate to successfully accomplish the objectives stated in the application:

Examining whether adequate resources exist, the Service relied primarily on information provided by Zambia (DNPW 2016). The long-term survival of lions in Zambia is directly tied to the economic and ecological success of the country. When ZAWA became a semi-autonomous agency, they struggled with funding to provide for adequate staffing and fulfillment of lion conservation objectives. However, after transforming back to a government agency, DNPW (formerly ZAWA) has been able to ensure that staff are adequately resourced and paid by Zambia's government, while retaining funding generated from sport hunting, as per the approved budget for the country. This ability to deliver on conservation objectives may improve even further with funding provided by U.S. sport hunters.

Therefore, based on the information available to the Service, the applicants that are engaged in legal, authorized hunting and that abide by management practices in accordance with national and provincial regulations, have the expertise, facilities, or other resources available to them to successfully accomplish the objective their application; i.e., the long-term survival of lions in Zambia.

Conclusion

Given the current status of lions within Zambia and the level of management and oversight provided to lions, it appears that trophy imports provide a benefit to lion populations. The on-going adaptive management and limited off-take of lions is important to the survival of lions in Zambia and the Service will continue to monitor the situation to determine if any revision to this finding is required.

Therefore, with the information currently available that would enable the Service to make such a finding in accordance with the general considerations laid out above, the Service is able to make a determination that the import of lions taken in Zambia during the 2016, 2017 and 2018 hunting seasons, and in compliance with Zambian laws and regulations, would meet the issuance criteria under 50 CFR 17.32. As stated above, however, there are areas where additional information will be needed in the future to monitor if Zambia's hunting program provides adequate benefits to its lion population. Therefore, until additional information becomes available that would affect this finding, the Service **is able to authorize the import of wild and wild-managed lion trophies from Zambia**. In accordance with the 4(d) rule for *P. l. melanochaita*, 50 CFR 17.40(r), the Service will review each application received for import of such specimens on a

case-by-case basis and each application also needs to meet all other applicable permitting requirements before it may be authorized.

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
International Affairs
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Falls Church, VA 22041-3803

In Reply Refer To:
FWS/AIA/DMA

Memorandum

AUG 30 2017

To: The File

From: Chief, Branch of Permits

Subject: Unable to find Enhancement for Captive (Captive-bred) Lions or Lions That Have Not Been Identified/Certified as Wild or Wild-managed Lions Taken as Sport-hunted Trophies in South Africa On or After January 1, 2017

On October 19, 2016, the U.S. Fish and Wildlife Service (Service) made a determination that it was unable to find the import of captive (captive-bred) lions (*P. l. melanochaita*) taken as sport hunted trophies in 2016 would meet the enhancement criteria under 50 CFR 17.32. After evaluating all information received after our October 19, 2016, finding from the Government of South Africa, other information available to the Service, and comments received from interested parties, the Service has determined that, based on the information available, it is **unable** to find that permits for the importation of sport-hunted trophies of both captive-bred lions (referred to in this document and by the Government of South Africa as captive lions) or lions that have not been identified/certified wild or wild-managed (referred to in this document as uncertified lions) taken in South Africa on or after January 1, 2017 would meet the enhancement criteria under 50 CFR 17.32. Therefore, applications received for import of such specimens will not be considered to meet this requirement, unless information becomes available through such an application or other sources which would allow the Service to make the required enhancement finding. In accordance with the 4(d) rule for *P. l. melanochaita*, 50 CFR 17.40(r), the Service will review each application received for import of such specimens on a case-by-case basis and each application will also need to meet all other applicable permitting requirements before it may be authorized.

Governance of the Lion in the United States:

On October 29, 2014, the Service published in the Federal Register a finding that listing the African lion subspecies (*Panthera leo leo*) as a threatened species under the Endangered Species Act (Act) was warranted and proposed a rule under Section 4(d) of the Act to provide conservation measures for the African lion [79 Fed. Reg. 64472]. On December 23, 2015, after fully considering the comments from the public and the peer reviewers on the proposed rule, the Service published in the Federal Register the final rule in which the taxonomic classification of the Asiatic lion (previously classified as *P. l. persica* and listed as an endangered species under the Act) was changed to *P. l. leo* (Asia and western, central and northern Africa) and listed as an endangered species, and the *P. l.*

melanochaita (southern and eastern Africa) subspecies was listed as a threatened species with a rule under Section 4(d) of the Act, which is set forth at 50 CFR 17.40(r) (USFWS 2015; 80 Fed. Reg. 79999). The effective date of this listing is January 22, 2016. Therefore, as of January 22, 2016, the lion subspecies *Panthera leo melanochaita*, whose range includes South Africa, is listed as threatened under the Act and is regulated under a Section 4(d) rule [50 CFR 17.40(r)].

Section 9 of the Act and our implementing regulations at 50 CFR 17.21 and 50 CFR 17.31 set forth a series of general prohibitions that apply to all endangered and threatened wildlife, respectively, except where a 4(d) rule applies to threatened wildlife, in which case the 4(d) rule contains all the applicable prohibitions and exceptions. Under the 4(d) rule for *P. l. melanochaita*, all of the prohibitions under 50 CFR 17.31 apply to *P. l. melanochaita* specimens. The prohibitions at 50 CFR 17.21 and 17.31, in part, make it illegal for any person subject to the jurisdiction of the United States to "take" (includes harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or to attempt any of these) within the United States or upon the high seas; import or export; deliver, receive, carry, transport, or ship in interstate or foreign commerce, by any means whatsoever, in the course of commercial activity; or sell or offer for sale in interstate or foreign commerce any lion specimens. It also is illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken in violation of the Act. Permits may be issued to carry out otherwise prohibited activities involving endangered and threatened wildlife species under certain circumstances. Regulations governing permits for endangered species, such as *P. l. leo*, are codified at 50 CFR 17.22. Regulations governing permits for threatened species, such as *P. l. melanochaita*, are codified at 50 CFR 17.32.

In summary, under paragraph 50 CFR 17.40(r)(1), all the prohibitions and exceptions under 50 CFR 17.31 and 50 CFR 17.32 apply to *P. l. melanochaita*. Accordingly, the Service may authorize the import of a sport-hunted lion trophy from South Africa, but only if it first makes a finding that permitting the import of a trophy would enhance the survival of the species in the wild.

As we explained when finalizing the 4(d) rule for *P. l. melanochaita*, any person wishing to conduct an otherwise prohibited activity, including all imports of *P. l. melanochaita* specimens, must first obtain a permit under 50 CFR 17.32. As with all permit applications submitted under 50 CFR 17.32, the individual requesting authorization to import a sport-hunted trophy of *P. l. melanochaita* bears the burden of providing information in their application showing that the activity meets the issuance criteria under 50 CFR 17.32(a)(2). In some cases, such as for import of sport-hunted trophies, it is not always possible for the applicant to provide all of the necessary information needed by the Service to make a positive determination under the Act to authorize the activity. In such cases, the Service may consult with the range country and other interested parties to the extent practicable to obtain the necessary information. The Service has the discretion to make the required findings on sport-hunted trophy imports of *P. l. melanochaita* on a country-wide basis, although individual import permits will be evaluated and issued or denied based on each application. While the Service may make enhancement findings for sport-hunted trophy imports of *P. l. melanochaita* on a country-wide basis, the Service encourages the submission of information from individual applicants. We rely on the most current information available to the Service and may also consider information from sources other than the applicant when making a permitting decision.

In evaluating the available data on lion hunting in South Africa, the Service is treating wild and wild-managed lions (referred to in this document as "wild") separately from lions that are not

identified/certified as wild or wild-managed (i.e., uncertified lions) or are identified as captive-bred lions raised for hunting purposes (i.e., captive lions) since the management and oversight of these specimens is different within South Africa and, therefore, information relevant to the Service's consideration of whether permitting import of sport-hunted trophies of lions may enhance the survival of the species in the wild is different between wild lions and captive lions in South Africa. A separate determination has been made for wild and wild-managed lions.

General considerations:

As we also explained when finalizing the 4(d) rule, our threatened species permitting regulations at 50 CFR 17.32 provide issuance criteria for threatened species permits (50 CFR 17.32(a)(2)), but do not specify what would constitute the enhancement of propagation or survival with regard to authorizing the import of parts or products of *P. l. melanochaita,* including sport-hunted trophies. Therefore, when making a determination of whether an otherwise prohibited activity enhances the propagation or survival of *P. l. melanochaita,* the Service examines the overall conservation and management of the subspecies in the country where the specimen originated and whether that management of the subspecies addresses the threats to the subspecies (*i.e.,* that it is based on sound scientific principles and that the management program is actively addressing the current and longer term threats to the subspecies). In that review, we evaluate whether the import contributes to the overall conservation of the species by considering whether the biological, social, and economic aspects of a program from which the specimen was obtained provide a net benefit to the subspecies and its ecosystem.

The Service will evaluate any application received that involves *P. l. melanochaita* in the context of enhancement of propagation or survival in accordance with our threatened species permitting regulations at 50 CFR 17.32 and the issuance criteria for threatened species permits (50 CFR 17.32(a)(2)). These include, in addition to the general permitting criteria in 50 CFR 13.21(b):

(i) Whether the purpose for which the permit is required is adequate to justify removing from the wild or otherwise changing the status of the wildlife sought to be covered by the permit;

(ii) The probable direct and indirect effect that issuing the permit would have on the wild populations of the wildlife sought to be covered by the permit;

(iii) Whether the permit, if issued, would in any way, directly or indirectly, conflict with any known program intended to enhance the survival probabilities of the population from which the wildlife sought to be covered by the permit was or would be removed;

(iv) Whether the purpose for which the permit is required would be likely to reduce the threat of extinction facing the species of wildlife sought to be covered by the permit;

(v) The opinions or views of scientists or other persons or organizations having expertise concerning the wildlife or other matters germane to the application; and

(vi) Whether the expertise, facilities, or other resources available to the applicant appear adequate to successfully accomplish the objectives stated in the application.

In addition to these factors, particularly in relation to sport hunting, we find the *IUCN Species Survival Commission (SSC) Guiding Principles on Trophy Hunting as a Tool for Creating Conservation Incentives, Ver. 1.0* (IUCN SSC 2012), to provide useful principles, which, considered in conjunction with our threatened species issuance criteria, will aid the Service when making an enhancement finding for importation of sport-hunted trophies of *P. l. melanochaita*. This document sets out guidance from experts in the field on the use of trophy hunting as a tool for "creating incentives for the conservation of species and their habitats and for the equitable sharing of the benefits of use of natural resources" (IUCN SSC 2012, p. 2) and recognizes that recreational hunting, particularly trophy hunting, can contribute to biodiversity conservation and more specifically, the conservation of the hunted species.

The SSC document lays out five guiding principles that, considered in conjunction with our threatened species issuance criteria, will aid the Service when making an enhancement finding for importation of sport-hunted trophies of *P. l. melanochaita:*

(a) *Biological sustainability:* The hunting program cannot contribute to the long-term decline of the hunted species. It should not alter natural selection and ecological function of the hunted species or any other species that share the habitat. The program should not inadvertently facilitate poaching or illegal trade in wildlife by acting as a cover for such illegal activities. The hunting program should also not manipulate the ecosystem or its component elements in a way that alters the native biodiversity.

(b) *Net Conservation Benefit:* The biologically sustainable hunting program should be based on laws, regulations, and scientifically based quotas, established with local input, that are transparent and periodically reviewed. The program should produce income, employment, and other benefits to create incentives for reducing the pressure on the target species. The program should create benefits for local residents to co-exist with the target species and other species. It is also imperative that the program is part of a legally recognized governance system that supports conservation.

(c) *Socio-Economic-Cultural Benefit:* A well-managed hunting program can serve as a conservation tool when it respects the local cultural values and practices. It should be accepted by most members of the community, involving and benefiting local residents in an equitable manner. The program should also adopt business practices that promote long-term economic sustainability.

(d) *Adaptive Management: Planning, Monitoring, and Reporting:* Hunting can enhance the species when it is based on appropriate resource assessments and monitoring (*e.g.*, population counts, trend data), upon which specific science-based quotas and hunting programs can be established. Resource assessments should be objective, well documented, and use the best science available. Adaptive management of quotas and programs based on the results of resource assessments and monitoring is essential. The program should monitor hunting activities to ensure that quotas and sex/age restrictions of harvested animals are met. The program should also generate reliable documentation of its biological sustainability and conservation benefits.

(e) *Accountable and Effective Governance:* A biologically sustainable trophy-hunting program should be subject to a governance structure that clearly allocates management responsibilities.

The program should account for revenues in a transparent manner and distribute net revenues to conservation and community beneficiaries according to properly agreed decisions. All necessary steps to eliminate corruption should be taken and to ensure compliance with all relevant national and international requirements and regulations by relevant bodies such as administrators, regulators and hunters.

The Service's approach to enhancement findings for the importation of sport-hunted trophies of *P. l. melanochaita* is consistent with the purpose and intent of the Endangered Species Act. As such, before we will authorize the importation of a sport-hunted trophy, we must determine that the trophy hunting program is managed to ensure the long-term survival of the species. As part of this evaluation, we recognized that in many parts of the world, wildlife exists outside of protected areas and must share the same habitat and compete with humans living in these areas for space and resources. As identified in the *IUCN SSC Guiding Principle on Trophy Hunting as a Tool for Creating Conservation Incentives*, if communities that share these resources with wildlife do not perceive any benefits from the presence of wildlife, they may be less willing to tolerate the wildlife. However, under certain circumstances, trophy hunting can address this problem by making wildlife more valuable to the local communities and encourage community support for managing and conserving the hunted species, as well as other species.

When evaluating whether the importation of a trophy of *P. l. melanochaita* would be authorized pursuant to 50 CFR 17.32, in accordance with our threatened species issuance criteria, we will examine how a country's management program for lions addresses the three main threats that have led to the decline of the subspecies: habitat loss, loss of prey base, and human-lion conflict. When examining a management program and whether trophies taken as part of that program meet the issuance criteria, we study a number of factors. Some of the factors we consider include whether the program is based on sound scientific information and identifies mechanisms that would arrest the loss of habitat or increase available habitat (*i.e.*, by establishing protected areas and ensuring adequate protection from human encroachment). We consider whether the management program actively addresses the loss of the lion's prey base by addressing poaching or unsustainable offtake within the country. A component of a management plan from which trophy imports would meet the issuance criteria would be whether there are government incentives in place that encourage habitat protection by private landowners and communities and incentives to local communities to reduce the incursion of livestock into protected areas or to actively manage livestock to reduce conflicts with lions. We examine if the hunting component of the management program supports all of these efforts by looking at whether hunting concessions/tracts are managed to ensure the long-term survival of the lion, its prey base, and habitat. Hunting, if properly conducted and well managed, can generate significant economic benefits that may contribute to the conservation of lions. In looking at whether we are able to authorize the import of a trophy under the issuance criteria of 50 CFR 17.32(a)(2), we will examine if the trophy hunting provides financial assistance to the wildlife department to carry out elements of the management program and if there is a compensation scheme or other incentives to benefit local communities that may be impacted by lion predation. We will also consider how a U.S. hunter's participation in the hunting program contributes to the overall management of lions within a country.

Management programs for *P. l. melanochaita* are expected to address, but are not limited to, evaluating population levels and trends; the biological needs of the species; quotas; management practices; legal protection; local community involvement; and use of hunting fees for conservation.

In evaluating these factors, we will work closely with the range countries and interested parties to obtain the information. By allowing entry into the United States of *P. l. melanochaita* trophies from range countries that have science-based management programs, we anticipate that other range countries would be encouraged to adopt and financially support the sustainable management of lions that benefits both the species and local communities. In addition to addressing the biological needs of the subspecies, a scientifically based management program would provide economic incentives for local communities to protect and expand *P. l. melanochaita* habitat.

Basis for Finding for Captive lions taken in South Africa:

On January 12, 2016, the Service sent a letter to South Africa's Department of Environmental Affairs (DEA) with a list of questions that would aid the Service in evaluating the overall conservation and management of the subspecies, *P. l. melanochaita*, in South Africa and whether that management addresses the three main threats that have been identified as the primary contributors to the decline of the species: habitat loss, loss of prey base, and human-lion conflict. Additionally, the Service's letter referenced the IUCN Species Survival Commission (SSC) Guiding Principles on Trophy Hunting as a Tool for Creating Conservation Incentives, Ver. 1.0 (IUCN SSC 2012), as it provides useful principles which, when considered in conjunction with the Service's permit issuance criteria, would aid in making the required enhancement finding for permitting importation of sport-hunted lion trophies.

In response to our January 12, 2016, letter, the South African Department of Environmental Affairs (DEA) informed the Service that South Africa has defined three populations of lions that exist within the country through their Biodiversity Management Plan for the Lion (*Panthera leo*) in South Africa (BMP; December 2015): *Wild lions,* who completely fulfil their role in biodiversity processes and are largely unmanaged, and exist only in formally proclaimed national parks and game reserves. These population's vital rates and demographics are not actively manipulated. *Wild-managed lions,* which include all lions that have been re-introduced into smaller fenced reserves ($<1{,}000 km^2$), are managed to limit population growth and maintain genetic diversity. Some of the vital rates and demographics of these lions are actively manipulated. *Captive lions* are bred for financial gain, where all vital rates and demographics of these populations are actively manipulated. DEA informed the Service that it had limited control over the management and harvest of captive lions. There are approximately 2,200 wild lions in South Africa. In addition, there are approximately 800 wild-managed lions separated among 45 fenced reserves of less than 1,000 square kilometers each (BMP pg. 40). According to the BMP, there are over 6,000 captive lions maintained on over 200 farms/ranches. In correspondence with DEA in early 2017, the concept of "uncertified wild-managed" and "uncertified" lions was raised. According to this correspondence, there are some reserves or farms in South Africa that have lions that do not currently meet the definitions established by DEA as wild-managed or have management programs that have not been evaluated to determine if they meet this definition. Without further information on what category (i.e., wild, wild-managed, or captive) these lions would be considered, the Service could not consider them under our finding for wild and wild-managed lions.

Further, the Service has been contacted by the South African Predator Association (SAPA), an organization of captive lion breeders. On August 26, 2016, in response to an inquiry to SAPA, the Service received an e-mail that contained a list of nine hunting ranches that have been accredited by SAPA as complying with SAPA's hunting standards and code of conduct (five more are currently

being considered). In addition, the e-mail contained an overview of how captive lions maintained by members of SAPA were contributing to the conservation of wild lions. The overview briefly discussed a number of activities being carried out by SAPA members and future activities that they intend to carry out to contribute to lion conservation. On September 28, 2016, during the 17th Meeting of the Conference of the Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Service met with SAPA to further discuss their contributions and how they viewed their activities would enhance the propagation and survival of lions in the wild. There was also the opportunity to discuss captive lions with Jonathan Denga of the Northwest Provincial Department of Rural, Environment, and Agricultural Development (READ) on September 28, 2016, to discuss how the provincial government was addressing captive lions. Since September 2016, the Service has exchanged e-mails with SAPA or its members on several occasions and is currently arranging an opportunity to speak with SAPA, either in person or via telephone conservation.

The lion is listed as vulnerable in the South African list of Threatened and Protected Species under Section 56(1) of the National Environmental Management Biodiversity Act, 2004 (South Africa 2004; NEMBA; BMP pg. 1). NEMBA further regulates the permit system set out in the Biodiversity Act in regards to restricted activities involving specimens of listed threatened or protected species. Regulated activities in need of registration include, among others, captive breeding facilities, sanctuaries, scientific institutions, game farms, wildlife traders, wildlife product traders, taxidermists, wildlife translocators, and freight agents (NEMBA pg. 25).

In addition to South Africa's domestic laws, it is also a Party to CITES. The lion is listed in Appendix II of the Convention. As an Appendix-II species, certain criteria must be met before such species can be exported, including a finding from the exporting country's CITES Scientific Authority that the proposed activity will not be detrimental to the survival of the species in the wild. In their reply to our inquiry, South Africa provided a copy of their CITES non-detriment finding for lions. Their finding, while focusing only on wild and wild-managed lions, applied to all lion exports from South Africa, including the captive lion population. In personal communication with the SA Management Authority, the Service was informed that the finding may be amended to better clarify that the finding applies to all lions within South Africa. However, the DEA does not oversee captive lion activities within South Africa, only the CITES requirements for exports of live animals, trophies, parts, and products.

Although there has been some discussions with DEA and the SAPA since the listing went into effect, the Service has not receive any specific information about the hunting of captive lions and how these hunts contribute to the species in the wild. The Service understands, however, that DEA is working with SAPA on how SAPA members could contribute to *in*-situ lion conservation. However, we are not aware of any final approach being adopted. While the 2015 management plan, BMP, for wild and wild-managed lions does have some discussion of the captive lions within South Africa, it does not include any discussion of how captive lions are contributing to the long-term conservation of lions in the wild. The brief overview of SAPA activities received on August 26, 2016, and further discussion on September 28, 2016, provided some additional discussion of how captive lions could contribute to wild lion conservation, but primarily addressed activities and support that may be started in the future or activities that, while generally contributing to South Africa's overall economy, do not contribute directly or indirectly to conservation efforts for *P. l. melanochaita*. Further, of over 200 farms/ranches that maintain captive lions, SAPA only identified 9 that were accredited under their standards for hunting.

According to the BMP, captive lions in South Africa are primarily held and bred in private facilities under the governance of individual State provinces and account for upwards of 95 percent of lion trophies taken in South Africa over the last 5 years. The BMP points to a prevailing view amongst carnivore specialists that captive lions do not contribute to the conservation of the species, particularly given that inbreeding is known to occur with captive lions. This could compromise genetic integrity and provenance and therefore not make these lions suitable for reintroduction purposes. Further, based on the limited information currently available, there is no evidence to suggest that captive breeding operations are supporting or contributing to any in-situ conservation efforts for wild lions. Given the level of management and oversight that is afforded wild and wild-managed lions, the claim that has been voiced by some that utilizing captive lions as trophy animals reduces the demand on wild lions is not demonstrated to be accurate based on available information.

There is an active lion bone trade from South Africa to several Asian countries for traditional medicinals that is primarily supplied from captive lions. Lion bones are being used as a substitute for tiger bones, which is highly valued in Asia, primarily in China and Vietnam (Williams et al. 2015, p. 1; Gratwicke et al. 2008, pp. 2–5; Graham-Rowe 2011, pp. s101–s102). While it appears that the source of the bones is primarily from lions that are taken as trophies, there is some indication that captive lionesses and juvenile lions are also being culled to increase supply of bones (BMP pg. 30). In 2008, South Africa began issuing CITES permits for the export of skeletons of captive lions to Asia. These exports currently come primarily from South Africa's captive lion hunting industry as a byproduct of trophy hunting. The number of lion skeletons for which South Africa issued permits for export to Asia (China, Viet Nam, Thailand and Lao PDR) increased tenfold from 2008 to 2011, from about 50 to about 573 skeletons, respectively, representing a total of 1,160 skeletons or about 10.8 metric tons (11.9 US tons) of lion bone in 4 years (Williams 2015, pp. ix–x, 46). With respect to meeting demand for lion bone, Lindsey et al. (2012, p. 20) states that there are likely to be large numbers of lion bones available for export from game farms, from lionesses and nontrophy males, and as byproducts from animals shot as trophies. In addition, Williams et al. (2015, p. 41) reports that there may be between 1,400 and 6,200 lion skeletons from past trophy hunts on South African game farms that could potentially be used to supply demand for lion bone.

While the BMP suggests that the value of bones, whether wild or captive, is not high enough to stimulate the illegal harvest of lions solely to sell the bones into the bone trade, there is the potential that if the value of bones increases due to increasing demand from Asian markets, that captive lions could be a legal source of bones that masks the illegal harvest of wild lions. However, evidence suggests that there may be incentive to poach wild lions for the bone trade. According to Williams et al. (2015, p. x), the 2013 price paid to South African game farmers and landowners for lion bones was $1,260–2,100 USD per skeleton. In many lion range states, this exceeds per capita GDP (gross domestic product) (World Bank 2015, unpaginated). Thus, the current price paid for lion bone may provide incentive in some countries to poach wild lions. While the lion bone trade appears to currently be based primarily in South Africa's captive lion hunting industry, the trade appears to be having little or no impact on wild lion populations in South Africa at this time—lion populations in South Africa are stable or increasing and there is little poaching of wild lions in the country (Funston and Levendal 2015, pp. 1, 26; Williams et al. 2015, pp. 79–80). However, the impact of the lion bone trade on lion populations outside South Africa is unknown. Based on the effect of the tiger bone trade on tiger populations, if current conditions—for example, rapidly increasing demand and involvement of an international crime syndicate in the lion bone trade (Final listing rule, pg.

80026) —continue unchanged, then there is considerable potential for extensive poaching of wild lions to occur in order to meet demand.

Evaluation:

As stated earlier, the Service will evaluate any application in accordance with our threatened species permitting regulations at 50 CFR 17.32 and the issuance criteria for threatened species permits [50 CFR 17.32(a)(2)]. In evaluating each of these criteria on the basis of information available to the Service, we have been unable to determine if the import of captive lions would qualify for the issuance of the required import permit.

17.32(a)(2)(i): Whether the purpose for which the permit is required is adequate to justify removing from the wild or otherwise changing the status of the wildlife sought to be covered by the permit:

To date, there has been insufficient information to show how permitting the import of captive lion trophies would provide a benefit to the species in the wild, thus potentially justifying the issuance of an import permit. At this time, the Service has received largely conclusory assertions from SAPA that captive lions can be used to contribute to the survival of lions in the wild, and therefore the continued activities of ranches utilizing captive lions needs to be supported by allowing the import of such trophies. SAPA stated that captive lions constitute 25% of all *P. l. melanochaita* in the world, but does not document why maintaining these animals is important to the overall conservation of the species. SAPA also commented on the benefit that ranches having captive lions contributes by providing additional habitat for lions, although at this time it did not identify how much additional habitat is provided by maintaining these hunting ranches. SAPA stated that captive lions could be used for re-introduction or re-stocking efforts and identified two experiments in Zambia and Zimbabwe of releasing captive lions. However, according to the BMP, captive lions cannot be released into the wild or used for re-introduction/re-stocking purposes and lion researchers have consistently questioned the viability of such releases. SAPA also identified the establishment of a conservation fund based on a surcharge of R10,000 (~$700) per lion hunted on SAPA-accredited ranches [During in-person discussions with representatives of SAPA at CoP17, it was stated that the conservation fund would be based on $1000 per lion hunted on SAPA-accredited ranches]. It is SAPA's assertion that this conservation fund would directly contribute to in-situ conservation efforts. While SAPA has stated that they are working with DEA on the development of this conservation fund, other than a general statement on how the funds would be utilized, no specific information has been provided showing how the funds would be spent to provide a conservation benefit. Further, there are only 9 SAPA-accredited ranches out of over 200 ranches in South Africa. Given the limited number of ranches that apparently would be contributing to this fund, it is unclear whether the limited funds, if directed to an appropriate conservation effort, would provide sufficient support to justify changing the status of the specimens.

Therefore, there is no basis in the information available to the Service that the issuance of an import permit would justify changing the status of the captive specimens hunted.

Currently, there is no information on how uncertified lions contribute to the propagation or survival of lions in the wild. As stated earlier, without more clarification into which category (i.e.,

wild, wild-managed, or captive) uncertified lions are included, the Service could not treat them as wild or wild-managed. It is possible that in the future, as DEA works with individual landowners to certify their lion populations or management regime, these lions could be included in or identified with one of these categories. Until that time, however, there is no basis, with the information currently available to the Service, that the issuance of an import permit would justify changing the status of uncertified lions.

17.32(a)(2)(ii): The probable direct and indirect effect that issuing the permit would have on the wild populations of the wildlife sought to be covered by the permit:

Based on current information, there is probably no direct beneficial effect on wild lions by authorizing the import of captive sport-hunted lion trophies. If it could be demonstrated that hunting, and allowing the import of captive lions could provide an indirect beneficial effect, the issuance of import permits might be justified. However, other than general statements, there is little evidence that captive lions could be used for re-introduction or that these specimens could contribute to better genetic management of wild lions. In addition, while SAPA points to the value that maintaining hunting ranches can have by providing habitat and a stable prey-base, two factors leading to listing under the Act, there has been no information on the quantity or quality of this additional habitat for wild lions. Finally, SAPA stated that contributions to in-situ conservation would only apply to the ranches that are "accredited" by them, this does not appear to constitute enough operations that the funds would have a meaningful impact on conservation efforts, if such efforts were clearly identified.

Therefore, there is no basis in the information available to the Service to determine the probable direct or indirect effect that issuing import permits for sport-hunted trophies of captive lions would provide to wild lions.

Currently, there is no information on whether the issuance of an import permit for uncertified lion trophies would have either a positive or negative, direct or indirect effect on wild lions. As stated earlier, without more clarification into which category (i.e., wild, wild-managed, or captive) uncertified lions are included, the Service could not treat them as wild or wild-managed. It is possible that in the future, as DEA works with individual landowners to certify their lion populations or management regime, these lions could be included in or identified with one of these categories. Until that time, however, there is no basis, with the information currently available to the Service, to determine the probable direct or indirect effect that issuing import permits for sport-hunted trophies of captive lions would provide to wild lions.

17.32(a)(2)(iii): Whether the permit, if issued, would in any way, directly or indirectly, conflict with any known program intended to enhance the survival probabilities of the population from which the wildlife sought to be covered by the permit was or would be removed:

Under current South African law, the oversight of captive lions is with the Department of Agriculture, while oversight of wild lions is with the Department of Environmental Affairs. Until the uncertified lions are actually classified, it is not clear which government agency has oversight for these specimens. Since captive lions and, presumably uncertified lions, cannot be used for re-

introduction or re-stocking efforts, there does not appear to be any conflicts that would arise if import permits were to be issued for these trophies. Further, since there is a limited number of poaching events of wild and wild-managed lions in South Africa, it does not appear that captive lion hunting or hunting of uncertified lions is acting as a cover for illegal harvests.

However, as stated above, there is an active trade in bones for Asian traditional medicinals collected from captive lions. Lion bones are being used as a substitute for tiger bones, which is highly valued in Asia, primarily in China and Vietnam. It is clear that there has been a significant increase in the number of lion skeletons exported from South Africa over the last 10 years, and that the majority of these skeletons are obtained through trophy hunting of captive lions. There is very limited evidence that poaching of wild lions is a current problem in South Africa, so the current trade does not appear to have any impact on wild or wild-managed lions in South Africa. Further, it has been reported that there may be between 1,400 and 6,200 lion skeletons from past trophy hunts on South African game farms that could potentially be used to supply demand for lion bone. It does not appear that this trade would have an immediate impact on wild lions in South Africa. However, there is some concern that trade in captive lion skeletons could have an impact on wild lions outside of South Africa by creating an incentive to poach wild lions. If the trade in captive lion skeletons, derived from trophy hunting, were to stimulate poaching or mask illegal harvest of lions outside of South Africa, this could adversely impact programs intending to enhance the survival of lions. The same could probably be stated for trade in skeletons taken from uncertified lion hunts. So, while it does not currently appear to be an issue, this situation would need to be monitored over time.

Therefore, based on the information available to the Service, there currently appears to be no direct or indirect conflict with known conservation programs for wild lions if import permits for captive lion trophies or uncertified lion trophies were issued.

17.32(a)(2)(iv): Whether the purpose for which the permit is required would be likely to reduce the threat of extinction facing the species of wildlife sought to be covered by the permit:

Although there have been general statements by SAPA on potential benefits that could be obtained for wild lions through captive lion management and hunting activities, there has been no clear indications that these activities would reduce the threat of extinction facing wild lions. Without additional information regarding uncertified lions, there is no indication that the import of these lions would lead to a reduction in the threat of extinction facing wild lions. Wild lions in South Africa are well managed by the DEA (see October 19, 2016, "Enhancement Finding for Wild and Wild-managed Lions taken as Sport-hunted Trophies in South Africa"). Through this management, the three identified threats to wild lions (i.e., habitat loss, loss of prey-base, and lion-human conflicts) are being addressed, thus reducing the threat of extinction within South Africa. While permitting the import of captive lion or uncertified lion trophies does not appear to have any negative impact on wild lions, there is also little evidence that it would reduce the threat of extinction.

Therefore, based on the information available to the Service, it does not appear that the import of captive lion or uncertified lion trophies would reduce the threat of extinction facing lions in the wild.

17.32(a)(2)(v): The opinions or views of scientists or other persons or organizations having expertise concerning the wildlife or other matters germane to the application:

While there are some concerns that breeding lions in captivity could compromise genetic integrity of lions, there appears to be general consensus that the captive lion hunting industry is not having a negative effect on wild lions. However, at the same time, there is little evidence obtained during this current review and/or information provided by commenters during the listing of lion under the Act to indicate that captive lion management, hunting, and the subsequent import of these trophies, would provide a benefit to the species. The same is true for uncertified lions. There have been a large number of comments from some NGOs and the public opposing hunting any lions, but particularly captive lions. This opposition, however, is primarily based on the perceived ethics of hunting. While these comments are an indication of concerns from some members of the public over hunting, they are not germane to our review process.

Therefore, based on the information available to the Service, the opinions or views provided by scientists or species experts that would be germane to this review are that the import of captive lion or uncertified lion trophies would not have a negative or positive impact on lion conservation.

17.32(a)(2)(vi): Whether the expertise, facilities, or other resources available to the applicant appear adequate to successfully accomplish the objectives stated in the application:

As stated previously, the decision to issue or deny an application to import any lion trophy is made on a case-by-case evaluation of each application submitted. Therefore, it would not be possible to determine in this general review if the expertise or facilities of a particular U.S. importer are adequate to successfully accomplish the objective stated in the application (i.e., whether permitting importation of a trophy of a lion would enhance the survival of the species). As such, we would need to evaluate each application individually to determine if the information provided by the applicant would enable the Service to find that a permit for the importation of sport-hunted trophies of captive lions or uncertified lions (*P. l. melanochaita*) taken in South Africa on or after January 1, 2017 meets the enhancement criteria under 50 CFR 17.32. However, based on the currently available information, permitting the importation of a captive lion or uncertified lion trophy does not appear to meet the purposes of the Act or the issuance criteria in 50 CFR 17.32(a)(2). As such, it does not appear that any applicant would have the expertise, facilities, or other resources that would enhance the propagation or survival of lions in the wild.

Therefore, based on the information available to the Service, the Service is **unable** to find that permits for the importation of sport-hunted trophies of captive lions (*P. l. melanochaita*) taken in South Africa during the 2017 calendar year meet the enhancement criteria under 50 CFR 17.32.

Conclusion

Given the current status of lions within South Africa and the level of management and oversight provided to certified wild and wild-managed lions, it does not appear that the harvest and import of uncertified wild-managed lions, uncertified lions, and captive (or captive-bred) lions as trophies is having an adverse effect on lion populations in South Africa. However, as explained above, permitting the import must go beyond having no adverse impact on wild populations. It must enhance the species by having a clear benefit to the species and its management. There is no indication that permitting the import of trophies of captive lions or uncertified lions sport-hunted in

South Africa taken on or after January 1, 2017, would enhance the propagation or survival of the species in the wild. Without additional information that would enable the Service to make such a finding in accordance with the general considerations laid out above, the Service is unable to make a determination that the import of captive lions or uncertified lions would meet the issuance criteria under 50 CFR 17.32(a)(2). Therefore, until such time as additional information becomes available that would affect this finding, the Service **is unable to authorize the import of captive lion or uncertified lion trophies from South Africa**. Such specimens will not be considered to meet this requirement, unless information becomes available through such an application or other means which would allow the Service to make the required enhancement finding. In accordance with the 4(d) rule for *P. l. melanochaita*, 50 CFR 17.40(r), the Service will review each application received for import of such specimens on a case-by-case basis and each application will also need to meet all other applicable permitting requirements before it may be authorized.

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