ENVIRONMENTAL ASSESSMENT

OPENING OF HUNTING

For

SAN ANDRES NATIONAL WILDLIFE REFUGE

Doña Ana County
New Mexico

U.S. Fish & Wildlife Service
San Andres National Wildlife Refuge
P.O. Box 756
Las Cruces, New Mexico 88004

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Las Cruces, New Mexico
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Fish and Wildlife Service

Environmental Assessment/Assessment of Effect

Opening for Hunting of Exotic Oryx
San Andres National Wildlife Refuge

Doña Ana County, New Mexico

SUMMARY: This environmental assessment describes two action alternatives and a no-action alternative, and their impacts to control or eliminate African oryx *(Oryx gazella gazella)* from San Andres National Wildlife Refuge (NWR) in south-central New Mexico. The preferred alternative is by limited public hunting. A lethal reduction by management alternative and a no action alternative are described. African oryx are large (up to 500 pound) members of the African antelope family, and were released by New Mexico Department of Game and Fish in the 1960s on military land near the refuge to establish a population for hunting. Oryx first began to appear on the refuge in small numbers in the 1980's and increased in the early 1990's. The refuge was closed to public hunting until the fall of 2000. By the mid 1990's, soil and vegetation impacts were apparent. A limited population reduction hunting program has been conducted since 2000 with 274 oryx removed. Reductions in the oryx population on the refuge have occurred and damage caused to habitat by oryx has been reduced.

NOTE TO REVIEWERS AND RESPONDENTS

If you wish to comment on the environmental assessment, you may mail comments to the address below. Our practice is to make comments, including names and home addresses of respondents, available for public review during regular business hours. Individual respondents may request that we withhold their home address from the record, which we will honor to the extent allowable by law. **If you wish us to withhold your name and/or address, you must state this at the beginning of your comment**. We will make all submissions from organizations or businesses and from individuals available for public inspection in their entirety.

Please send comments by March 30, 2007.

Address comments to:
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INTRODUCTION

SETTING

San Andres National Wildlife Refuge (Refuge) was established in 1941 by Executive Order 8646 for "... the conservation and development of natural wildlife resources." The Refuge is home to the largest concentration of desert bighorn sheep in the Chihuahuan desert and is managed by the U.S. Fish and Wildlife Service under the Department of Interior.

San Andres National Wildlife Refuge is located in the San Andres Mountains in south-central New Mexico. The nearest town is Las Cruces, 30 miles to the southeast. Refuge headquarters is located on highway U.S. 70 just east of Las Cruces, New Mexico. The refuge is within Doña Ana County and encompasses 57,215 acres in the southern portion of the San Andres Mountains.

The refuge is entirely surrounded by military lands comprising the White Sands Missile Range (WSMR), a 2.2 million acre test range managed by the U.S. Army. Land within the refuge boundary is entirely federally owned.

ORYX BIOLOGY

Oryx are native to desert lands of Africa and the Arabian Peninsula, and are also known as gemsbok or *Oryx gazella gazella*. They are a type of African antelope and members of the family *Bovidae*.

Between 1969 and the early 1970s, the New Mexico Department of Game and Fish (NMDGF) released 95 African oryx on White Sands Missile Range adjacent to the refuge, for the purpose of developing a population for public hunting on the White Sands Missile Range. Oryx thrive in southern New Mexico, and the population has increased to more than 4,000. The New Mexico Department of Game and Fish issues 1200 annual hunting permits for scheduled hunts on White Sands Missile Range, plus an additional 500-800 permits for off-range depredation hunts. The hunter success rate is about 95 percent on the Refuge. White Sands Missile Range and New Mexico Department of Game and Fish goals are to reduce the existing oryx population to 750-1,250 animals.

Adult oryx are about the size of female elk, with adult males weighing up to 500 pounds. Both males and females have long, sharply pointed horns and both males and females fight with their horns. Sexes are hard to differentiate from a distance. Calves are born year around. The gestation period is nine months, and females can become pregnant almost immediately after calving. This makes for a possible birth rate of 1.3 calves per mature (at least two years old) female per year (Estes, 1991). The sex ratio of calves is 1:1. Twin calves are very rare (Burkett 1999). Oryx in New Mexico do not migrate seasonally, and appear to have favored territories. Oryx generally live in dispersed small bands, often consisting of a dominant male, several females, and non-breeding juveniles. Herds of up to 75 animals are seen on a regular basis. Solitary males or groups of males are also sighted.

The southern New Mexico oryx range has mild winters. In mountain areas with more severe weather, occasional extreme winters result in mass reductions of elk, deer, bighorn sheep, and other native wildlife populations. This is not the case with oryx. Severe droughts also do not affect oryx populations, because they are not dependent on surface water. Oryx can subsist with little or no surface water by using the moisture in plant material or digging to ground water. American predators are ineffective in controlling the oryx population, with the exception of calves under 14 days old (Burkett 1999).

A demographic model has been developed as part a three-year interagency research project on White Sands Missile Range. Current information indicates that the oryx population may have leveled off due to increased hunting pressure on WSMR, but their range is spreading out off WSMR. (D. Burkett, personal comm.), (M. Hakkila, personal comm.)

USFWS ORYX HISTORY

After release of oryx onto White Sands Missile Range in the early 1970's, oryx were occasionally seen on the refuge. This began to change in the early 1990's as the range wide population of oryx exploded. By the 1990's oryx were seen regularly on the refuge and by 1997 it was estimated by refuge staff that there was a minimum of 50-75 oryx established on the refuge in all habitats. In response to increasing evidence of habitat damage by oryx, concerns about competition between oryx and native ungulates, disease issues regarding oryx and native species, and Service policy regarding exotic species management, a limited public hunt program was instituted to reduce the oryx population on the refuge to meet management goals. As of February 1, 2007, 274 oryx have been removed from the refuge by public hunting.

Summary, Hunting Removal

Fall 2000-Spring 2001	23 oryx removed by hunting
Fall 2001-Spring 2002	71 oryx removed by hunting
Fall 2002-Spring 2003	46 oryx removed by hunting
Fall 2003-Spring 2004	54 oryx removed by hunting
Fall 2004-Spring 2005	28 oryx removed by hunting
Fall 2005-Spring 2006	43 oryx removed by hunting
Fall 2006-Spring 2007	9 oryx removed by hunting
TOTAL:	274 oryx removed by hunting

FISH AND WILDLIFE SERVICE POLICY

Fish and Wildlife Service policy is to manage refuge lands to protect native species and to remove non-native species when feasible. In this case, oryx is a non-native invasive species to the refuge and to North America. In the Refuge Manual 7RM8.1 the policy states:

> The National Wildlife Refuge System exists for the protection and management of plants and animals native to the United States. The policy of the Service is to prevent further introduction of exotic species on national wildlife refuges except where an exotic species would have value as a biological control agent and would be compatible with the

objectives of the refuge. The continued existence, or management of exotic plants and animals on refuge lands will be permitted only if:

A. An exotic species has become established and its elimination, while desirable, is no longer practicable, or
B. An exotic species has become established and maintained on a non-augmented basis for at least 25 years and does not conflict with refuge objectives.

Executive Order 13112, Invasive species, issued in February, 1999 instructs Federal Agencies Duties to:

(a) Each Federal agency whose actions may affect the status of invasive species shall, to the extent practicable and permitted by law,
    (1) identify such actions:
    (2) subject to the availability of appropriations, and within Administration budgetary limits, use relevant programs and authorities to: (i) prevent the introduction of invasive species; (ii) detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner; (iii) monitor invasive species populations accurately and reliably; (iv) provide for restoration of native species and habitat conditions in ecosystems that have been invaded; (v) conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species; and (vi) promote public education on invasive species and the means to address them.

SAN ANDRES NATIONAL WILDIFE REFUGE

ENVIRONMENTAL ASSESSMENT

1. Purpose for Action

The purpose of this action is to remove the exotic antelope oryx *(Oryx gazella gazella)* on the San Andres National Wildlife Refuge (NWR) through a limited hunting program, Dona Ana County, New Mexico.

2. Need for Action

Oryx is a large African antelope that has become established in refuge habitats in large numbers. After release of oryx onto White Sands Missile Range in the early 1970's, oryx were occasionally seen on the Refuge. This began to change in the early 1980's as the range wide population of oryx exploded. By the 1990's oryx were seen regularly on the refuge and by 1997 it was estimated by refuge staff that there was a minimum of 50-75 oryx established on the refuge in all habitats. This exotic has caused large scale habitat damage throughout the refuge, presents potential disease problems for the refuge population of desert mule deer and desert bighorn sheep, competes with these species for space and food, and as an exotic species, the Service is mandated by policy and Executive Order to control or eliminate this species.

3. Alternatives

This action is in response to the Fund for Animals/Humane Society lawsuit of 2003. This hunt program was opened in July, 2000 with an Environmental Assessment, Hunt plan, FONSI, Section 7 consultation and a compatibility determination. We are revising the Environmental Assessment of the hunting program at San Andres National Wildlife Refuge to include a cumulative impact analysis of our preferred alternative. In revising this document, we changed our alternatives to Alternative A- Limited hunting; Alternative B-Lethal Removal by Refuge Staff; and Alternative C-No hunting. A more in-depth discussion of these alternatives follows:

A. Limited Hunting Alternative – Preferred Alternative
Alternative A would allow limited participation to hunt oryx on San Andres NWR using restricted methods. Hunters would be escorted by refuge personnel during the hunt. Hunts would be generally conducted during the colder months of the year, usually October to April. Hunting would be allowed on limited days, typically no more than 5 days in any one month; number of hunters per day would also be limited to one to six per day. This hunting alternative is compatible with Refuge purposes, complies with Executive Order 13112, and allows for the reduction and control of an invasive exotic species. This alternative will also provide some compatible recreational opportunities to the general public and contribute to refuge objectives. It is estimated that Refuge costs would be about

$4,000 per year to conduct these hunts for law enforcement, program implementation and administration and equipment maintenance. These costs would be covered in part by charging a hunt fee to participants.

B. Lethal Removal by Management
Alternative B would allow authorized refuge staff to locate and shoot any oryx within the San Andres NWR boundaries. This alternative would be for year round control, whenever an oryx is found on the refuge. For long term refuge resource management, whenever oryx sign is detected within the refuge, immediate action would be taken to locate and shoot the animal. No public hunting on the refuge would occur. Off road travel for locating animals and removing carcasses would be by foot, ATV's and mules. Carcasses would be salvaged whenever possible and transferred to New Mexico Department of Game and Fish for human use by standard department procedure. Wild game carcasses are sold for the meat, hide and horns by New Mexico Department of Game & Fish. This alternative is in compliance with Executive Order 13112 and allows for the reduction and control of and invasive exotic species. A substantial amount of staff time and effort would be required using this alternative and no compatible recreational opportunities to the general public would be offered.

C. No Action Alternative
No action alternative would allow oryx on San Andres NWR to expand with no attempt to control their numbers. This would result in the uncontrolled growth of an exotic species that the Service is mandated to control under Executive Order 13112. Under this alternative there would be a loss of a recreational opportunity that is compatible with Refuge purposes. Implementation of this alternative would not be in compliance with the Improvement Act of 1997 in regards to compatible public recreation and not in compliance with Executive Order 13112. There would be no additional monetary costs to the Refuge under this alternative

TABLE 1. SUMMARY OF ALTERNATIVES

Alternative A: (Preferred) Removal of Oryx by Limited Public Hunting	Alternative B: Removal of Oryx by Refuge Management	Alternative C: No Action- No Oryx Reduction
Limited hunting using public hunters from New Mexico Department of Game and Fish population reduction hunt lists. Hunters will be escorted by refuge personnel to remove oryx from any area on the Refuge. Ultimate goal is to reduce to low level or eliminate oryx from Refuge.	Authorized refuge staff will locate and shoot any oryx on the Refuge. Carcasses will be removed if possible. ATV's or mules will be used for off road travel. Oryx removal would continue over years whenever fresh sign is detected. No public hunting would be allowed on	No removal of oryx from the Refuge would occur. Population would be allowed to grow as large as habitat would support.

	Refuge.	

TABLE 2. SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS

IMPACT TOPIC	ALTERNATIVE A (Preferred) Removal of Oryx by Limited Public Hunting	ALTERNATIVE B Removal of Oryx by Refuge Management	ALTERNATIVE C No Action-No Oryx Removal
Resident Wildlife	Improved conditions for resident wildlife by removing an aggressive exotic species. Reduction or removal of health threat due to oryx functioning as a reservoir of wildlife diseases. Short term disturbance from hunters.	Improved conditions for resident wildlife by removing an aggressive exotic species. Reduction or removal of health threat due to oryx functioning as a reservoir of wildlife diseases.	Oryx would increase beyond pre hunt numbers with increasing impacts to resident wildlife by damaging habitat, competition, disease issues.
Vegetation	Improved long term natural ecosystem functions by removing oryx as a source of disturbance to vegetation by trampling and browsing/grazing. Short term minor impacts from off-road ATV to locate and remove hunter killed oryx. Negligible long term impacts from ATV tracks.	Improved natural ecosystem functions by removing oryx as a source of disturbance to vegetation by trampling and browsing/grazing. Short term minor impacts from off-road ATV and mule tracks to remove oryx carcasses. Negligible long term impacts from tracks.	Increasing long term impacts to vegetation due to trampling, trailing, digging and overbrowsing/over grazing by large numbers of oryx.
Soils	Improved long term natural ecosystem functions by removing oryx and reducing soil compaction by oryx	Improved long term natural ecosystem function by removing oryx and reducing soil compaction by oryx	Increasing long term impacts to refuge soil from trampled soil crusts, extensive trailing, soil compaction and

	and protecting soil crusts from oryx hooves. Short term minor impact from ATV or mule track removing carcasses. Negligible long term impact from ATV and mule tracks anticipated.	and protecting soil crusts from oryx hooves. Short term minor impact from ATV or mule track removing carcasses. Negligible long term impact from ATV and mule tracks anticipated.	disturbance from digging and trailing and impacts of herds of large numbers of oryx.
Cultural Resources	No effect on historic sites, ruins or cultural resources.	No effect on historic sites, ruins or cultural resources.	Possible damage to archaeological sites due to trailing, trampling and digging due to high levels of oryx.

4. Affected Environment

IMPACT TOPICS ANALYZED IN THIS ENVIRONMENTAL ASSESSMENT

Resident Wildlife: Located in the heart of the Chihuahuan Desert, the Refuge provides valuable habitats for more than 45 species of reptiles and amphibians, more than 45 species of mammals, and more than140 species of birds. Historically the refuge was home to the largest population of desert bighorn sheep *(Ovis canadensis mexicana)* in New Mexico. The New Mexico Department of Game and Fish lists the desert bighorn as a State endangered animal. The refuge also supports populations of desert mule deer *(Odocoileus hemionus crooki)*, mountain lion *(Puma concolor)* and javelina *(Pecari tajacu)*.

Soils: Soils are typically very shallow and intermixed with exposures of bedrock. Soils are generally well drained and are composed of gravels, sands, sandy and loamy silts and some clays. Organic matter in these soils is low. The rock formations include limestone, sandstone, basalt and shale. The outcrops of limestone commonly occur as vertical or nearly vertical exposures and ledges, giving a "stair-step" appearance to the landscape of the east escarpment. A thin mantle of stoney, loamy soil occurs between the outcrops of bedrock on very steep slopes, below rock ledges, and in small, narrow valleys.

Vegetation: According to Larson (1970), five plant communities described by Merriam are found on the Refuge. These include desert shrub (14,305 acres), desert riparian (2,860 acres), grass-shrub (28,610 acres), mountain shrub (5,720 acres) and pinyon-juniper (5,720 acres). Merriam Life Zones represented include both the Upper (above 7,000 feet) and Lower (below 6,500 feet) Sonoran of the Chihuahuan Desert.

In general, the lowlands, foothills and alluvial fans are dominated principally be creosote bush *(Larrea tridentate)*, acacia *(Acacia constricta)*, honey mesquite *(Proposis glandulosa)*,

tarbush *(Flourencia cernua)*, and mimosa *(Mimosa aculeraticarpa)*. Grasslands which occupy the lower slopes and piedmonts of the refuge are dominated by plants such as New Mexico needlegrass *(Stipa neomexicana)*, fluffgrass *(Dasyochloa pulchella)*, bush muhly *Muhlenbergia porteri)*, and various grama grasses *(Bouteloua spp.)*. Yuccas *(Yucca bacata and Y. elata)*, ocotillo *(Fouquieria splendens)* and sotol *(Dasylirion wheeleri)* are also common in these areas, often times mixed or in transition to shrublands dominated by fourwing saltbush *(Atriplex canescens)*, sand sage *(Artemisia filifolia)*, mesa dropseed *(Sporobolus flexulosus)*, tobosa grass *(Hilaria mutica)* and alkali sacaton *(Sporobolus airoides)*.

The middle and higher elevations within the refuge support a combination of pinyon pine *(Pinus edulis)*, juniper *(Juniperus monosperma)*, oak *(Quercus grisea, Q. turbinella, Q. pauciloba)*, and mountain mahogany *(Cercocarpus breviflorus)*. Riparian vegetation occurs around springs and in the major drainages and includes Fremont cottonwood *(Populus fremontii)*, black willow *(Salix goodingii)*, apache plume *(Fallugia paradoxa)* and desert willow *(Chilopsis linearis).*

Cultural Resources: Twenty-seven sites have been documented within the confines of the San Andres National Wildlife Refuge. Temporal components documented on the refuge include Middle Archaic, Late Archaic, early and late Formative (ceramic), Protohistoric, and Historic. Less than 1 percent of the refuge has been surveyed for cultural resources. (Gibbs, 2003

IMPACT TOPICS DISMISSED FROM FURTHER ANALYSIS:

Air Quality: There would be no effect by proposed actions as emissions from motor vehicles or ATV's would be well within background levels of normal operations in the region.

Water and Water Quality: No proposed action would affect water resources including springs, streams, wetlands and floodplains.

Rainfall averages about 13" a year with most moisture coming in the form of short intense rainfall from thunderstorms in the late summer. Springs, seeps and some permanent streams in major canyons provide water for most refuge wildlife. Most water is located within canyons or higher up the escarpment with no road access.

Noise: No effect by proposed actions as noise from limited gunshots and ATV's would be within usual background levels of normal daily operations in the region.

White Sands Missile Range, which surrounds the Refuge, is a 2.2 million acre test range run by the U.S. Army where weapons testing are a daily occurrence. In addition, there are regular overflights of fighter aircraft from Holloman Air Force Base.

Endangered and Threatened Species: No proposed action would affect federally listed endangered or threatened species. There are no federally listed species on the Refuge.

Migratory Species: No proposed action would affect migratory species. Actions would occur predominantly in the winter months and any impact would be negligible to migratory species.

Social/Economic Uses: No proposed action would affect social or economic conditions.

The San Andres NWR is located in the southern portion of Dona Ana County approximately 30 miles northeast of Las Cruces (population 85,000). The presence and operation of the Refuge has very limited socio-economic impact on the surrounding communities, particularly with regard to recreational activities. This is due largely to the fact that San Andres NWR is located within the boundaries of the White Sands Missile Range and is therefore restricted to all forms of public use. The primary socioeconomic influence on Las Cruces is the recycling of refuge budget money due to refuge personnel living in the area, purchasing of all equipment and supplies, and in contracting local labor to accomplish refuge projects.

Land Use: No proposed action would affect land use. The Refuge is surrounded by Federal land including the 2.2 million acre White Sands Missile Range which is the largest Department of Defense facility in the USA and has been a primary military testing and training reservation since World War II.

Recreation: Proposed actions would have a negligible effect on recreation. While some additional hunting opportunities would be opened up by population reduction hunts on the Refuge, they would be limited by time and number and so would have little impact. There are approximately 1100 hunting permits on the range for trophy and population reduction hunts which will increase to 1600 in the 07-08 oryx hunt year. In addition there are 500-800 permits for off-range oryx hunting. The Refuge is closed to public access due to the proximity of White Sands Missile Range which surrounds the Refuge. This area is a large area primarily for military weapons testing. Visitors are not allowed on the Refuge unescorted. For this reason, the Refuge is not opened to all recreational activities-fishing, interpretation, environmental education, wildlife observation, and wildlife photography and will not be impacted by the hunting program

Hydrology: No proposed action would have a discernible effect on the hydrology of the Refuge. The San Andres escarpment is responsible for the recharge of the aquifer in the Jornada del Muerto Basin. Precipitation in the highland areas of the mountain range is absorbed by porous alluvium as runoff percolates into the water table. The aquifer under the San Andres contains water of poor quality, with high amounts of dissolved solids and heavy salt concentrations. The San Andres Mountains are relatively well watered with springs, seeps and permanent streams in major east-west canyons. Extensive water drainage in canyon bottoms can occur immediately following heavy rainfall in the form of thunderstorms.

Refuge Facilities: No proposed action would have a discernible effect on Refuge facilities. There would be a slight increase in vehicle traffic on Refuge roads due to hunter traffic.

Most would occur on 2-track roads that are not maintained. On maintained refuge roads, the increase of traffic from hunting would be negligible.

Environmental Justice: According to the guidance issued by the Council on Environmental Quality, environmental justice is the fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including a racial, ethnic, or socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies. Presidential Executive Order 12898, "General Actions to Address Environmental Justice in Minority Populations and Low Income Populations," requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing the disproportionately high and/or adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. The proposed action would not have health or environmental effects on minorities or low-income populations or communities as defined in the Environmental Protection Agency's Environmental Justice Guidance (1998). Therefore, environmental justice was dismissed as an impact topic in this document.

Public Health and Safety: Each alternative would have negligible effects on human health and safety.

5. Environmental Consequences

METHODOLOGY FOR ASSESSING IMPACTS

Terms

Impacts are described in terms of context (site-specific, local, or regional), duration (short-term or long-term), and intensity (negligible, minor, moderate, or major). The thresholds of change for the duration and intensity of an impact are defined as follows:

Short-term: The impact lasts one year or less

Long-term: The impact lasts more than one year

Negligible: The impact is at the lowest levels of detection

Minor: The impact is slight, but detectable

Moderate: The impact is readily apparent

Major: The impact is a severe or adverse impact or of exceptional benefit

Cumulative Impacts

The Council on Environmental Quality (CEQ) regulations, which implement the National Environmental Quality Act (NEPA), requires assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7).

Cumulative impacts are determined by combining the impacts of each alternative with other past, present, and reasonable foreseeable future actions. Therefore it was necessary to identify other ongoing or reasonable foreseeable future actions within San Andres National Wildlife Refuge and, if applicable, the surrounding region.

The only past and present project or management action being conducted within the Refuge that would directly affect resources analyzed in this environmental assessment is the prescribed burning program being conducted on the refuge since 1999. The prescribed fire program has affected nearly all of the refuge since burns have been conducted on about 90% of the Refuge. Prescribed burning is conducted on the Refuge to restore habitats, specifically to rejuvenate forage species for mule deer and desert bighorn such as mountain mahogany, increase forage palatability and quality for native wildlife, recycle nutrients, and reduce brush encroachment into desert grasslands and sheep habitat. Indications are that there is a benefit for resource values of the refuge by conducting prescribed burns. Prescribed burns are done during historical burning periods and are designed to mimic natural fires. Habitats located on the San Andres NWR are adapted to fire with many plant species dependent on regular burning to maintain themselves.

Off Refuge, a more regional cumulative impact would be the overall hunting program on oryx throughout southern New Mexico. Oryx have expanded their range and have continually invaded new habitats since their initial release in 1969. They are expanding south into West Texas and have colonized as far north as Sevilleta NWR north of Socorro, NM. They have crossed the San Andres Mountains westward and invaded the Jornada del Muerto, and eastward into the McGregor range. Every Federal land owner within oryx colonization areas currently has some kind of oryx removal program ongoing with all of the removal accomplished through hunting. Oryx population numbers are estimated at between 3,000 to 4,000 and current harvest levels are between 1,100 and 1,200 oryx. It is thought that current harvest levels are maintaining the current population level with a possible slight decline although complete surveys have not been able to confirm this. When oryx were first released on the range, it was agreed between NMDGF and WSMR that NMDGF would manage the herd at about 800-1000 animals. That is still the goal and hunt programs will be adjusted to increase the harvest levels to get to that target. Oryx harvested on the Refuge during population reduction hunts are included in regional harvest numbers and as part of the strategy to decrease the population to manageable levels. Hunter success on all hunts runs about 85-90% while on the Refuge success rates have been 95-98%.

IMPACTS OF ALTERNATIVE A: (PREFERRED) LIMITED HUNTING OF ORYX

Impacts on Resident Wildlife:

Removal of oryx from the Refuge would improve conditions for native resident wildlife especially desert bighorn sheep and desert mule deer by removing a large, non-native, aggressive animal that presents a disease threat to these species. Oryx have exploited every habitat on the Refuge from the valley floor at 3,600 feet up to the top of San Andres Peak at 8,229 feet, and compete for food, space and water resources with deer and sheep. Oryx have been documented charging desert bighorn rams and forcing them off their beds and run up steep terrain to get away from the oryx (T. Beus, personal comm). Oryx consume both browse and grass species, putting them in competition with deer and sheep as well as many other species of resident wildlife. Due to their size, disposition and habits, there is no native predator that has any significant effect on their population except for humans.

Oryx are also carriers of numerous wildlife diseases and can serve as reservoirs of infection of native species. These diseases appear to have little effect on the oryx themselves but they carry many diseases that can be devastating to bighorn sheep including bluetongue, EHD, and pneumonia. Oryx may have been a contributing factor to a die-off of desert bighorn on the Refuge in the fall of 2006 to disease. In addition, a new strain of Malignant Cataharral fever (MCF) has been isolated from oryx found on the Refuge and WSMR. While it is not known how deadly this disease is to native wildlife, MCF found in other African antelopes has been found to be 100% fatal to cervids such as mule deer and elk. It is unknown what effect this will have on mule deer but as oryx populations have increased in the last 15 years, mule deer populations have dramatically decreased.

Overland travel in remote areas of the Refuge to locate oryx and remove carcasses, gunshots, and a small increase in short term human presence will cause some short term negligible disturbance to resident wildlife. Since hunts would be limited to small numbers of hunters and hunts would be only for 1 day, disturbance would be negligible.

Cumulative Impacts

The prescribed fire program being conducted has minor short term impacts on native resident wildlife due to increased human activity, helicopter disturbance and burning of vegetation. Resident wildlife on the Refuge evolved with fire, impacts of conducting the burn are limited to less than a week in a portion of the Refuge, and the fire burns a mosaic throughout the burn unit, thus presenting a minor, short-term impact to resident wildlife.

Past management practices of no control of oryx resulted in extensive habitat damage and overgrazing as well as more opportunities for contact between native wildlife and oryx. Removal of oryx through a limited hunting program would reduce the possibility of disease transmission between native and non-native wildlife and reduce competition for scarce food resources as well.

When combined with hunting programs of surrounding Federal agencies, the cumulative impacts to resident wildlife are still considered minor and short term. Trophy hunts conducted on White Sands Missile Range normally are two day hunts and cover large areas of the range with hunter numbers ranging from 55 to 105. WSMR has a total of 10 hunts per year. In addition, WSMR has an average of 8 hunters/month in the southern San Andres Mountain Hunt Unit just north of the refuge. This hunt is run for 8 months per year. (D. Black, personal comm.). Jornada Experimental Range (JER), an entity of the Department of Agriculture, runs oryx population reduction hunts similar to the refuge to reduce or eliminate oryx from their property. Jornada typically removes 30-50 oryx per year from the JER. (K. Havstad, personal comm.). Without removal of oryx by hunting, the regional effects of oryx population growth on native populations of wildlife would be huge. Due to the slow start of control programs, impacts by oryx are widespread and significant.

Conclusion

There would be short term, minor intensity impacts to resident wildlife from increased human presence during hunts, ATV, vehicle and gunshot noise. As the oryx population is reduced these impacts are expected to be negligible. Resident wildlife would benefit in the long-term by removing oryx and allowing oryx-caused impacts to recover.

Because there would be no major, adverse impacts to a refuge resource whose conservation is necessary fulfill the specific purposes identified in the executive order establishing San Andres NWR and is identified as a goal in the refuge Comprehensive Conservation Plan, there would be no impairment of the refuge's resources or values.

Impacts on Soil and Vegetation

Removal of oryx from the Refuge would improve natural ecosystem functions by removing the cause of existing impacts on soil/vegetation such as extensive oryx trails, trampling, digging roots, overgrazing and overbrowsing. Disturbed areas would grow back, with soil crust and other vegetation becoming re-established over time on existing bare soil, resulting in long-term benefit to soil and vegetation natural conditions. Lichen soil crust functions of nitrogen fixing, moisture holding, stabilization, and reducing wind and water erosion would become re-established on areas currently disturbed and bare due to oryx use. Consumption, digging and trampling of vegetation by oryx would cease, with that material made available to native wildlife or recycled during decomposition.

Off road human travel, mostly in the eastern 1/3 of the refuge, to locate oryx and remove carcasses would cause some short-term, minor soil/vegetation disturbance, whether by mule or ATV travel. Tire tracks of ATV's running at a moderate speed (about 5-10 miles per hour) on refuge soils are about the same depth as a human footprint. In most cases, ATV tracks would not be visible after about a year. About 30% of the Refuge could be impacted and track density would be very sparse.

Cumulative Impacts

The prescribed fire program conducted on the Refuge would be the only other current or future program with the potential for affecting soil and vegetation in most areas of the Refuge and while the impact of burning in most habitats is moderate, it is short term. Desert grasslands and mountain mahogany habitats on the Refuge are dependent on fire to persist through time and fire has a beneficial effect on soil by recycling nutrients into the soil. Burn units have various intensities of fire in them and effects to certain vegetation can be slight to severe. Prescribed fire is used as a tool to manage habitats for the benefit of native wildlife and to insure that certain fire dependent plant species remain healthy and viable on the Refuge through time.

Past management practices of letting oryx increase with no effort to control numbers resulted in minor-to-moderate soil and vegetation impacts distributed over a majority of the refuge. Proposed action in this alternative would create minor, short-term impact (ATV or mule tracks) on soil/vegetation in the process of removing the cause (oryx) of long-term impacts. It is expected within 1-2 years that ATV track visibility would be negligible and natural conditions recovered. Past soil and vegetation destruction from high oryx populations would also recover over time as soil crust and vegetation became re-established.

Conclusion

There would be short-term minor intensity impacts on soil/vegetation from ATV and mule tracks. Within five years, expected impacts would be negligible. Natural soil/vegetation conditions would benefit in the long-term by reducing/removing oryx and allowing oryx-caused impacts on soil/vegetation to restore

Because there would be no major, adverse impacts to a Refuge resource whose conservation is necessary to fulfill the specific purposes identified in the executive order establishing San Andres NWR, and is identified as a goal in the refuge Comprehensive Conservation Plan, there would be no impairment of the refuge's resources or values.

Impacts On Cultural Resources

No impacts would occur to identified historic ruins or sites, because proposed operational activities would avoid these areas. No impact on cultural resources is known from existing oryx use.

Off road access by mule or ATV for locating and removing oryx could possibly pass over an unmapped archeological site consisting of a surface scatter of material, as these sites are not obvious. Such sites may be found over a wide variety of habitats on the Refuge. Cultural material would not be displaced by ATV or mule passage, erosion is not expected to result, and impact would be expected to be negligible. No adverse effect is expected.

Cumulative Impacts

No other past or present management actions have resulting impacts on cultural resources that would have a cumulative effect when combined with effects of the proposed action. No other proposed management actions would have a cumulative effect when combined with the proposed alternative. Impacts to cultural resources within WSMR would be minor as most cultural, historic sites on the Range are well known and protected so that the hunting public would avoid these sites during hunts.

Conclusion

No effects would occur to ruins or sites. Negligible effects on archeological sites consisting of surface scattered material may occur from ATV passage over a remote and unmapped site on a one-time basis, resulting in no adverse effect.
Because there would be no major, adverse impacts to a refuge resource whose conservation is necessary to fulfill the specific purposes identified in the executive order establishing San Andres NWR, and is identified as a goal in the refuge Comprehensive Conservation Plan, there would be no impairment of the refuge's resources or values.

IMPACTS OF ALTERNATIVE B: REMOVAL OF ORYX BY REFUGE MANAGEMENT

Resident Wildlife

Removal of oryx from the Refuge would remove a source of competition and disease for native wildlife as described under alternative A. Resident wildlife would restore to a more natural condition as described under alternative A.

There would be negligible short-term impacts and no long-term impacts from off road travel, gunfire and slight increase in human presence during oryx harvest and removal.

Cumulative Impacts

As stated under Alternative A, the prescribed fire program is the only other past, current or future program that would affect resident wildlife and no long-term detrimental effects are expected.

Conclusion

Negligible, short term impacts on resident wildlife would result from the proposed action.

Because there would be no major, adverse impacts to a Refuge resource whose conservation is necessary to fulfill the specific purposes identified in the executive order establishing San

Andres NWR, and is identified as a goal in the refuge Comprehensive Conservation Plan, there would be no impairment of the refuge's resources or values.

Impacts to Soils and Vegetation

Removal of oryx from the Refuge would remove a major source of impact on soils and vegetation as described under alternative A. Disturbed soil and vegetation would restore to more natural conditions as described under alternative A.

There would be negligible short-term impacts and no long-term impacts from off-road ATV and mule travel to remove oryx.

Cumulative Impacts

As stated under alternative A, the prescribed fire program is the only other past, current or future program that would affect vegetation on the refuge and no large scale detrimental affects are expected.

Conclusion

Negligible short-term impacts on soil and vegetation conditions would result from the proposed action.

Because there would be no major, adverse impacts to a Refuge resource whose conservation is necessary to fulfill the specific purposes identified in the executive order establishing San Andres NWR, and is identified as a goal in the refuge Comprehensive Conservation Plan, there would be no impairment of the refuge's resources or values.

Impacts on Cultural Resources

No impacts would occur on cultural resources the same as alternative A.

Cumulative Impacts

No other past or present management actions have impacts on cultural resources that would have a cumulative effect when combined with the effects of the proposed action. No other proposed management actions would have a cumulative effect when combined with the proposed alternative.

Conclusion

No effect would occur to ruins or sites. Negligible effects on archeological sites consisting of surface scattered material may occur from ATV passage over a remote and unmapped site on a one-time basis, resulting in no adverse effect. Because there would be no major, adverse impacts to a refuge resource whose conservation is necessary fulfill the specific purposes identified in the executive order establishing San Andres NWR and is identified as a goal in

the refuge Comprehensive Conservation Plan, there would be no impairment of the refuge's resources or values.

IMPACTS OF ALTERNATIVE C: NO ACTION-NO ORYX REDUCTION

Resident Wildlife

After cessation of oryx population reduction hunts, oryx numbers would climb to pre-hunt numbers and presumably continue to increase. Interactions between bighorn sheep and oryx and mule deer and oryx would increase and native ungulates would suffer due to the oryx's more aggressive behaviors. Competition for food and space requirements would increase with the native ungulates being out competed by the oryx. Oryx populations would continue to expand into higher elevations and all habitats would be supporting denser numbers of oryx. Oryx would be better able to exploit drought conditions to the detriment of native ungulates as food resources became scarcer during drought. Oryx act as reservoirs of endemic diseases or introduce new diseases into the area. As oryx numbers increase, the likelihood of disease outbreaks on native ungulates would increase.

Cumulative Impacts

No other project on the Refuge other than the prescribed burn program as described under Alternative A has the potential for affecting resident wildlife on the Refuge. Lack of hunting on the Refuge would affect WSMR and JER by serving as a reservoir of oryx capable of re-populating areas that are being hunted for oryx and making it more difficult for those agencies to meet their oryx management objectives

Conclusion

Refuge resident wildlife would be at risk of moderate to major, long-term impact from uncontrolled oryx population increase within the Refuge.

If the potential impacts to resident wildlife were allowed to occur, this would impact on a Refuge resource whose conservation is necessary to fulfill the specific purposes identified in the executive order establishing San Andres NWR and is identified as a goal in the Refuge Comprehensive Conservation Plan, there would be some impairment of the Refuge's resources or values.

Impacts on Soil and Vegetation

After several years without oryx population reduction hunts, the oryx population would increase to pre-2000 levels. Before 2000, impacts on soil and vegetation were very evident, as described above in Purpose and Need. Over time with no hunting and no significant predation, the refuge oryx population would continue to increase to some level that would significantly damage soil and vegetation. At some time the oryx population would stabilize, with controlling factors likely being some behavioral mechanism and/or severely impacted vegetative conditions. At this stage, there would be moderate to major impacts on native

vegetation for as long as the oryx population remained high. Soil erosion could increase due to damage to soil crust and plant cover. This scenario is typical of world-wide desert ecosystems that are destabilized by overgrazing. The overall result is a loss of ecosystem stability and productivity of native species.

Cumulative Impacts

As stated above, the prescribed fire plan is the only other management action with the potential to impact soils and vegetation. This ongoing program is designed to mimic natural conditions and no major or long-term impacts are predicted.

Conclusion

Refuge soil and vegetation would be at risk of moderate to major, long-term impact from uncontrolled oryx population increase within the Refuge boundaries.

If the potential impacts to soils and vegetation were allowed to occur, this would impact on a refuge resource whose conservation is necessary to fulfill the specific purposes identified in the executive order establishing San Andres NWR, and is identified as a goal in the refuge Comprehensive Conservation Plan, there would be some impairment of the refuge's resources or values.

Impacts On Cultural Resources

No impacts would occur to identified historic ruins or sites, because proposed operational activities would avoid these areas. No impact on cultural resources in known from existing oryx use.

Cumulative Impacts

No other past or present management actions have resulting impacts on cultural resources that would have a cumulative effect when combined with effects of the proposed action. No other proposed management actions would have a cumulative effect when combined with the proposed alternative.

Conclusion

No impacts on cultural resources would result from the proposed action.

IDENTIFICATION OF ENVIRONMENTALLY PREFERRED ALTERNATIVE

The environmentally preferred alternative is determined by applying the criteria suggested in the National Environmental Policy Act of 1969 (NEPA), which is guided by the Council on Environmental Quality (CEQ). The CEQ provides direction that "the environmentally preferable alternative is the alternative that will promote the national environmental policy as expressed in NEPA's Section 101.

1. fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
2. assure for all generations safe, healthful, productive, and esthetically and culturally pleasing surroundings;
3. attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;
4. preserve important historic, cultural and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice;
5. achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities; and
6. enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Alternative A is the environmentally preferred alternative. It accomplishes the stated management objectives of oryx removal from the refuge while providing for limited public recreation. Alternative B also accomplishes the stated management objectives but requires additional staff time and offers no compatible public recreation like Alternative A. Alternative C makes no attempt to protect the environment or meet oryx removal management objectives, but is used as a necessary basis for comparison of alternatives.

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REGULATORY COMPLIANCE

Executive Order 8646 established San Andres National Wildlife Refuge in 1941 for "... the conservation and development of natural wildlife resources."

Executive Order 13112, Invasive species, issued in February, 1999 instructs Federal Agencies to:

(b) Each Federal agency whose actions may affect the status of invasive species shall, to the extent practicable and permitted by law,
   (1) identify such actions:
   (2) subject to the availability of appropriations, and within Administration budgetary limits, use relevant programs and authorities to: (i) prevent the introduction of invasive species; (ii) detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner; (iii) monitor invasive species populations accurately and reliably; (iv) provide for restoration of native species and habitat conditions in ecosystems that have been invaded; (v) conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species; and (vi) promote public education on invasive species and the means to address them.

Administrative Procedure Act (5 U.S.C. 551-559, 701-706, and 801-808) as amended: Contains procedures that Federal agencies must follow, including public information, open meetings, and privacy of information requirements, and provision for hearings, adjudications, rule making and judicial and congressional review of agency actions.

Antiquities Act of 1906 (16 U.S.C 431-433): It is illegal for a person to appropriate, excavate, injure or destroy an historic or prehistoric run or monument, or an object of antiquity, situated on lands owned or controlled by the U.S., without permission of the Secretary of the department with jurisdiction over the Land.

Bald Eagle Protection Act (16 U.S.C. 668-668d) as amended: Prohibits the taking (includes pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb) or possession of and commerce in bald and golden eagles, with limited exceptions.

Clean Air Act (42 U.S.C. 7401-7671q) as amended: Establishes Federal standards for air pollutants from stationary and mobile sources and to work to regulate polluting emissions. The Act was designed to improve air quality.

Endangered Species Act of 1973 (16 U.S.C. 1531-1544) as amended: Provides broad protection for species of fish, wildlife, and plants that are listed as threatened or endangered in the U.S. or elsewhere.

Federal Lands Recreation Enhancement Act (REA), 16 U.S.C. 6803(c), Consolidated Appropriations Act (PL 108-447): This law grants the Secretary authority to collect recreation fee revenues for public recreation and rescinds the collection authorities in the Emergency Wetland Resources Act and those provided by the Land and Water Conservation Fund Act. REA replaces the Recreation Fee Demonstration Program (Fee Demo) and authorizes the Recreation Fee Program for 10 years (through 2014).

Fish and Wildlife Act of 1956 (16 U.S.C. 742a -754j-2) as amended: Directs the Secretary of the Interior to develop the policies and procedures necessary for carrying out fish and wildlife laws and to research and report on fish and wildlife matters. The Act establishes the Fish and Wildlife Service within the Department of the Interior.

Fish and Wildlife Conservation Act (16 U.S.C. 2901-2911) as amended: Encourages states to develop conservation plans for nongame fish and wildlife of ecological, educational, aesthetic, cultural, recreational, economic, or scientific value. Also directs the Secretary to undertake certain activities to research and conserve migratory nongame birds.

Fish and Wildlife Improvement Act of 1978 (16 U.S.C. 742l): Authorizes the Secretary of the Interior to assist in training of state fish and wildlife enforcement personnel to cooperate with other federal or state agencies for enforcement of fish and wildlife laws and to use appropriations to pay for rewards and undercover operations. Also allows for disposal of property abandoned or forfeited under federal fish, wildlife or plant laws administered by the Secretary in a manner deemed appropriate by the Secretary.

Migratory Bird Treaty Act (16 U.S.C. 703-712) as amended: Implements various treaties and conventions between the U.S. and Canada, Japan, Mexico and the former Soviet Union for the protection of migratory birds. Under this Act, taking, killing, or possessing migratory birds is unlawful. The Secretary of the Interior may adopt regulations determining the extent to which, if at all, hunting, taking, capturing, killing possessing, selling purchasing, shipping, transporting, or exporting of any migratory bird, part, nest or egg will be allowed.

National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee) as amended: Provides for the administration and management of the national wildlife refuge system including wildlife refuges, areas for the protection and conservation of fish and wildlife threatened with extinction, wildlife ranges, game ranges, wildlife management areas, and waterfowl production areas. This Act also authorizes 6 priority public uses when deemed compatible and appropriate with the mission of the site. Hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation are these priority uses.

Recreational Hunting Safety and Preservation Act of 1994 (16 U.S.C 5201-5207): Provides for civil penalties to be assessed against a person who intentionally and significantly hinders a lawful hunt.

Refuge Recreation Act (16 U.S.C. 460K-460k-4) as amended: Authorizes the Secretary of the Interior to allow public recreation in federal conservation areas when compatible with the purposes of these areas.

Sikes Act (16 U.S.C. 670a-670o) as amended: Authorizes the Secretary to develop cooperative plans for conservation and rehabilitation programs. The Secretary, in cooperation with state agencies and in accordance with comprehensive plans, is to plan, develop, maintain and coordinate programs for conservation and rehabilitation of wildlife, fish and game under his jurisdiction.

Soil and Water Resources Conservation Act of 1977 (16 U.S.C. 2001-2009) as amended: Provides for a continuing appraisal of U.S. soil, water and related resources, including fish and wildlife habitats, and a soil and water conservation program to assist landowners and land users in furthering soil and water conservation.

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