ENVIRONMENTAL ASSESSMENT

OPENING of MOUNTAIN LION HUNTING

on

KOFA NATIONAL WILDLIFE REFUGE

Yuma and La Paz County

Arizona

For Further Information, Contact:
Refuge Manager
U.S. Fish and Wildlife Service
Kofa National Wildlife Refuge
356 W 1st St.
Yuma, AZ 85364
Paul_Cornes@fws.gov

Prepared by:
U.S. Department of the Interior
Fish and Wildlife Service
Yuma, Arizona
October, 2006

KOFA NATIONAL WILDLIFE REFUGE

ENVIRONMENTAL ASSESSMENT

I. Background

Although somewhat vague in its language, the enabling Executive Order is widely understood as establishing Kofa NWR to preserve what was, at that time, a dwindling population of desert bighorn sheep (*Ovis canadensis mexicana*) and the habitat upon which the sheep depend. Toward that end, management practices in the early years of the Refuge's existence were almost exclusively aimed at enhancing bighorn sheep habitat, even to the point of implementing a predator control program (an acceptable practice 50 - 60 years ago). However, management strategies have evolved since that time and the "single-species" concept has been replaced by the ecosystem management concept where refuges strive to maintain natural biological diversity.

Public hunting was prohibited on Kofa NWR until 1956 when the Refuge was opened to mule deer hunting. The first desert bighorn sheep hunt followed in 1960. Predator control (mostly coyotes and bobcats) had been conducted for many years by Refuge personnel, but in 1967 coyotes and foxes became legal game on the Refuge under the fur-bearer designation. Gambel's quail and cottontail rabbits were first opened to hunting in the same year.

Hunting regulations on Kofa NWR generally follow those of the State of Arizona with Refuge-Specific Regulations governing certain activities (e.g., abbreviated season on fur-bearers).

Mountain lions (*Puma concolor*) are one of ten big game species recognized by the Arizona Game and Fish Department (AGFD). Mountain lions have long been considered occasional transients on Kofa NWR, not residents. After a mountain lion was killed by a government trapper on the Refuge in 1944, no reliable reports of mountain lions were obtained until June 2000 when a mountain lion was seen by a Refuge staff member near Squaw Tank. Continued sightings by hunters and a sighting of three mountain lions by an AGFD biologist during a 2003 aerial survey prompted the Refuge to place remote cameras at waterholes starting in December 2003. In 2005, seven more cameras were added. Between January 2004 and August 2006, 46 photographs of mountain lions were obtained. In 2006, the Refuge made two attempts to capture and place a Global Positioning System (GPS) satellite collar on a mountain lion with the assistance of U.S. Department of Agriculture Wildlife Services. Based on examinations of photographs and tracks found during these capture efforts, there are at least five mountain lions in the Kofa Mountains alone. Several photographs of a female mountain lion with kittens in successive years suggest that mountain lions are breeding successfully on the Refuge. Organized lion monitoring has not occurred in the Castle Dome Mountains, and so population information is extremely limited for that area. A deer killed by a mountain lion and loosely covered with gravel was discovered at Little White Tanks in 2001 and a mountain lion was seen by an AGFD remote video at Adams Well in 2002.

II. Purpose and Need for Action

The purpose of this action is to permit mountain lion hunting on the Kofa River National Wildlife Refuge (NWR), Yuma and La Paz County, Arizona. Mule deer, bighorn sheep, quail, coyote, fox, and cottontail rabbit hunting is currently authorized and on-going. Kofa NWR was established for the following purposes:

> "…set apart for the conservation and development of natural wildlife resources, and for the protection of public grazing lands and natural forage resources." [Executive Order 8039]
>
> "…consolidating the authorities relating to the various categories of areas that are administered by the Secretary of Interior for the conservation of fish and wildlife, including…game ranges….are hereby designated as the National Wildlife Refuge System,…and shall be administered by the Secretary through the United States Fish and Wildlife Service." [National Wildlife Refuge System Administration Act of 1966, as amended]
>
> "…certain lands in the Kofa National Wildlife Refuge, Arizona, which comprise approximately 510,900 acres and certain other public lands comprising 5,300 acres which are hereby added to and incorporated within such Refuge (and which shall be managed accordingly)…areas designated under this title shall be administered…in accordance with the Wilderness Act…" [Arizona Desert Wilderness Act of 1990]

In addition to the stated purpose of the Refuge, additional objectives were also established under the 1996 *Kofa National Wildlife Refuge & Wilderness and New Water Mountains Wilderness Interagency Management Plan* as follows:

1. Preservation of Wilderness Values – maintain or enhance the wilderness values of naturalness, outstanding opportunities for solitude and primitive recreation, and special features of the planning area.

2. Wildlife and Habitat Management – maintain and enhance the natural diversity of flora and fauna.

3. Recreation, Legal access, and Public Information – maintain high quality opportunities for recreation within the planning area, and where applicable, wildlife dependent and/or primitive recreation that is compatible with the purpose for which Kofa NWR was established. These uses include wildlife observation, hiking, hunting, camping, photography, and solitude.

4. Minerals Management –minimize the environmental impacts of mining activities on all lands and resources within the planning area.

The Plan acknowledges that hunting is a long-standing public use on Kofa NWR, but it does not specifically address opening the Refuge for hunting programs that were not in existence at the time. As a management objective, hunting provides the public with an opportunity to utilize a renewable resource. Hunting is compatible with Refuge purpose and mission of the system and is in the public's interest on Kofa NWR as described under the National Wildlife Refuge System

Improvement Act of 1997.

The need for the proposed hunt is based on an expression of interest from various local individuals and the Arizona Game and Fish Commission. In addition, recent information collected by Refuge staff and consultants from USDA Wildlife Services has determined that a population of mountain lions exists on the Refuge that would support limited hunting.

The National Wildlife Refuge System Improvement Act of 1997 identified hunting as a legitimate use of national wildlife refuges and suggested that hunting should be allowed where compatible with the purposes for which the individual refuge unit was established. In that context, mountain lion hunting in and of itself would not be contrary to refuge purposes. However, there are elements of hunting that should be examined in order to ensure that hunting complies with the overall mission of refuges and FWS.

Refuges are places that are, and should be, held to a higher standard. It has long been the policy of the FWS that refuges should offer quality recreational opportunities including hunting programs. As defined in 605 FW 2.1 (Fish and Wildlife Service Manual, Chapter 2 - Hunting), a quality hunting experience is one that:

(1) Considers safety for hunters and other visitors;

(2) Encourages the highest standards of ethical behavior;

(3) Is available to a broad spectrum of the hunting public;

(4) Contributes positively to population management of resident or migratory species;

(5) Reflects positively on the System;

(6) Provides hunters uncrowded conditions;

(7) Provides reasonable challenge and opportunities for taking; and

(8) Creates minimal conflict with other priority wildlife-dependent recreational uses or refuge operations.

III. Alternatives

This action will allow the public to hunt on Kofa NWR according to established regulations. Three Alternatives were considered for mountain lion hunting on the Refuge. They included:

A. No Action

B. Limited Hunting (during State seasons)

C. Open Hunting (during State seasons)

Criteria for evaluation of alternatives include:

1. Compatibility with Refuge purposes

2. Inviting public comment in planning process

3. Refuge cost

A. No Action Alternative

Under Alternative A, Kofa NWR would remain closed to mountain lion hunting. This would result in the loss of a recreational opportunity that is compatible with Refuge purposes. The possible benefit to bighorn sheep and mule deer populations from predator reduction would not be realized. Implementation of this Alternative would generally not be in compliance with the Improvement Act of 1997 in regards to compatible public recreation.

B. Limited Hunting (during State seasons)

Alternative B will allow limited participation to hunt mountain lions on the Kofa NWR during the regular hunt season for small game and predators. Under this alternative, Kofa NWR would be opened to mountain lion hunting, subject to the statewide one lion per person per year bag limit. In the first year of mountain lion hunting on Kofa NWR, Game Management Unit 45 (45A, 45B, and 45C) would be added to the existing mountain lion hunt currently encompassing Game Management Units 16B, 40B, 41, 43A, 43B, and 44B. The total harvest objective for the expanded mountain lion hunt would remain at one animal per year. As in all existing mountain lion hunts in Arizona, spotted kittens or females accompanied by spotted kittens may not be harvested. Hunting would be permitted during daylight hours only.

Units 45A, 45B, 45C, 16B, 40B, 41, 43A, 43B, and 44B would close to the take of mountain lions following the reported harvest of a mountain lion. Per Arizona Game and Fish Department (AGFD) regulations, all hunters that take a mountain lion are required to check out in person or by phone within 48 hours. Prospective mountain lion hunters would be responsible for calling 1-877-438-0447 before hunting to determine if their hunt is still open.

This hunting program is designed to contribute to, or be compatible with, Refuge objectives. It will provide a recreational experience to the general public and the opportunity to utilize a renewable resource. It could also maintain some wildlife populations at managed levels. The seasons, species, and bag limits will be within the framework of the AGFD regular state seasons and further regulated by Refuge regulations according to Fish and Wildlife Service policy. Refuge management goals and objectives may require occasional modifications to the hunting program as harvest data, public use pressure, and Refuge programs are developed. As currently proposed, it is estimated that Refuge costs would be about $24,000 per year for mountain lion hunting, for law enforcement, population monitoring, program implementation, facility maintenance, and compliance checks under Alternative B.

For *Refuge-Specific Regulations*, reference Section E.

C. Open Hunting (during State seasons)

Alternative C will allow year-long hunting of mountain lions on Kofa NWR during the entire State regulated season. The season and bag limits will be within the framework of the AGFD's regular state seasons and further regulated by Refuge regulations according to Fish and Wildlife Service policy. Refuge management goals and objectives may require occasional modifications to the hunting program as harvest data, public use pressure, and Refuge programs are developed. As currently proposed, it is estimated that Refuge costs would be about $50,000 per year for mountain

lion hunting, for law enforcement, program implementation, facility maintenance, and compliance checks under Alternative C. Under this Alternative, the two Refuge staff law enforcement officers would not be able to monitor each day the hunt is in progress. Since the State regulated season lasts 365 days, substantial overtime would be necessary or the hiring of temporary staff would be needed. Staff will randomly check hunters in or out over the various units that are open for the season. Open hunting of mountain lions might increase visitation by hunters with associated maintenance costs for roads and impacts to camping areas. This increased visitation might also generate conflicts with other recreational users of the Refuge by creating impacts to other recreational values such as opportunities for solitary or unconfined recreation.

For *Refuge-Specific Regulations*, reference Section E.

III. Description of the Affected Environment

Kofa NWR is located in the southwest corner of Arizona in the Sonoran Desert, a low-elevation, hot, and arid desert. Clear skies, low relative humidity, low rainfall, and large daily temperature variations characterize the climate. Meteorological records indicate that the average daily temperatures range from 80°F to well over 100°F during summer months and from 40°F to 65°F during winter months. Average yearly precipitation is less than 4". Typically, two "monsoon" seasons provide the bulk of the rainfall: July through September and December through March. April through June is usually extremely dry while October and November are somewhat variable, but tend to be dry as well. Prevailing winds are from the north-northwest during autumn until early spring. As temperatures warm, winds shift to a more southerly direction. Winds associated with summer monsoons shift more toward the southeast. Air quality is usually excellent except when high winds stir up dust or wildfires west of the Refuge result in smoke and haze.

Prior to the arrival of European man, the area that is now Kofa NWR was inhabited on an irregular basis by Native Americans. It is generally believed that indigenous people used the area for infrequent foraging and as a trade route between distant cultures. The area undoubtedly remained unchanged until the 19th century when prospectors entered the area seeking gold and silver. Upon discovery of those precious metals, and other minerals, the landscape changed with the extensive mining operations that were developed. Few of the mines prospered, however, and by the mid-20th century, most of the mining activity had died out. Left behind were numerous abandoned mine shafts, adits, tailings, and other mining debris. In recent years Refuge managers have made significant strides in cleaning up many of the abandoned mine sites, but there are still a few areas containing mostly non-hazardous materials. Occasionally some hazardous material is occasionally located such as old car batteries, oil drums, or relic engines with oil and other fluids still intact.

The dominant perennial vegetation of the area includes creosote bushes (*Larrea tridentata*), white bursage (*Ambrosia dumosa*), ocotillos (*Fouqueria splendens*), ironwood trees (*Olneya tesota*), jojoba (*Simmondsia chinensis*), honey mesquite *(Prosopis juliflora*), desert lavender (*Hyptis emoryi*), catclaw (*Acacia greggii*), foothill paloverde trees (*Cercidium microphyllum*), blue paloverde (*Cercidium floridum*), and saguaro cacti (*Carnegiea giganteus*). More than 400 taxa of flora are found on the Refuge.

There is a diversity of wildlife species on the Kofa NWR. The species that occupy this area are primarily those that are common to the mountains and bajadas of the Sonoran Desert. This includes, but is not limited to: white-winged and mourning doves (*Zenaida asiatica* and *Z. macroura*), numerous passerine species, red-tailed hawks (*Buteo jamaicensis*), desert bighorn sheep, mule deer, desert cottontails (*Sylvilagus auduboni*),mountain lions (*Mountain lion concolor*), coyotes (*Canis latrans*), ringtails (*Bassariscus astutus*), gray foxes (*Urocyon cineroargenteus*) western diamondback rattlesnakes (*Crotalus atrox*), kingsnakes (*Lampropeltus getulus*), side-blotched lizards (*Uta stansburiana*), and western whiptail lizards (*Cnemidophorus tigris*). An additional 193 species of birds, 49 species of mammals, and 41 species of reptiles and amphibians have been documented on Kofa NWR.

No Federally designated threatened or endangered species are known to occur within the Refuge. The Sonoran Desert population of the desert tortoise is not listed by the FWS, but is on the AGFD list of Wildlife of Special Concern. Inventories for rare plants on the Refuge have failed to discover any listed plants. Several other animal and plant species that are on the AGFD list of Special Concern are listed in Appendix A.

The following information regarding various resources was excerpted from the *Kofa National Wildlife Refuge & Wilderness and New Water Mountains Wilderness Interagency Management Plan and Environmental Assessment.*

> Refuge files contain variable records of approximately 92 known or recorded archeological and historic sites on the Kofa NWR. However, the actual number of reliably locatable sites may ultimately prove to be a good deal less since more than half of the purported 92 site records are in fact little more than site "leads" offering only vague and incomplete locational references.
>
> As would be expected of such a marginal environment, all of the sites are indicative of ephemeral uses of the Kofa range. Cleared circles, rock rings and rock alignments, lithic and pottery scatters, small occurrences of ground stone artifacts and bedrock mortars, foot trails, and rock art sites point to highly transitory occupations either for short-term subsistence gathering purposes, or for travel and trade across the range.
>
> The Kofa NWR displays a relief of two major block-faulted mountain ranges (Kofa and Castle Dome Mountains) typified by extensive exposures of bedrock, sparse vegetative cover, lack of soil development, steep slopes and structurally controlled drainage systems. Elevations range from 680 feet on the desert floor to 4,877 feet atop Signal Peak. Shallow, stony soils and rock outcrops are predominant in the mountainous and steep slope areas. Alluvial fans and valley floors are characterized by deep, gravelly, moderately fine textured soils high in lime concentrations.
>
> Kofa NWR provides numerous water resource developments available for use by wildlife. Most of these are developed as tanks, catchments, or wells that receive and collect rain water from surrounding watersheds. There are some natural springs as well. Development of wildlife water sources has been carried out on the Refuge since it was first established. Throughout the years wildlife managers have believed that the development of water on the Refuge has been instrumental in helping to restore the bighorn sheep population. Water catchments are monitored primarily by Refuge personnel. Water is transported to a limited number of these sites during seasons of extensive drought.

In many cases the waterholes on Kofa NWR would not fit the usual definition of a wetland. However, with the exception of the wells, all of the waterholes are natural, albeit enhanced in some cases. At some of them, and at most of the springs, natural wetland vegetation may be found (cattail, sedge, water nymph). Salt cedar, an exotic invasive species, is also found at various locations.

Information obtained during the past five years indicates that these water sources are used by a myriad of desert fauna. Remote cameras placed at selected waterholes have documented extensive use by doves and many passerine species, raptors, quail, reptiles, amphibians, mule deer, bighorn sheep, mountain lions, and other wildlife. Water quality varies considerably between the various waterholes on the Refuge. Immediately following a rain event, recharged collection sites contain water of significantly better quality than stagnant water that often harbors algal blooms. Despite the unfavorable appearance of these stagnant pools however, there has been no evidence found that toxins reach lethal levels for wildlife that consume the water. A recent AGFD research project (O'Brien, Rosenstock et al.) that included analysis of water quality at wildlife water sources located no health considerations for animals. Better water quality is found at the natural springs scattered throughout the Refuge, although not all springs produce water on a continual basis. Recent evidence suggests that there may be high levels of heavy metals found in some of the wells on the Refuge, but again, there has been no observation of adverse effects to wildlife at these wells. All wells on the Refuge have been posted as non-potable to the visiting public.

Kofa NWR allows a variety of recreational uses. The National Wildlife Refuge System is mandated to consider wildlife first in all management activities, and all other uses (public) are considered secondary. The National Wildlife Refuge System Improvement Act of 1997 identified six wildlife-dependent public uses that are generally considered appropriate on refuges, including hunting. Nevertheless, all public uses must undergo a compatibility analysis to determine the use is not incompatible with the purposes for which the refuge was established; included in that analysis must be a finding that funding is available for the management of these activities. Uses that are allowed within designated wilderness must also conform to requirements of The Wilderness Act.

Recreational use of the Refuge, including wildlife observation, hiking, exploring in four-wheel drive vehicles, and hunting, occurs almost exclusively in the fall, winter, and spring months. The public is not permitted to drive vehicles off the designated roads regardless of whether or not the road is adjacent to wilderness. Hunters, participating in any of the various hunting seasons, may presently hunt anywhere on the Refuge outside of private inholdings.

Kofa NWR hosts an estimated 50,000 - 60,000 visitors each year. Many visitors are members of the retirement community that spend the winter in the Yuma/Quartzsite area. Hunters are included in those totals, contributing approximately 2000 visits per year. Tourism is one of the top two industries in Yuma (after agriculture), resulting in considerable socioeconomic benefit to the area. Although it is widely accepted that National Wildlife Refuges contribute economically to the communities in which they are found, it is unknown what Kofa NWR's specific contributions may be. For the purposes of this analysis, it is assumed that the Refuge's socioeconomic contributions to the area would not change materially whether or not mountain lion hunting is permitted.

In 1990 the Arizona Desert Wilderness Act (Act) was enacted, establishing over 510,000 acres of designated wilderness on Kofa NWR. This law effectively mandated management that had been in practice since Kofa's first attempt at establishing wilderness in the mid-1970s. Vehicle use had been restricted to designated roads since 1976, but about 25 miles of roads were closed

for all use with passage of the Act (more than 300 miles are still available for public use). Also, mechanized equipment was prohibited from the wilderness areas. Wilderness designation does not preclude hunting but it does require greater scrutiny of recreational use such that wilderness character is not impacted adversely. Some concerns include increased visitor use of wilderness resulting in a diminution of solitude for some users and increased noise levels due to discharge of firearms.

III. Environmental Consequences

This section addresses the environmental impacts of the no action, limited hunting, and open hunting alternatives as they relate to physical resources, biological resources, recreational resources, Improvement Act of 1997, and cultural resources.

The following critical elements have been analyzed and would not be affected by the preferred action or alternatives:
A) hazardous, solid, or toxic wastes
B) prime or unique farmlands
C) floodplains
D) Native American religious concerns
E) threatened or endangered species
F) wild and scenic rivers
G) environmental justice
F) socioeconomic resources

A. No Action - Alternative A

Under this Alternative, Kofa NWR would remain closed to mountain lion hunting.

a) Physical Resources

This alternative would not result in any new physical resource impacts.

b) Biological Resources

No mountain lions would be legally killed by hunters under this alternative. Lions do prey upon bighorn sheep and mule deer, although currently lion predation is not suspected to be significantly detrimental to these populations on the Refuge. There is some evidence that mountain lion predation may limit some small, isolated bighorn sheep populations (Hayes et al. 2000, Schafer et al. 2000, Kamler et al. 2002). The Kofa bighorn sheep herd is regionally important and suffered a large decline from 2003 to 2006, largely due to long-term drought in the region. It is possible that a reduction in the mountain lion population would assist in the recovery of the sheep population (CMGWG 2005), a benefit that might not be realized under this alternative.

c) Recreational Resources

This alternative would not provide the public with an opportunity to utilize a renewable resource, although hunting is compatible with Refuge objectives. If the mountain lion population continues to increase it is possible that mountain lion-human interactions might begin to take place.

d) Improvement Act of 1997

Section 5(a)(3) of the Act states:

"(B) Compatible wildlife-dependent recreation is a legitimate and appropriate general public use of the System, directly related to the mission of the System and the purposes of many refuges and which generally fosters refuge management and through which the American public can develop an appreciation for fish and wildlife;
(C) compatible wildlife-dependent recreational uses are the priority general public uses of the System and shall receive priority consideration in refuge planning and management; and
(D) when the Secretary determines that a proposed wildlife-dependent recreational use is compatible within a refuge, that activity should be facilitated, subject to such restrictions or regulations as may be necessary, reasonable and appropriate."
This alternative would not generally fulfill this requirement.

f) Cultural Resources

Cultural resources would not be affected under this alternative

B. Limited Hunting - Alternative B (*Preferred Alternative*)

Under Alternative B, hunting will be open on the Kofa NWR, with restrictions noted below and under Section E, Refuge-Specific Regulations.

a) Physical Resources

Alternative B will not likely increase road or campsite damage beyond what is normally incurred. It is anticipated that few hunters will come to the Refuge specifically to hunt mountain lions; rather, most hunters will incorporate mountain lions in to their big game hunts. In addition to a more complete list of Refuge-Specific Regulations listed under Section E, some of the restricted management practices that will be used to minimize impacts include: 1) control the number of hunters (thus fewer vehicles); 2) limit the length of the hunt season; and 3) strictly limit the use of all terrain vehicles.

b) Biological Resources

Some adverse, but temporary, biological impacts will occur during hunting activities to flora and fauna under this alternative. These will not be more than those already incurred under the Refuge's other hunts. Ways to minimize adverse effects such as the effect of human-caused noise, trampling of vegetation, and visual disturbances include many Refuge-Specific Regulations listed under Section E such as: 1) controlling the number of hunters; 2) limiting the length of the hunt season; 3) strictly limiting the use of all terrain vehicles; and 4) hunting during daylight hours only. Hunters will be encouraged, although not required, to take male lions rather than females. Additionally, increased presence by Refuge staff and law enforcement personnel should help minimize biological impacts to the area through education.

The Kofa bighorn sheep herd is regionally important and suffered a large decline from 2003 to 2006, likely due to long-term drought in the region. It is possible that a reduction in the mountain lion population from hunting would assist in the recovery of the sheep population (CMGWG 2005). There is some evidence that mountain lion predation may limit some small, isolated bighorn sheep populations (Hayes et al. 2000, Schafer et al. 2000, Kamler et al. 2002), but hunting may not provide the targeted control method recommended in these circumstances (CMGWG, 2005).

No hunter has reported taking a lion within the existing mountain lion hunt that currently takes place in Units 16B, 40B, 41, 43A, 43B, and 44B. Mountain lion hunting is difficult in the desert due to the scarcity of lions and the inability of trained hounds to work effectively when temperatures become very hot. If monitoring indicates that the lion population can support additional removals, the harvest objective for the combined units might be increased in future years.

The lion population on Kofa has traditionally been transient and could easily become so again. Mountain lions are a part of Refuge biodiversity and are equally protected under Refuge regulations. Additionally, mountain lions are solitary animals that are slow to recolonize vacated areas (Logan et al. 1996). Population monitoring must continue in order to confirm that the population can sustain harvest, and the monitoring must be sufficient to determine trends in the population: cougar sightings, depredation events, and harvest levels are not reliable ways to index cougar populations (CMGWG 2005). If monitoring indicates that the mountain lion

population is no longer capable of sustaining a hunt, or conditions arise where population monitoring is not possible, the hunt would be discontinued until such time that the population could sustain it.

c) Recreational Resources

Alternative B will provide a limited opportunity for a wildlife-dependent recreational use of a renewable resource. Controlling the number of hunters and hunt days would allow for a sustained, enjoyable hunt. The limited hunt season coincides with the coolest weather on the Refuge and most popular time of year for recreation. There is some potential for conflict between hunters and other visitors to the Refuge, but this has not been documented in the past and is not anticipated to increase with the opening of the lion hunt. It is expected that much, if not all, of the mountain lion hunting that would take place on the Refuge would be conducted by individuals already visiting the Refuge to hunt other species of wildlife.

e) Improvement Act of 1997

Section 5(a)(3) of the Act states:

"(B) Compatible wildlife-dependent recreation is a legitimate and appropriate general public use of the System, directly related to the mission of the System and the purposes of many refuges and which generally fosters refuge management and through which the American public can develop an appreciation for fish and wildlife;
(C) compatible wildlife-dependent recreational uses are the priority general public uses of the System and shall receive priority consideration in refuge planning and management; and
(D) when the Secretary determines that a proposed wildlife-dependent recreational use is compatible within a refuge, that activity should be facilitated, subject to such restrictions or regulations as may be necessary, reasonable and appropriate."

This alternative would comply with the Improvement Act of 1997.

f) Cultural Resources

This alternative is unlikely to affect cultural resources. It is possible that hunters may unknowingly disturb cultural sites, but this has not been documented in the past. Illegal off-road vehicle use may also cause damage, but this alternative would not increase this problem beyond what already exists. During the regular hunt season, the Refuge frequently has law enforcement support from other agencies to help enforce Refuge regulations.

C. Open Hunting - Alternative C

Under this Alternative, hunting would be open throughout the Kofa NWR, during the entire State year-long season, with few Refuge restrictions and unlimited number of hunters. However, because seasons would remain the same for all other hunted species, it is unlikely that many hunters would come to the Refuge outside of the regular seasons only to hunt lions.

a) Physical Resources

Physical resource impacts noted in Alternative B would continue under this alternative. Alternative C may increase deterioration of the limited Refuge dirt road system and increase potential pollution from vehicular sources in the form of fumes and oil or radiator leaks from year-long hunter usage. Refuge-Specific Regulations listed under Section E would be limited under this Alternative.

b) Biological Resources

Greater adverse biological impacts might occur during hunting activities to flora and fauna under this Alternative from an extended hunt season. The state bag limit of one lion per person per calendar year would still apply. The bighorn sheep population may benefit from reduced predation if a lion is harvested, but the impact from the removal of no more than one lion annually is unlikely to be significant (see Alternative B for full discussion). Although some ways to minimize major adverse effects would be included under the Refuge-Specific Regulations listed in Section E, most other restrictions addressing the number of hunters and length of hunt season would be eliminated under this alternative. Increased presence by Refuge staff and law enforcement personnel may not be sufficient to minimize biological impacts to the area.

c) Recreational Resources

Alternative C would provide an opportunity for a wildlife-dependent recreational use of a renewable resource. The additional eight months of mountain lion hunting allowed by this alternative would include the hottest part of the year when Refuge use is scant. It is unlikely that lion hunters would take advantage of additional hunting opportunities during this time.

e) Improvement Act of 1997

Section 5(a)(3) of the Act states:

"(B) Compatible wildlife-dependent recreation is a legitimate and appropriate general public use of the System, directly related to the mission of the System and the purposes of many refuges and which generally fosters refuge management and through which the American public can develop an appreciation for fish and wildlife;
(C) compatible wildlife-dependent recreational uses are the priority general public uses of the System and shall receive priority consideration in refuge planning and management; and
(D) when the Secretary determines that a proposed wildlife-dependent recreational use is compatible within a refuge, that activity should be facilitated, subject to such restrictions or regulations as may be necessary, reasonable and appropriate."

This alternative would not fully comply with the Act.

f) Cultural Resources

Because the Refuge would not be able to rely on law enforcement assistance from other agencies year-round, the possibility of illegal off-road vehicle use escaping enforcement is greater. However, because so few hunters would likely use the Refuge outside of the existing hunt season, it is unlikely that this alternative would impact cultural resources more than current conditions

IV. Cumulative Impacts

The Arizona Game and Fish Department estimates that there are 2,500 mountain lions in the State of Arizona. Since 1988, the year mandatory check-outs were established, mountain lion harvest has ranged from 196-384 lions per year, approximately 15% of which were taken by predator control agents (AGFD 2006). Mountain lion hunting is not allowed on any of the other eight National Wildlife Refuges in the state of Arizona.

Kofa NWR would still be subject to the statewide bag limit of 1 lion per person statewide per year. All units on the Kofa (along with Units 16B, 40B, 41, 43A, 43B, and 44B) would close to mountain lion hunting following the reported harvest of a mountain lion. It is possible that no lions will be harvested on the Kofa at all; or, one lion per year could theoretically be removed from the Kofa. However, hunting must be balanced with maintaining a harvestable population of lions on the Refuge. Population monitoring must continue to ensure that a harvestable population remains. If a lion is harvested from the Refuge annually and monitoring indicates that the population of lions can sustain it, the harvest objective for the hunt may be raised to more than one lion per year. If the mountain lion population is reduced, or conditions exist that monitoring is not possible, then the hunt will not be continued, or might be temporarily suspended.

In a regional setting, it is unlikely that the harvest of one lion per year will adversely affect the mountain lion population. It is also unlikely that one lion would be taken every year on the Kofa. However, it is possible that the local Refuge population of lions could be reduced below a harvestable or sustainable population. Mountain lions are solitary animals that are slow to recolonize vacated areas (Logan et al. 1996). The hunt is not intended to extirpate lions from the Refuge. At this time, only one breeding female is known for certain, although others may be present on the Refuge. If this female is harvested, it may take some time for another female to establish a territory on the Refuge. There is also potential for hunters to take a breeding female not accompanied by her kittens, which would orphan and cause the death of the kittens. For this reason hunters should be encouraged to take only male lions. Male lions have large home ranges and disperse widely; if a male lion is taken it would probably take less time for another male to replace the harvested male. However, the Kofa population was long considered transient and may become so again, which would make the hunt success rate very low. As mentioned previously in this document, no hunter has reported harvesting a lion within the existing multiple-unit mountain lion hunt to which the Refuge is proposed to be added.

The lion population must be monitored to ensure that the local population remains at an acceptable level. A viable monitoring program, with support from both the Refuge and the AGFD, is essential for this hunt to operate, and the monitoring must be sufficient to determine trends in the population: cougar sightings, depredation events, and harvest levels are not reliable ways to index cougar populations (CMGWG 2005). Ideally, a regional monitoring strategy could be devised to monitor lion populations both on and off the Refuge.

V. Consultation and Coordination With Others

Preparation of this draft EA was a joint effort between Kofa NWR staff and the AGFD, Region 4 Office staff. A preliminary meeting was held in October 2006 between several members of the two agencies after several public groups had expressed concern interest in opening the Refuge to mountain lion hunting. Through the efforts of that team, this document was prepared. Members of the team were:

Paul Cornes, Refuge Manager, Kofa NWR
Susanna Henry, Assistant Refuge Manager, Kofa NWR
Lindsay Smythe, Refuge Biologist, Kofa NWR
Larry Voyles, Regional Supervisor, Region IV, AGFD
John Hervert, Wildlife Program Manager, AGFD
Bob Henry, Game Specialist, AGFD
Randy Smith, Wildlife Manager III, AGFD

VI. Summary

Summary of Impacts by Alternative

Impact Topics	Alternative A No Action	Alternative B Limited Mountain lion Hunting *PREFERRED ALTERNATIVE*	Alternative C Open Hunting
Physical Resources	No new impacts.	Some adverse impacts likely, but can be minimized with maintenance and enforcement.	Some adverse impacts likely, with limited controls for prevention.
Biological Resources	No effect on lions. No possible benefit to bighorn sheep from reduced predation	Some adverse effects likely, but can be controlled with Refuge-specific regulations and enforcement. Limited benefit possible to bighorn sheep	Some adverse impacts could occur due to reduced Refuge-specific regulations. Limited benefit possible to bighorn sheep.
Recreational Resources	A new compatible, recreational use would not be added.	Would allow a compatible, although limited, recreational use.	Allows longer hunting opportunity, but could reduce quality aspects of hunt and may impact other recreational uses of the Refuge.
Improvement Act of 1997	Partially met	Met	Partially met
Cultural Resources	No effect	Not likely to effect	Possible greater adverse impacts

Based on the review of the three alternatives, ***opening the Refuge to Limited Hunting, Alternative B, was chosen as the Preferred Alternative.*** This alternative was selected because the Service believes it offers the best type of public hunt with minimal impact on physical and biological resources, while meeting the congressionally mandated Improvement Act of 1997 and refuge management goals.

VII. References

Arizona Game and Fish Department. 2006. Hunt Arizona. Survey, harvest, and hunt data for big and small game. Phoenix, AZ.

Cougar Management Guidelines Working Group (CMGWG). 2005. Cougar management guidelines. WildFutures, Bainbridge Island, Washington, USA.

Hayes, C.J., E.S. Rubin, M.C. Jorgensen, R.A. Botta, and W.M. Boyce. 2000. Mountain lion predation of bighorn sheep in the peninsular ranges, California. Journal of Wildlife management 64:954-959.

Kamler, J.F., R.M. Lee, J.C. de Vos, Jr., W.B. Ballard, and H.A. Whitlaw. 2002. Survival and cougar predation of translocated bighorn sheep in Arizona. Journal of Wildlife Management 66:1267-1272.

Logan, K. A., L. L. Sweanor, T. K. Ruth, and M. G. Hornocker. 1996. Cougars of the San Andres Mountains, New Mexico. Final Report., Project W-128-R. New Mexico Dept. Game and Fish, Santa Fe, NM. 280pp.

O'Brien, Chantal S., Steven Rosenstock et al. 2004. Studies of wildlife water developments in southwestern Arizona: wildlife use, water quality, wildlife diseases, wildlife mortalities, and influences on native pollinators. Ariz. Game and Fish Dept. Tech. Guidance Bull. No.8

Schaefer, R.J., S.G. Torres, and V.C. Bleich. 2000. Survivorship and cause-specific mortality in sympatric populations of mountain sheep and mule deer. California Fish and Game 86:127-135.

United States Department of the Interior, Bureau of Land Management and Fish and Wildlife Service. 1996. Kofa National Wildlife Refuge and Wilderness and New Water Mountains Wilderness Interagency Management Plan, Environmental Assessment, and Decision Record. EA # EA-AZ-055-95-105, Bureau of Land Management Yuma Field Office, Yuma, AZ.

APPENDIX A

List of State Special Status Species known to occur on Kofa NWR

Allium parishii	Parish Onion
Antrozous pallidus	Pallid Bat
Berberis harrisoniana	Kofa Barberry
Charina trivirgata gracia	Desert Rosy Boa
Colubrina californica	California Snakewood
Corynorhinus townsendii pallescens	Pale Townsend's Big-eared Bat
Crotalus mitchellii	Speckled Rattlesnake
Erigeron lobatus	Lobed Fleabane
Gopherus agassizii (Sonoran Population)	Sonoran Desert Tortoise
Heloderma suspectum cinctum	Banded Gila Monster
Lasiurus xanthinus	Western Yellow Bat
Macrotus californicus	California Leaf-nosed Bat
Myotis californicus	California Myotis
Nyctinomops femorosaccus	Pocketed Free-tailed Bat
Opuntia echinocarpa	Straw-top Cholla
Petalonyx linearis	Longleaf Sandpaper Plant
Tadarida brasiliensis	Brazilian Free-tailed Bat
Tetracoccus fasciculatus var. hallii	Hall Shrub Spurge
Teucrium glandulosum	Desert Germander
Washingtonia filifera	California Fan Palm