Environmental Assessment

Expansion of Hunting on Buenos Aires National Wildlife Refuge

July 2020

Prepared by
Joshua T. Smith, Buenos Aires National Wildlife Refuge
P.O. Box 109
Sasabe, AZ 85633

Estimated Lead Agency Costs Associated with Developing and Producing this EA: $16,000

Table of Contents

List of Figures

Environmental Assessment for Buenos Aires NWR Hunt Plan

This Environmental Assessment (EA) is being prepared to evaluate the effects associated with this proposed action and complies with the National Environmental Policy Act (NEPA) in accordance with Council on Environmental Quality regulations (40 CFR 1500-1509) and Department of the Interior (43 CFR 46; 516 DM 8) and U.S. Fish and Wildlife Service (550 FW 3) regulations and policies. NEPA requires examination of the effects of proposed actions on the natural and human environment.

Proposed Action

The U.S. Fish and Wildlife Service (Service) is proposing to open hunting opportunities for gallinule, merganser, snipe, mountain lion, badger, bobcat, white-nosed coati, kit and gray foxes, raccoon, and ringtail on the Buenos Aires NWR (BANWR/NWR/refuge) in accordance with the refuge's Hunt Plan. Opportunities would continue for hunting of duck, goose, coot, white-winged, mourning, and Eurasian collared-dove, white-tailed deer, mule deer, javelina, feral hog, black-tailed and antelope jackrabbits, cottontail rabbit, coyote, and skunks (hooded, hog-nosed, spotted, and striped). Scientific names provided in Appendix 2. This action would re-open the species listed in the BANWR 1988 Hunt Plan to hunting, except weasel, which do not occur on the refuge. It would also open gallinule and merganser. The proposed action is a change from the Buenos Aires NWR Comprehensive Conservation Plan (CCP) as described in the attached CCP Minor Revision Memo. Adopting the proposed action would bring refuge regulations into better alignment with Arizona Game and Fish Department (AZGFD) regulations in accordance with Secretarial Orders (SO) 3356 and 3366.

This proposed action is often iterative and evolves over time during the process as the agency refines its proposal and learns more from the public, tribes, and other agencies. Therefore, the final proposed action may differ somewhat from the original. The final decision on the proposed action will be made at the conclusion of the public comment period for the EA and the 2020-2021 Refuge-Specific Hunting Regulations.

Background

National wildlife refuges are guided by the mission and goals of the National Wildlife Refuge System (NWRS), the purposes of an individual refuge, Service policy, and laws and international treaties. Relevant guidance includes the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997, Refuge Recreation Act of 1962, and selected portions of the Code of Federal Regulations and Fish and Wildlife Service Manual.

The refuge was established on August 1, 1985, under the authority of the Federal Property and Administrative Service Act of 1949 (40 U.S.C. 471-535), as amended; Fish and Wildlife Coordination Act of 1934 (16 U.S.C. 661-666c) as amended; Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j Stat. 1119) as amended; the Act of May 19, 1948, Public Law 80-537 (16 U.S.C. 667b-667d; 62 Stat. 240) as amended; and The National Wildlife Refuge System Administration Act of 1966 as amended by the National Wildlife Refuge System Improvement Act of 1997(16 U.S.C. 668dd-668ee) ". . .to conserve (A) fish or wildlife which are listed as endangered species or threatened species. . .or (B) plants . . ." 16 U.S.C. 1534 (Endangered Species Act of 1973) and for the ". . . development, advancement, management, conservation, and protection of fish and wildlife resources . . . " 16 U.S.C. 742(a) (4) (Fish and Wildlife Act of 1956).

The primary purpose of the refuge is to establish a self-sustaining population of endangered masked bobwhite quail and to protect a grassland ecosystem unique to south-central Arizona. Other refuge objectives are to preserve the natural diversity of wildlife native to southeast Arizona and to provide for wildlife-oriented recreation and education.

In the 1978 Recovery Plan for the Masked Bobwhite Quail (U.S. Fish and Wildlife Service 1978), it was recommended that the Buenos Aires Ranch be purchased for the reestablishment of the species. Congress approved the $4,900,000 needed to purchase the central part of the ranch under the authority of the Endangered Species Act of 1973 and the Fish and Wildlife Act of 1956. Since the ranch owners would only sell the entire ranch, an additional $4,000,000 was approved in 1984. The purchase was finalized in August, 1985 when BANWR was officially established in the Altar Valley of Pima County, Arizona. Approximately 21,000 acres were received in fee title and 90,000 acres were in state leases. In 1991, the state lease lands were exchanged for federal lands. Three tracts of land remained under the administration of the Arizona State Land Department. The refuge eventually acquired these state leases, including the 801-acre El Cazador Ranch, half of which was under state lease.

The mission of the NWRS, as outlined by the National Wildlife Refuge System Administration Act (NWRSAA), as amended by the National Wildlife Refuge System Improvement Act (16 U.S.C. 668dd et seq.), is:

> *"... to administer a national network of lands and waters for the conservation, management and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans."*

The NWRSAA mandates the Secretary of the Interior in administering the System to (16 U.S.C. 668dd(a)(4):

- Provide for the conservation of fish, wildlife, and plants, and their habitats within the NWRS;
- Ensure that the biological integrity, diversity, and environmental health of the NWRS are maintained for the benefit of present and future generations of Americans;
- Ensure that the mission of the NWRS described at 16 U.S.C. 668dd(a)(2) and the purposes of each refuge are carried out;

- Ensure effective coordination, interaction, and cooperation with owners of land adjoining refuges and the fish and wildlife agency of the States in which the units of the NWRS are located;
- Assist in the maintenance of adequate water quantity and water quality to fulfill the mission of the NWRS and the purposes of each refuge;
- Recognize compatible wildlife-dependent recreational uses as the priority general public uses of the NWRS through which the American public can develop an appreciation for fish and wildlife;
- Ensure that opportunities are provided within the NWRS for compatible wildlife-dependent recreational uses; and
- Monitor the status and trends of fish, wildlife, and plants in each refuge.

The Secretary of the Interior Order 3356 continues the Department of the Interior's efforts to enhance conservation stewardship; increase outdoor recreation opportunities for all Americans, including opportunities to hunt and fish; and improve the management of game species and their habitats for this generation and beyond. It directs several components of the Department to assess past and ongoing implementation of the recommendations set forth in Executive Order 13443, "Facilitation of Hunting Heritage and Wildlife Conservation," to inform how best to enhance and expand public access to lands and waters administered by the Department, lands and waters owned by all Americans-for hunting, fishing, recreational shooting, and other forms of outdoor recreation.

The Secretary of the Interior Order 3366 mandates all Bureaus to ensure public lands and waters under the management and administration of the U.S. Department of the Interior (Department) are open and accessible for recreational pursuits by all Americans and visitors to the United States. Therefore, it is a priority of the Service to provide for wildlife-dependent recreation opportunities, including hunting and fishing, when those opportunities are compatible with the purposes for which the refuge was established and the mission of the National Wildlife Refuge System.

The refuge is located approximately 60 miles southwest of Tucson in Pima county AZ (Attachment 1), in a region of high biological diversity, with influences from the Chihuahuan, Sonoran, and Madrean geographic provinces. The refuge has documented more than 330 species of birds and has recorded 61species of mammals, 49 species of reptiles, and 12 species of amphibians.

History of hunting on the refuge

Buenos Aires Ranch comprised much of the present-day refuge. Hunting was permitted by the Buenos Aires Ranch owners, and hunting activities continued uninterrupted after 1985. An initial Hunt Plan was written in 1988 allowing the take of duck, goose, coot, snipe, white-winged dove, mourning dove, white-tailed deer, mule deer, javelina, feral hog, mountain lion, jackrabbit, cottontail rabbit, kit fox, gray fox, ringtail, skunk, bobcat, coyote, coati, badger, weasel, and raccoon. The refuge was open to hunting from September 1 to March 31 with hunt seasons conforming to state regulations within those dates. No hunting was allowed from April 1 to August 31.

Due to management objectives at the time refuge hunting regulations were amended in 1994 to restrict hunted species to duck, goose, coot, mourning and white-winged dove, cottontail rabbit, white-tailed deer, mule deer, javelina, and feral hogs. All predator (coyote and skunk) hunting was ceased except by Special Use Permit (SUP). Feral hogs were only allowed to be taken during other permitted hunts. Refuge regulations likely remained unchanged from 1995 to 2002 (no record of regulation changes). In the refuge hunting regulations dated 2003, there was no mention of feral hogs or skunks, and coyote hunting was permitted by SUP only.

In 2006, the SUP restriction for coyotes and skunks was lifted and predator hunting was open year round in accordance with State regulations. In 2008, refuge hunting regulations listed Eurasian collared-doves as a legal species for the first time. In 2012, the refuge included jackrabbits as a legal species. No opening package was completed for these actions.

In 2019, the refuge further aligned season dates and method of take for cottontail rabbits and jackrabbits with AZGFD regulations and removed the restriction that feral hogs may only be taken during other permitted big game hunts.

Refuge Hunt Units

The refuge is comprised of portions of three separate state game management units (GMU) (Fig. 1):

GMU 36A = 617.24 square miles, 80.46 square miles on refuge
GMU 36B = 560.80 square miles, 72.50 square miles on refuge
GMU 36C = 314.95 square miles, 23.28 square miles on refuge

Purpose and Need for the Proposed Action

The purpose of this proposed action is to provide compatible wildlife-dependent recreational opportunities on Buenos Aires NWR and to bring current hunting activities and regulations into compliance with service policy. The need of the proposed action is to meet the Service's priorities and mandates as outlined by the NWRSAA to "recognize compatible wildlife-dependent recreational uses as the priority general uses of the NWRS" and "ensure that opportunities are provided within the NWRS for compatible wildlife-dependent recreational uses" (16 U.S.C. 668dd(a)(4)).

The purpose of this EA is to evaluate the effects of increased hunt management for gallinule, merganser, snipe, mountain lion, badger, bobcat, white-nosed coati, kit and gray foxes, raccoon, and ringtail on Buenos Aires NWR. The purpose of the proposed action is to manage the select species on the refuge and offer hunting opportunities for the public on a national wildlife refuge. Hunting on refuge lands has been occurring for decades for duck, goose, coot, mourning and white-wing doves, coyote, skunk, mule and white-tailed deer, javelina, and feral hog. The refuge has provided a terrific opportunity for the public for generations of users. The goal of hunting on the refuge is to offer opportunities to the public and to fulfill one of the Service's priority public uses and offer maximum hunting opportunity that is also compatible with the operations of the refuge and strengthens our mission.

This action is also needed to effectively implement Secretarial Order 3356, which directs bureaus and offices within the Department of the Interior (DOI), in collaboration with states, tribes, and territorial partners, to implement programs to enhance hunting, fishing, and recreational shooting opportunities on DOI-managed lands and waters, while also promoting conservation activities.

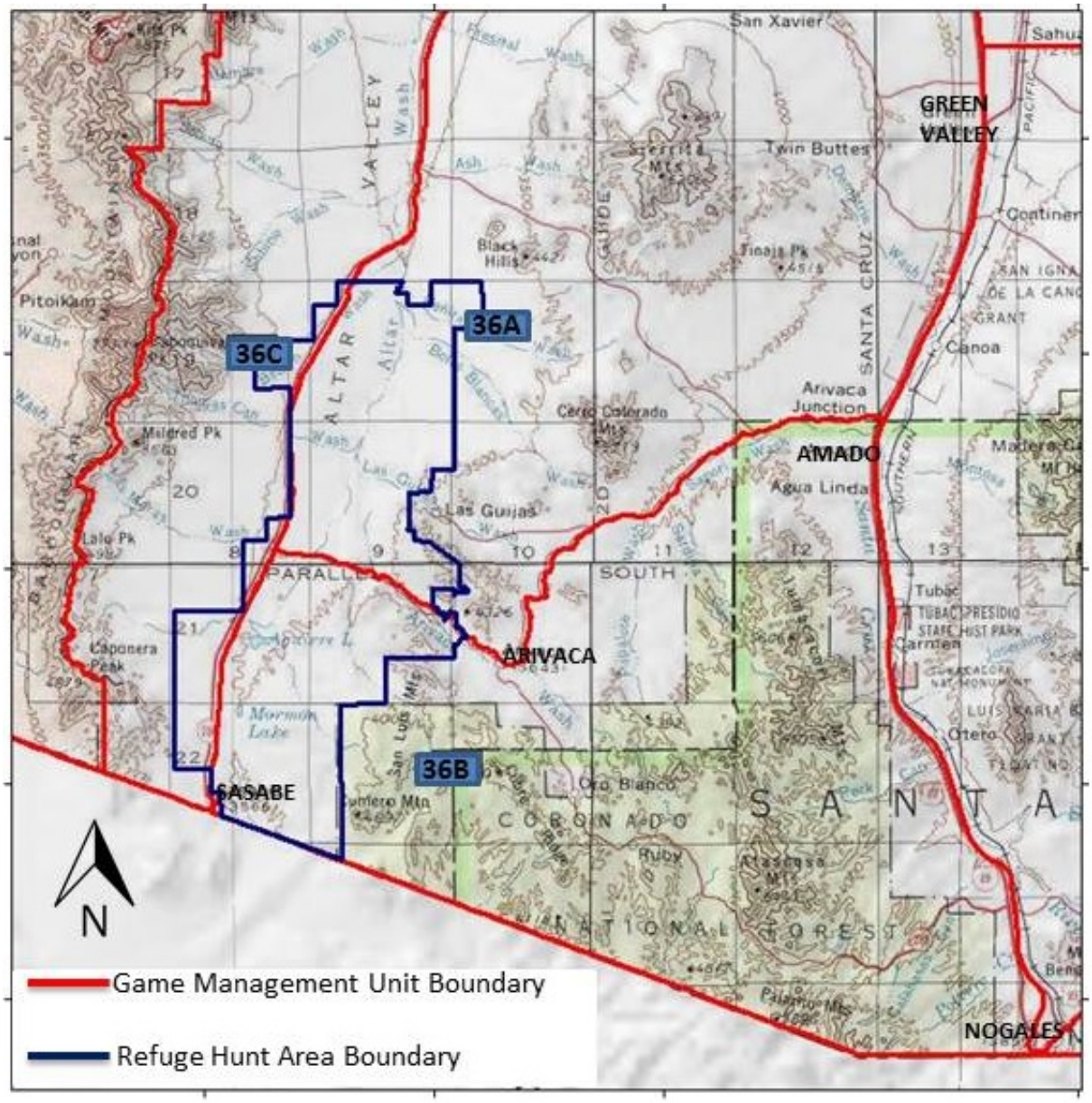

Figure 1. Buenos Aires NWR and associated Arizona Game Management Units

Alternatives

Alternatives Considered

Alternative A – No Action (Current Management):

The No Action Alternative would continue the current hunt program. This action permits public hunting for duck, goose, coot, mourning and white-wing doves, Eurasian collared-dove, coyote, skunk (hog-nosed, hooded, spotted, and striped), jackrabbits (black-tailed and antelope), cottontail rabbit, mule and white-tailed deer, javelina, and feral hog on Buenos Aires NWR in accordance with AZGFD regulations, seasons, and methods of take. All other wildlife are protected. Approximately 89 percent (105,113 acres) of the refuge would remain open to hunting and there would be no change to the current no hunt zones. An estimated 3,300 hunters pursue big game and 300 pursue small game and migratory birds on the refuge each year.

Hunting seasons and quantity of permits are regulated by the AZGFD. Deer firearm hunts are limited to six seasons, ranging from 4 – 14 days in late October through December. Javelina firearm hunts are similarly regulated and limited to two week-long seasons during late winter and early spring. Archery hunting is also permitted on BANWR. Deer may be harvested during a two-week archery season in September and again during a six-week season in December and January. One javelina archery season extends throughout the month of January. Cottontail, jackrabbit, dove, and waterfowl seasons are more extensive than the deer and javelina seasons, and hunter numbers are not regulated. Hunting guide service providers are required to obtain a special use permit (SUP). Coyote and skunk are open to hunting year-round. No trapping is allowed for any species.

This alternative would result in no change in management of any other game species on the refuge, and the loss of fulfilling one of the Service priority public uses which is providing hunting opportunity.

Alternative B – Proposed Action - Expand Hunting Opportunities as Described in the 2020 Hunt Plan

The refuge has prepared a hunt plan (Buenos Aires National Wildlife Refuge Migratory Bird, Upland Game, Big Game, Predator, and Fur-bearing Mammal Hunt Plan), which is presented in this document as the Proposed Action Alternative. Proposed uses within this plan have been determined to be appropriate and compatible with the mission of the Refuge System and purposes for which the refuge was established.

Under the Proposed Action Alternative, the refuge would expand the hunted species to include badger, bobcat, white-nosed coati, foxes, gallinule, merganser, snipe, mountain lion, raccoon, and ringtail. The hunt program for duck, goose, coot, mourning and white-wing doves, Eurasian collared-dove, mule and white-tailed deer, javelina, feral hog, cottontail rabbit, jackrabbits, coyote, and skunks would remain the same. Hunt seasons, bag limits, and methods of take will continue to be established by AZGFD. The refuge will not allow pursuit with dogs or night hunting of these species nor will falconry be permitted. The refuge investment in time and resources are unlikely to increase as the seasons for new species overlap with existing open seasons. Most of these new species were previously open to hunting on the refuge as described in the 1988 Hunt Plan.

Many of the proposed species are potential predators of quail and their nests. Opening the opportunity to hunt these species could potentially be beneficial to the masked bobwhite quail recovery efforts. Additionally, opening the refuge to the take of bobcats and foxes may indirectly increase coyote take through increased predator hunter use. Several hunters have specifically stated they would hunt on the refuge more often if they were not prohibited from taking other species that come to their predator calls. Increasing coyote take, directly or indirectly, may be beneficial to deer and pronghorn herds as well as jackrabbits.

There are no proposed changes to refuge hunting regulations aside from allowing additional species to be taken.

Mitigation Measures to Avoid Conflicts:

- Areas of high public use around the headquarters, the Arivaca creek management unit (all service lands east of mile 8.1 on Arivaca-Sasabe Road), Brown Canyon, and ¼ mile buffers around residences will remain No Hunt Zones.
- Hunting with dogs is being limited to retrieving downed game. Pursuit or harassment of wildlife by dogs is not permitted to reduce the chance of disturbing the endangered masked bobwhite quail.
- Hunting and/or discharging firearms at night is not being considered to avoid conflict with border security operations and to foster a safe environment at dispersed campsites throughout the refuge.
- Trapping will not be permitted due to the risk to the endangered masked bobwhite quail being caught as bycatch. Additionally, leaving unattended equipment is against refuge regulations.
- The refuge will continue to be closed to all quail hunting to minimize the opportunity for direct mortality of the endangered masked bobwhite quail by hunters.
- Refuge hunt information brochures will be available at all kiosks and hunt information boxes at most access points.

The proposed action alternative offers increased opportunities for public hunting/fishing and fulfills the Service's mandate under the National Wildlife Refuge System Improvement Act of 1997. The Service expects that the hunt plan will be compatible with the purposes of the Buenos Aires National Wildlife Refuge and the mission of the NWRS. This action is also needed to effectively implement Secretarial Orders 3356 & 3366, which direct bureaus and offices within DOI, in collaboration with states, tribes, and territorial partners, to implement programs to enhance hunting, fishing, and recreational shooting opportunities on DOI-managed lands and waters, while also promoting conservation activities.

Alternative(s) Considered, But Dismissed from Further Consideration

The Arizona Game and Fish Department has requested full alignment with state hunting regulations on national wildlife refuges in Arizona. The following are requests by AZGFD that were considered but dismissed from further analysis:

- The AZGFD requested "daylong" hunting for coyote, raccoon, ringtail, badger, and skunk. The refuge is not considering nighttime hunting with the use of lights or firearm discharges because it will interfere with border security law enforcement and cause disruption to campers throughout the refuge.

- Other nongame mammal or bird hunting is not being proposed because the species (house sparrows, starling, crow, pigeons) are not generally present on the refuge.
- Falconry and use of trailing dogs may cause disturbance to masked bobwhite quail, therefore, they are not being considered at this time.
- The Service's annual station-specific hunting and sport fishing regulation does not consider opening refuges to the take of reptiles and amphibians (recreational herping), therefore, this request is outside the scope of the proposed action. Additionally, recreation herping is not consistent with Service policy. Collections, as defined in 701 FW 5, is the taking of flora and fauna in accordance with applicable State and Federal regulations by Service personnel for official purposes or by other agencies individuals for scientific and educational purposes. The refuge considers take of reptiles and amphibians for research purposes on a case-by-case basis through issuance of a special use permit when found to be a compatible use of the refuge.
- The Service's annual station-specific hunting and sport fishing regulation does not open or expand trapping. Hunting and fishing are priority public uses of national wildlife refuges; trapping is evaluated separately from hunting. In House Report 105-106, Congress makes a distinction between hunting and trapping by stating that management tools encompass actions "such as hunting, trapping and fishing." Trapping is a wildlife management tool used in the conservation and management of wildlife populations. Trapping occurs on some national wildlife refuges in accordance with the conservation mission of the National Wildlife Refuge System however, where trapping does occur, some individual refuges may prohibit trapping by the public and conduct trapping only as a tool for management concerns like invasive species control or to prevent damage to infrastructure. Trapping is outside the scope of the proposed action and is not being considered on the refuge.
- Hunting for Gambel's, Scaled, and Montezuma quail on the refuge was considered by refuge management in consultation with the State of Arizona. AZGFD supports no quail hunting on the Buenos Aires NWR due to the ongoing recovery efforts of the endangered masked bobwhite quail. Reintroduction and recovery of masked bobwhite quail is a purpose of the refuge and quail hunting would not be compatible with the refuge purpose. Recent success in our masked bobwhite recovery efforts, as evidenced by an increasing wild population, would put recovery efforts at risk. Masked bobwhites are occasionally observed comingling with other quail species and the opportunity for accidental take is too high. Therefore, quail hunting is not being further considered at this time.

Affected Environment and Environmental Consequences

Affected Environment

The BANWR consists of approximately 117,310 acres in Pima County, Arizona (Figure 1, Attachment 1). The refuge is managed as three management units: Semi-desert Grasslands Unit, Arivaca Unit, and Brown Canyon Unit. The proposed action is located in the semi-desert grassland unit. No hunting occurs in the Arivaca unit or the Brown Canyon unit. The following resources are not discussed in this EA because the proposed hunting activities are not expected to have any impacts on them: geology, minerals, water quantity, visual resources, and wilderness. The tables below describe the resources that could be impacted (directly or indirectly) by the alternatives discussed in this document. For more information regarding the affected environment, please see Sections 2.0 – 2.7 of the refuge's CCP.

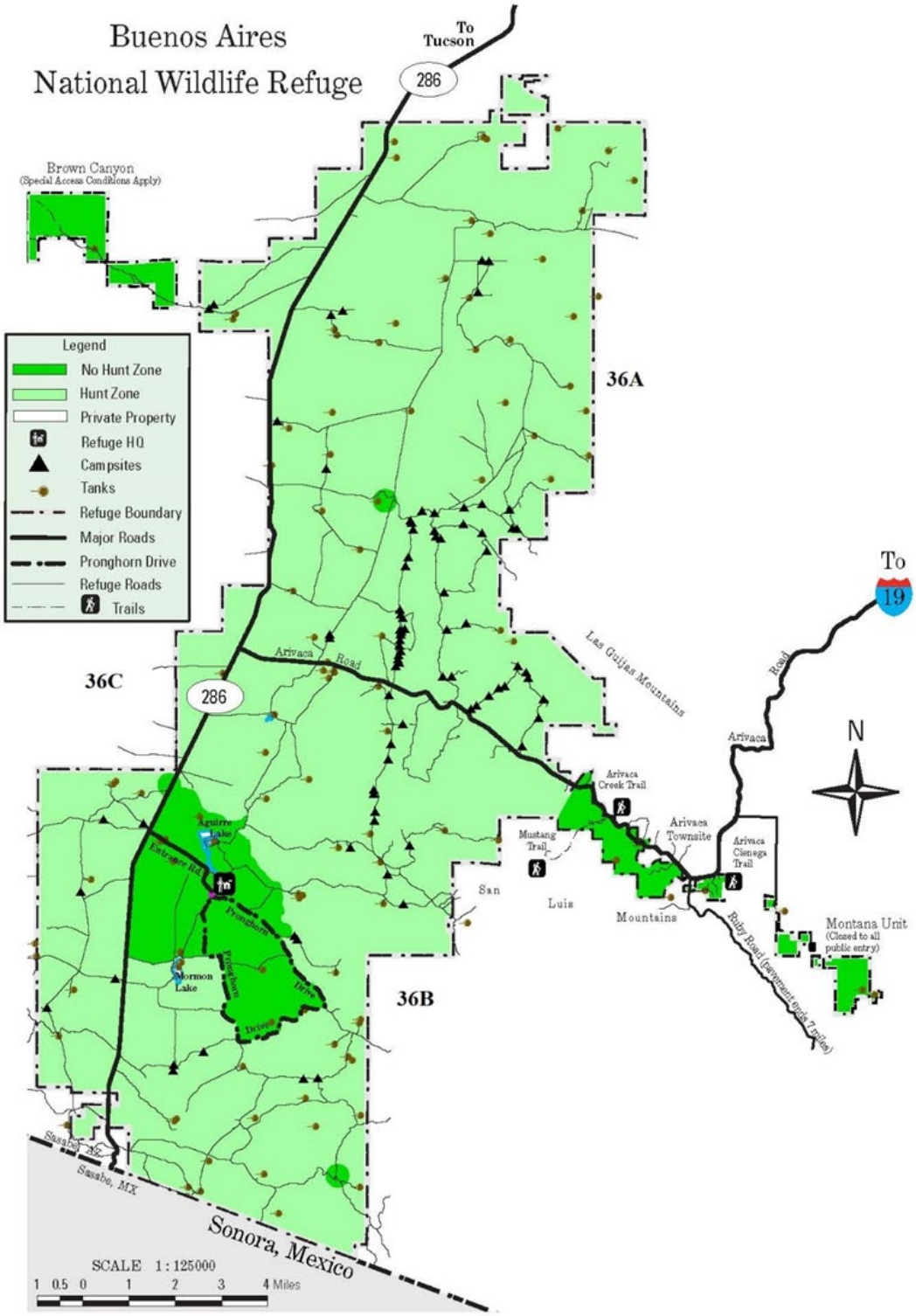

Figure 2. Refuge hunt map showing refuge boundaries, roads, and no hunt zones.

Environmental Consequences of the Action

This section analyzes the environmental consequences of the action on each affected resource, including direct and indirect effects. This EA only includes the written analyses of the environmental consequences on a resource when the impacts on that resource could be more than negligible and therefore considered an "affected resource." An analysis of the effects of management actions has been conducted on the physical environment (air quality, water quality, and soils); biological environment (vegetation, wildlife, and threatened and endangered species); and socioeconomic environment (cultural resources, socioeconomic features including public use/recreation, and visual and aesthetic resource). Any resources that will not be more than negligibly impacted by the action have been dismissed from further analyses.

Impact Types:

- *Direct effects* are those that are caused by the action and occur at the same time and place.
- *Indirect effects* are those that are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.
- *Cumulative impacts* result 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.

The sections below contain brief descriptions of each resource affected by the alternatives considered and anticipated direct, indirect, and cumulative impacts on each resource.

Affected Natural Resources and Anticipated Impacts of the No Action and Proposed Action Alternatives

Currently hunted species. Will remain open under both alternatives.

Hunted Species – Badger
Regional Analysis Widely distributed, the badger occurs almost anywhere in Arizona having ground suitable to dig in and excavate burrows. Although the take of badger pelts averaged more than a 1,000 a year in the late 1970s and early 1980s, the number of these animals recently trapped in Arizona is virtually insignificant. A few badgers are undoubtedly also taken incidental to pursuing other game, but these numbers too are very small. In all, probably less than 50 badgers a year are taken in the state (www.azgfd.com). Local Analysis Badger numbers on the refuge are unknown. Sightings are not numerous (5 per year) but also not uncommon. This may be due to low detection probability as badgers spend much of their time under ground and are typically nocturnal or crepuscular (active at twilight) in nature.

Direct and Indirect Impacts

Alternative A (No Action Alternative)

Under Alternative A, badger hunting would remain closed on the refuge. Badgers will continue to have a direct predation impact on rabbits, rodents, ground nesting birds, snakes, and lizards.

Alternative B (Proposed Action Alternative)

Under alternative B badger hunting would be allowed in accordance with AZGFD season dates and bag limits. Method of take would be restricted to not allow pursuit with dogs or trapping. Take will largely be incidental. The most direct impact will be increased mortality of badgers on the refuge, though take is expected to be zero or less than five due to their nocturnal and crepuscular activity and spending most of their time underground. Allowing the take of badgers may have a positive impact on reptile and small mammal populations and may be beneficial to refuge masked bobwhite quail recovery efforts through decreased predation mortality by badgers of those species (Fletcher et al. 2010).

Hunted Species – Bobcat

Regional Analysis

Distributed throughout the state, bobcats (*Lynx rufus*) are considered one of the most common predators in Arizona. They are particularly abundant in rugged and brushy habitats associated with Sonoran desert scrub and interior chaparral. Solitary animals such as bobcats are often secretive and are therefore rarely seen. But they exist in large numbers across the continent. The U.S. population has been estimated to be between 2.3 and 3.6 million bobcats (Roberts and Crimmins 2010). In 2010, Arizona's statewide bobcat population was estimated to be between 62,000 and 66,000. Arizona has documented some of the highest densities of bobcats in the western U.S. (www.azgfd.com).

Local Analysis

Bobcats are a common sight on the refuge. Staff and visitors report sightings of 1–2 bobcats weekly. Scat and tracks can be observed in washes and near water sources consistently. A trail camera near the visitor center captures images of 1–2 bobcats each week.

Direct and Indirect Impacts

Alternative A (No Action Alternative)

Under Alternative A, bobcat hunting would remain closed on the refuge. Bobcats will continue to have a direct predation impact on rabbits, reptiles, rodents, quail, and other bird and small mammal species.

Alternative B (Proposed Action Alternative)
Under Alternative B, bobcat hunting would be allowed in accordance with AZGFD season dates (August through end of March) and bag limits. Method of take will be restricted to not allow pursuit with dogs or trapping. The most direct impact would be an increase in bobcat mortality on the refuge. Take is expected to be between 10 and 20 bobcats based on current estimate of population and number of predator hunters. Allowing the take of bobcats may have a positive impact on bird and small mammal populations and may be beneficial to refuge masked bobwhite quail recovery efforts through reduced predation mortality of those species (Fletcher et al. 2010). Additionally, allowing bobcat take may indirectly lead to increased coyote take as more predator hunters may be attracted to the refuge as a result of opening more species to hunt.

Hunted Species – White-nosed Coati (Coati)

Regional Analysis
White-nosed coatis occur in Arizona, New Mexico, Texas, and south through Mexico and Central America into the far northwestern portion of South America and in over nearly the entire south half of Arizona. White-nosed coatis primarily occur in mixed conifer forest, coniferous and mixed woodlands, and juniper savanna; they are also commonly observed in montane scrub, Chihuahuan desert scrub, closed basin scrub, plains-mesa grassland, and desert grassland (Biota Information System of New Mexico 2008a).

Local Analysis
Coatis in Arizona inhabit woodlands consisting primarily of oaks, sycamores, and walnuts. They are also found in canyons that contain a mixture of oaks and pines, shrubby woodland, or grassland and shrubs in the lower canyons of the southeastern mountains. They are usually found near streams or creeks or some source of water, probably living in natural retreats such as rock crevices, cavities among tree roots, and caves or mines (Rosemont EIS). White-nosed coatis are occasionally seen in the Arivaca creek riparian areas. No surveys have been conducted and population numbers are unknown. Casual observations suggest 2–3 solitary males and 2 troops of 7–11 females with young. Coati habitat on the refuge is rather limited and mostly within no hunt zones.

Direct and Indirect Impacts

Alternative A (No Action Alternative)
Under Alternative A, white-nosed coati hunting would remain closed on the refuge. Coatis will continue to have a direct predation impact on rabbits, reptiles, rodents, quail, and other bird and small mammal species.

Alternative B (Proposed Action Alternative)
Alternative B would allow for the take of coatis on the refuge in accordance with AZGFD season dates (September 1–March 31) and bag limits (1 per year). Method of take will be restricted to not allow pursuit with dogs or trapping. Coatis are typically taken incidentally while pursuing other game and are seldom specifically targeted. The most direct impact will be increased mortality in coatis on the refuge though take is expected to be minimal. Take is anticipated to be near 0 because most coati habitat is in the no hunt zone.

Hunted Species – Fox (Gray fox, Kit fox)

Regional Analysis

Gray fox are the most numerous and most often seen fox in Arizona. They are regularly active during daylight hours and are found throughout the state. Kit fox prefer sandy areas and are almost exclusively nocturnal spending much of the day underground. Whatever the species, the annual take of about 3,500 fox by hunters, predator callers and trappers has been relatively stable in recent years and not a major source of mortality in the statewide fox population. Diseases such as rabies, distemper and other canine sickness as well as drought related factors control the fox population much more than any human related source of mortality (AZGFD.com). Population data are unavailable.

Local Analysis

Foxes on the refuge are most evident by their tracks and scat in washes and arroyos. They are seldom seen. Coyote hunters report seeing them while predator calling on the refuge.

Direct and Indirect Impacts

Alternative A (No Action Alternative)

Under Alternative A, fox hunting would remain closed on the refuge. Foxes will continue to have a direct predation impact on rabbits, reptiles, rodents, quail, and other bird and small mammal species.

Alternative B (Proposed Action Alternative)

Alternative B would allow for the take of foxes on the refuge in accordance with AZGFD season dates and bag limits. Method of take will be restricted to not allow pursuit with dogs or trapping. The most direct impact will be increased mortality in foxes on the refuge. Take is expected to be between 10 and 20 foxes based on current estimate of population and number of predator hunters. Additionally, allowing fox take may indirectly lead to increased coyote take as more predator hunters may be attracted to the refuge as a result of opening more species to hunt. Small mammals and birds, including the endangered masked bobwhite quail may benefit, through decreased predation mortality, from allowing fox hunting on the refuge.

Hunted Species – Mountain Lion

Regional Analysis

The mountain lion is a successful, far-ranging species that occupies a broad range of habitats in both temperate and tropic environments from the southern tip of Argentina in South America to northern British Columbia in North America. Breeding populations of mountain lions are known to occur in at least 16 western states. Since 1990, 10 additional states east of this range have reported mountain lion sightings, suggesting an eastward range expansion.

Local Analysis
In Arizona, mountain lions are widely distributed and are expanding into previously unoccupied areas or areas where they were once considered to be only transient. Before 2001, mountain lions in southwestern Arizona were rare. Now, it is not uncommon to observe mountain lion sign in those mountain ranges. Those mountain lions most likely immigrated from adjacent populations in Mexico and southern Arizona. The current population estimate range of 2,000-2,700 is based on population reconstruction models and supports previous estimates of 2,500 (AZGFD 2017).

The refuge is likely a small portion of the home ranges of several mountain lions that spend most of their time on adjacent public and private lands. Sightings by staff and visitors are not uncommon which suggests an elevated local population as sightings of this secretive cat are rare range-wide (AZGFD 2017). A trail camera at the refuge headquarters captures images of mountain lions 4-6 times per year.

Direct and Indirect Impacts
Alternative A (No Action Alternative)
Under Alternative A, mountain lion hunting would remain closed on the refuge and the population would remain unregulated. Mountain lions will continue to have a direct impact on most mammal species present on the refuge through predation mortality. Deer, pronghorn, and javelina are most impacted as they are the primary prey species.

Alternative B (Proposed Action Alternative)
Under Alternative B, mountain lion hunting will be allowed in accordance with AZGFD season dates and bag limits. Method of take will be restricted to not allow pursuit with dogs. Take will largely be incidental to other hunts. The most direct impact will be an increase in mountain lion mortality on the refuge though take is expected to be less than three per year. Allowing the take of mountain lions may have a positive impact on ungulate populations and may be beneficial to refuge pronghorn recovery efforts through reduced predation mortality.

Hunted Species – Raccoon

Regional Analysis
A relatively common animal along Arizona's perennial streams, lakes, and reservoirs, raccoons can also be found near some of the larger stock tanks and in rural areas where permanent water is available. Although not often seen in the wild because of its nocturnal habits, the raccoon's distinctive five-toed tracks are commonly observed in mud around stock tanks and along river courses.

Local Analysis
Raccoon tracks are often seen near permanent water sources on the refuge. Photographs of raccoons are often captured on refuge camera traps. Population data are unavailable.

Direct and Indirect Impacts
Alternative A (No Action Alternative)
Under Alternative A, raccoon hunting would remain closed on the refuge.

Alternative B (Proposed Action Alternative)
Alternative B would allow for the take of raccoons on the refuge in accordance with AZGFD season dates and bag limits. Method of take will be restricted to not allow pursuit with dogs, night hunting, or trapping. Take will largely be incidental. The most direct impact will be an increase in raccoon mortality on the refuge. Take is expected to be minimal or zero as raccoons are nocturnal and also mainly occur in the no hunt zones.

Hunted Species – Ringtail

Regional Analysis
Ringtails are found in rocky areas throughout Arizona with about the only areas devoid of ringtails being flat, alluvial valleys.

Local Analysis
Due to their nocturnal nature ringtails are seldom observed on the refuge. Scat and tracks can be found in most washes and canyons. Population data are unavailable.

Direct and Indirect Impacts

Alternative A (No Action Alternative)
Under Alternative A ringtail hunting would remain closed on the refuge.

Alternative B (Proposed Action Alternative)
Alternative B would allow for the take of ringtails on the refuge in accordance with AZGFD season dates and bag limits. Method of take will be restricted to not allow pursuit with dogs, night hunting, or trapping. Take will largely be incidental. The most direct impact will be a reduction in ringtails on the refuge. Take is expected to be minimal or zero as ringtails are nocturnal.

Hunted Species – Snipe

Regional Analysis
Wilson's snipe are among the most widespread shorebirds in North America. IUCN conservation status is "Least Concern."

Local Analysis
Snipe are migratory birds found in the wetlands of the refuge during the winter. Their numbers vary from year to year. The snipe season in Arizona coincides with the general waterfowl season. The daily bag limit is eight.

Direct and Indirect Impacts

Alternative A (No Action Alternative)
Under Alternative A, snipe hunting would remain closed on the refuge.

Alternative B (Proposed Action Alternative)
Alternative B would allow for the take of snipe on the refuge in accordance with AZGFD season dates and bag limits. Most snipe are taken incidentally by waterfowl hunter. Take is expected to be minimal as there are approximately 30 waterfowl hunting visits per year. If every waterfowl hunter fulfilled their bag limit of 8 snipe per day, we would expect a maximum harvest of 240 snipe taken per year.

Hunted Species – Mule Deer

Regional Analysis

Mule deer are the most abundant big-game animal in Arizona, with the statewide population estimated at 75,000 to 80,000 post-hunt adults in 2009. Mule deer are found in most areas of the state, from desert to high mountain elevations. Rocky Mountain mule deer are present in northern Arizona, with desert mule deer in the more southern GMUs, including the refuge. Mule deer population levels are largely determined by the number of fawns that survive to be yearlings. Fawn survival is mainly influenced by climatic events, with wet, mild winters contributing to high fawn survival rates. Dry winters and springs lead to poor fawn survival. Today, about 47,000 mule deer permits are offered annually by the AZGFD. Mule deer are "boom and bust" animals, and their populations are lessened at present but can improve with better winter rains.

Local Analysis

Presently, mule deer comprise just over 56 percent of the annual Arizona deer harvest. The ten-year average (2007–2016) harvest is 7,671 mule deer per year. The AZGFD does not estimate population at the state or GMU level. Over the past five years, the number of permits (approximately 1,075) issued for mule deer in the GMUs (36A, 36B, and 36C). These number have remained static.

Direct and Indirect Impacts

Alternative A (No Action Alternative)

The current mule deer hunts would continue. Mule deer hunting on the refuge occurs during five hunt periods. There are two mule deer specific firearms hunts, two separate archery hunts and one youth only hunt for any antlered deer during which mule deer may be taken. The AZGFD will continue to conduct surveys and determine the number of permits issued. Permits will be issued through the AZGFD draw system. Hunting mule deer on the refuge in accordance with AZGFD regulations should not negatively impact the deer herd. During mule deer hunts, campsites and road usage temporarily increases. The refuge hosts approximately 332 mule deer hunters annually resulting in an estimated 1,000 visitor use days. This estimate includes permit holders and their hunting companions. During the past five years, mule deer harvest in the 3 GMUs combined have fluctuated from a low of 220 harvested in 2012 to 341 harvested in 2015. The statewide mule deer harvest follows this generally increasing trend with 7,117 harvested in 2012 to 9,947 harvested in 2016. This data suggests mule deer populations are currently increasing in Arizona. Using harvest data divided by GMU acreage, we are able to estimate a harvest rate average of 0.027 deer per acre across all 3 GMUs. Multiplying the deer per acre by refuge hunting area acres we are able to estimate that the 5 year average mule deer take on the refuge is 17 in GMU 36A, 12 in GMU 36B, and 3 in GMU 36C.

Alternative B (Proposed Action Alternative)

Impacts to mule deer would be similar to Alternative A. Mule deer on the refuge may experience decreased predation mortality from increased predator hunting including mountain lions as proposed in Alternative B (Harrington and Conover 2007). No changes are being proposed to the mule deer hunt.

Hunted Species – White-tailed deer

Regional Analysis

In the early 1900s, there were an estimated 500,000 white-tailed deer in the United States. Unregulated commercial hunting and subsistence hunting removed the white-tailed deer from much of its range. At that time many state wildlife agencies were formed, hunting regulations were put into place, and the harvest of antlerless (female) deer was prohibited. White-tailed deer populations have rebounded, so that today there are over 20 million white-tailed deer in the United States, and numbers are rising.

The Coues' white-tailed deer is a small subspecies, most common in Arizona's southern mountains. The Arizona population estimate is 70,000–75,000 post-hunt adults (2009). This subspecies requires areas of predictable summer rain and is most common in oak woodlands and chaparral hillsides with oaks and pines. In Arizona's southern mountain ranges, they are generally found at higher elevations and rougher country than mule deer.

Local Analysis

On the refuge, white-tailed deer are seen on the eastern, more dissected landscapes, in the oak woodlands of the Baboquivari Mountains, and in the riparian sections of Arivaca Creek and Arivaca Cienega. Coues' white-tailed deer are more resilient toward hunt pressure than mule deer, less tolerant of drought, and may be more affected by livestock grazing (Hunt Arizona 2017). The ten-year average (2007–2016) harvest is 5,912 whitetails per year. Presently, whitetails comprise just under 44 percent of the annual Arizona deer harvest. The AZGFD does not estimate population at the state or GMU level. Over the past 5 years, the number of permits (approximately 4,355) issued for white-tailed deer in the GMUs included in the refuge have remained static.

Direct and Indirect Impacts

Alternative A (No Action Alternative)

The current white-tailed deer hunts would continue. The AZGFD will continue to conduct surveys and determine the number of permits issued. Permits would be issued through the AZGFD draw system. Hunting white-tailed deer on the refuge in accordance with AZGFD regulations should not negatively impact the deer herd. During white-tailed deer hunts campsites and road usage temporarily increases. The refuge hosts approximately 498 white-tailed deer hunters annually resulting in an estimated 1,500 visitor use days. This estimate includes permit holders and their hunting companions. Hunting white-tailed deer on the refuge in accordance with AZGFD regulations should not negatively impact the deer herd. During the past five years, white-tailed deer harvest in the 3 GMUs combined have fluctuated from a low of 1,091 harvested in 2012 to 1,932 harvested in 2017. Using harvest data divided by GMU acreage, we are able to determine a harvest rate average of 0.129 white-tailed deer per acre across all 3 GMUs. Multiplying the deer per acre by refuge hunting area acres, we are able to estimate that the 5 year average white-tailed deer take on the refuge is 54 in GMU 36A, 96 in GMU 36B, and 19 in GMU 36C. These estimates for refuge take constitute 0.024 of the statewide white-tailed deer take for 2017. These estimates are clearly high as the majority of habitat on the refuge is mule deer habitat.

Alternative B (Proposed Action Alternative)
Impacts to white-tailed deer would be similar to Alternative A. White-tailed deer on the refuge may experience reduced predation mortality from increased predator hunting, including mountain lions and coyotes, as proposed in Alternative B (Harrington and Conover 2007). No changes are being proposed to the white-tailed deer hunt.

Hunted Species – Javelina

Regional Analysis
Javelina have increased in distribution in Arizona during the 20th century and are now common throughout southern Arizona (Hunt Arizona 2017; Crosswhite 1984). They suffer periodic setbacks, however, primarily due to diseases such as distemper, parvo, and by freezing temperatures. The AZGFD increased the annual bag limit for javelina from 1 to 2 in 2013 due to large numbers of permits going unsold.

Local Analysis
Javelina are seldom seen on the refuge as their preferred habitat is limited and typically not adjacent to roads where most observations are made.

The refuge does not comprise as much javelina habitat compared to the other portions of GMUs 36A, B, and C. The rolling slopes and flats of the refuge do not harbor as many javelina as do the upland canyons and mountains.

Direct and Indirect Impacts
Alternative A (No Action Alternative)
The current javelina hunts would continue. The refuge hosts approximately 700 javelina hunters per year. Javelina hunting primarily occurs in late winter from January 1st through the first week of March. The AZGFD issues permits through the annual spring big game draw and through the first-come leftover permits available over the counter after the draw. The annual bag limit is two javelina per calendar year with no more than one (1) javelina taken per open area as defined in each hunt number. The bag limit may be filled in any combination of permit-tag (draw tag or first-come left over draw tag as long as differing hunt numbers) or nonpermit-tag (over-the-counter tag) hunts as prescribed in R12-4-114. No more than one (1) permit-tag shall be issued per hunter through the initial draw. Since populations have remained stable, hunting javelina on the refuge in accordance with AZGFD regulations should not negatively impact the javelina herd.

Alternative B (Proposed Action Alternative)
Impacts to javelina would be similar to Alternative A due to a potential reduction in javelina predators (mountain lions, bobcats, coyotes). Javelina on the refuge may experience some benefit from increased predator hunting as proposed in Alternative B. No changes are being proposed to the javelina hunt.

Hunted Species – Feral Hog

Regional Analysis

The USDA APHIS reports that there are few, small populations throughout the state. Most feral hogs in the state are associated with riparian areas adjacent to permanent rivers. There are populations along the Colorado River near Havasu NWR, Virgin River near Littlefield, Agua Fria River near Cordes Junction, and San Pedro River near Redington (Basmajian 2017). Active hog control does occur at Havasu NWR, which is along the Colorado River approximately 400 miles northwest of the Buenos Aires NWR. Since 2017, a total of 203 feral hogs have been removed from Havasu NWR and that population is nearing eradication.

Local Analysis

Sightings of feral hogs on the refuge were never common and are now increasingly rare. There have been no reported sightings in a decade. The USDA APHIS considers the refuge population to be eradicated.

Direct and Indirect Impacts

Alternative A (No Action Alternative)

Feral hog hunting is open on the refuge year round with unlimited take. Feral hogs are an invasive species and eradication is the goal. Hunter participation is likely zero as feral hogs have not been observed on the refuge in more than 10 years. Since this is an invasive species, feral hog hunting will remain as a management tool for controlling hogs on the refuge in the event that populations return.

Alternative B (Proposed Action Alternative)

Impacts are the same as those described in Alternative A.

Hunted Species – Cottontail Rabbit

Regional Analysis

Populations can vary dramatically, and because of these wide fluctuations in numbers, annual take is highly erratic. The state season is year-round. Arizona populations range from a high of 850,000 in 1979 to fewer than 26,000 in 2014. Presently, 10,000–25,000 hunters in Arizona take 45,000 to 120,000 cottontails annually (Hunt Arizona 2017). Long-term harvest and hunt success data show an inexplicable decline in the numbers of cottontails harvested in Arizona. Cottontails have litter sizes ranging from 2.6–3.6 young per litter and because of the length of the breeding season, seven to eight months, four litters per year are likely (Sowls 1957; Chapman and Ceballos 1990).

Local Analysis

Cottontails are frequently observed throughout the refuge by visitors and staff primarily early in the morning and late evening.

Direct and Indirect Impacts

Alternative A (No Action Alternative)

Cottontail rabbit hunting is open year round on the refuge. The daily limit is 10 cottontails per day. Hunter participation is low with very few hunters reporting pursuing cottontails.

Although some hunters consider cottontail hunting as their primary sport, cottontails traditionally have been taken in Arizona in conjunction with dove and quail hunting (Hunt Arizona 2017). Cottontail populations are not likely be impacted by hunting on the refuge due to their prolific breeding capabilities and the more than adequate refuge habitat. Hunting cottontails on the refuge in accordance with AZGFD regulations should not negatively impact the cottontail population because they are nocturnal and hunting without a dog decreases success of take.

Alternative B (Proposed Action Alternative)
No changes to the cottontail rabbit hunt are proposed. Impacts to cottontails would be similar to Alternative A. Due to a potential reduction in cottontail predators (bobcat, badger, fox, coyote) cottontails on the refuge may experience some benefit from increased small predator hunting as proposed in Alternative B.

Hunted Species – Jackrabbits

Regional Analysis
Arizona's jackrabbit populations are not systematically surveyed, nor are their harvests and hunt success reported. This is unfortunate, as black-tailed jackrabbit populations (*L. californicus*) appear to be at a low level compared to previous years. The status of antelope jackrabbits (*L. alleni*) appears to be secure except where affected by habitat alterations (Brown, pers. comm.).

Local Analysis
Jackrabbit numbers appear to be stable on the refuge and surrounding ranches (Altemus unpublished data). Detection of jackrabbits varies greatly depending on vegetation density and annual rainfall.

Direct and Indirect Impacts

Alternative A (No Action Alternative)
Jackrabbit hunting is open year round on the refuge. Take is unlimited. Annual hunt participation is low (less than 40 hunters/year) and has minimal impact on the jackrabbit population. Hunting jackrabbits on the refuge in accordance with AZGFD regulations should not negatively impact the jackrabbit population significantly because hunter success during the annual Junior Jack Kamp (a youth jackrabbit hunt camp) over the past five years averages to 0.97 jackrabbits per hunter day (1.93/2 day event) (pers. comm., Karen Klima, Arizona Game and Fish Department). This event comprises the majority of the jackrabbit hunting that occurs on the refuge and adjacent lands.

Alternative B (Proposed Action Alternative)
No changes to the jackrabbit hunt are proposed. Impacts to jackrabbits would be similar to Alternative A. Due to a potential reduction in jackrabbit predators (bobcat, badger, fox, coyote) jackrabbits on the refuge may experience some benefit from increased small predator hunting as proposed in Alternative B.

Hunted Species – Waterfowl –Ducks, Geese, Coots, Mergansers, Gallinules

Regional Analysis

Today, the hunting of waterfowl in the United Sates is based on a thorough regulatory process that involves numerous sources of waterfowl population and harvest monitoring data, including surveys and estimates each year by the Service. Annually, the AZGFD sets harvest regulations within the limits set by the Service's Division of Migratory Birds. These regulations are enforced for waterfowl hunters on the refuge.

In 2019, the total breeding duck population estimate was 38.9 million, which is 10 percent above the long-term average. Canada goose numbers are at or above the 10-year average across all flyways and populations. Light geese numbers are also at or above the 10-year average (Raftovich et al. 2019).

Local Analysis

Arizona is included in the Pacific Flyway for population and harvest reporting. Arizona waterfowl harvest fluctuates widely, ranging from more than 150,000 in 1979–80 to fewer than 18,000 in 1990–91. The total reported duck harvest for 2018 was 15,800 and the total reported goose harvest for 2018 was 1,200. Arizona only accounts for 0.65 percent of the national coot harvest at 900 coots in 2016 (no data reported for 2017 or 2018). Waterfowl harvest in Arizona (18,000) is only 0.0013 percent of the total U.S. harvest (13.3 million).

In southeastern Arizona, significant habitat is provided by farm ponds and other small wetlands. The refuge has 152 earthen stock water tanks. Many rarely contain water; others contain water during portions of the year, especially in the summer rainy season. The vagaries of precipitation, drought, and undependable presence of water in stock tanks and Aguirre Lake will continue to result in low or fluctuating numbers of waterfowl for migration stopovers or wintering on the refuge. Most waterfowl on the refuge are transient and spend little time in the area. The refuge has very few goose observation records, they seldom occur on refuge lands and waters. In 2019, only two geese were reportedly seen on the refuge. Water sites are scattered and ephemeral, resulting in fewer than 30 waterfowl hunters per year.

Direct and Indirect Impacts

Alternative A (No Action Alternative)

The refuge gets approximately 30 waterfowl hunt visits per year. Waterfowl hunting on the refuge is typically the jump shooting ducks off tanks (earthen ponds). Limited visitor reports indicate that success rates are typically low (less than half the bag limit per hunt). Based on these estimates the maximum harvest of waterfowl on the refuge would be approximately 210 animals and we estimate less than half of that number are taken (0.006–0.013 percent of state take). Hunted animals may be disturbed from regular life activities such as feeding, resting, and drinking by hunter presence or activities. Another potential disturbance impact may be avoidance of an area by animals. Under the no action alternative duck, goose, and coot will remain open to hunting. Hunting waterfowl on the refuge in accordance with State and Federal regulations should not negatively impact the seasonal waterfowl density on the refuge significantly. The refuge does not actively manage for waterfowl. Waterfowl are managed at a national level by the Service.

Alternative B (Proposed Action Alternative)
Refuge management of waterfowl hunts would remain the same as Alternative A. Alternative B would open the refuge to the take of mergansers and gallinules. In the past, these species have been lumped in with ducks, specifically allowing them removes any confusion. Impacts to waterfowl would be similar to Alternative A. The daily bag limit for gallinules and coots is 25; mergansers are included in the duck daily bag limit of 7 birds. Refuge hunters would have the option to include gallinules and mergansers in their waterfowl take.

Direct mortality of the two species may increase. No increase in hunter participation or success rates is anticipated. Gallinule and merganser are not primary target species and are not popular table fare.

Hunted Species – Doves

Regional Analysis

Mourning Doves

Mourning Doves are found statewide and are the most common and widely-ranging game bird in Arizona. The high period of harvest was in the 1960s and 70s. Hunting success has declined due to urban expansion, changing farm practices, and more restrictive seasons. The reported statewide harvest for 2016 was 395,800 (Raftovich et al 2017) which is 2.93 percent of the national harvest of 13,502,000.

White-winged Doves

White-winged doves range through the southern half of Arizona. Population numbers were high before World War I and after World War II. Since the 1960s, there were fewer doves and hunting opportunities due to the decline of nesting habitat and virtual replacement of grain farming by cotton and alfalfa plantings. Numbers were low in the 1980s but populations and hunting capacity have gradually increased since that time (Hunt Arizona 2017).

Most white-winged doves migrate out of state prior to the opening of dove season on September 1. Thus, they constitute a very small proportion of the state dove harvest. Colonial populations may stay later along river bottoms adjacent to agricultural areas. Those are the birds taken most often after September 1st. The reported Arizona harvest in 2016 was 69,000, which is 4.14 percent of the national harvest of 1,667,100.

Eurasian Collared-Doves

This exotic species originates from Asia and was introduced to the Bahamas in 1970. It spread to Florida by 1972 and is now found as far west as California. It has greatly expanded its range and numbers since 2000. Eurasian collared-doves are common residents over much of urban and rural Arizona, they seem to prefer to live near buildings and are seldom seen far from inhabited areas. These birds are prolific, capable of producing up to six broods per year. The first collared-doves were seen on the refuge in approximately 2002, since then sightings have become more common but are still infrequent. State regulations allow hunting for Eurasian collared-doves year round with unlimited take.

Local Analysis

Mourning Doves

During the early season (September 1–15) Mourning doves are abundant as they migrate through the refuge. Several hundreds of birds roost around every available water source. Hunter effort during the early season is estimated at 75 hunter days. During the late season (November 24– January 8), mourning dove numbers are reduced to only resident birds. The flight activity is less predictable and hunters are far less successful. Hunter effort during the late season is estimated at 45 hunter days.

White-winged Doves

White-winged doves are only open to hunting during the early dove season (September 1–15). By that time, most white-winged doves have already migrated out of state.

Eurasian Collared-Doves

Eurasian collared-doves are rarely seen outside of the no hunt zones. There have been no reports of take by hunters.

Direct and Indirect Impacts

Alternative A (No Action Alternative)

The refuge is open to dove hunting during state seasons as described above. Approximately 120 dove hunting visits occur on the refuge annually, most during the September 1–15 early season. Most hunts occur at earthen water tanks (Figure 2, brown circles represent water tanks). State bag limits for dove are 15 in the aggregate, of which no more than 10 may be white-winged doves. Eurasian collared-doves are open year round with unlimited take allowed. Dove hunting is open 60 days per year divided between two seasons. Hunter success is highly variable and contingent on rain events. If it rains immediately before or during the season, the doves are less concentrated around water sources and success declines. Maximum take on the refuge is approximately 1,800 mourning and white-wing doves in the aggregate. Hunted animals may be disturbed from regular life activities such as feeding, resting, and drinking by hunter presence or activities. Another potential disturbance impact may be avoidance of an area by animals. Hunting doves on the refuge in accordance with State and Federal regulations is not likely to negatively impact the dove populations. The reported statewide harvest for 2016 was 395,800 (Raftovich et al. 2017), which is 2.93 percent of the national harvest of 13,502,000. Refuge take accounts for 0.004 percent of the annual harvest for Arizona. Hunters comprise approximately 6 percent of all visits to the refuge annually.

Alternative B (Proposed Action Alternative)

Impacts to doves would be similar to Alternative A. Doves on the refuge may experience some benefit through decreased mortality by predation from increased small predator hunting as proposed in Alternative B.

Other Wildlife and Aquatic Species

The refuge supports a diversity of wildlife species of Southern Arizona, including game and nongame mammals, birds, reptiles, amphibians, and invertebrates, which are important contributors to the overall biodiversity on the refuge. The refuge has documented more than 330 species of birds and has recorded 61species of mammals, 49 species of reptiles, and 12 species of amphibians. Management of many of these species remains a collaborative effort with the AZGFD.

Direct and Indirect Impacts

Alternative A (No Action Alternative)

This alternative currently results in some negative impacts on small mammals, birds, and other wildlife due to disturbance in areas where human access for hunting activities occur. The active breeding season for most birds and small mammals is between March and July. Hunting during this period is extremely limited due to inhospitable climatic conditions and limited opportunity, adverse impacts would be negligible. Raptors (e.g., red-tailed hawks, great horned owls) may be nesting during periods of hunting activity (0–10 hunters), so disturbance is expected to be minimal. During the autumn and winter hunting seasons, most amphibians and many reptiles are hibernating underground and would not be exposed to disturbance caused by hunting activities. Invertebrate populations are most abundant during spring and summer months. During most hunting seasons, invertebrate populations die off, and their dormant eggs are protected from disturbance underground or under tree bark until spring and are not exposed to hunt disturbance.

Alternative B (Proposed Action Alternative)

Impacts would be similar to Alternative A. The hunting seasons overlap and no previously closed areas are being opened. Despite opening many new species, hunter participation is not expected to increase significantly. Most of the new species are not primary target species and several are nocturnal. With the exception of mountain lion, bobcat, and fox all take of new species is expected to be incidental while pursuing other game.

Reducing small predators may reduce quail and kangaroo rat mortality. Kangaroo rats are landscape architects that are believed to slow the invasion of invasive grasses. Predator reduction may also benefit jackrabbits, which are key seed dispersers for cacti, including the Pima Pineapple Cactus (*Coryphantha scheeri* var. *robustispina*) (PPC). Allowing for the take of more predator species will likely indirectly lead to more coyote take, which may be beneficial to the deer, javelina, and pronghorn herds. Opening the refuge to mountain lion hunting may have a similar effect.

Threatened and Endangered Species and other Special Status Species

Endangered Species

Masked bobwhite quail (*Colinus virginianus ridgwayi*) recovery efforts have been ongoing since the 1970s. Current reintroduction efforts have resulted in a small wild population concentrated in three distinct areas of the semi-desert grasslands unit. Chiricahua leopard frogs (*Lithobates chiricahuensis*) occur in many earthen ponds across the refuge. They are rather wary and enter the water at the slightest disturbance.

PPC occur in very specific habitat types throughout the semi-desert grassland unit of the refuge. They are a small, low profile cactus. Kearny's Bluestar (*Amsonia kearneyana*) occurs in the lower reaches of Brown Canyon along Brown creek. They all occur within the Brown Canyon no hunt zone.

Threatened Species
Southwestern willow flycatcher (*Empidonax traillii extimus*) are rarely observed on the refuge, most often within the Arivaca creek management unit no hunt zone.

Direct and Indirect Impacts
Alternative A (No Action Alternative)
Under the No Action Alternative, these species of concern are not significantly impacted (1994 FONSI).

Masked bobwhites are found within the refuge hunt zone however there is no open season for quail of any species on the refuge. Masked bobwhites tend to live in areas that do not lend themselves to the style of hunting common in southern Arizona and thus disturbance should be minimal.

There is no season for frogs of any species on the refuge. Hunting activity may have a positive effect for Chiricahua leopard frogs by scaring their predators (herons and egrets) away from their habitats.

Hunting activity could pose a threat to PPC as hunters are likely to walk the ridges on which they occur and may accidentally step on them. Javelina hunting may benefit PPC by increasing javelina mortality. Javelina are known to uproot PPC and eat their taproots. Jackrabbit hunting may negatively impact PPC as antelope jackrabbits (*Lepus alleni*) are the primary seed dispersers for the species (R. Schmalzel, pers. comm.). However, jackrabbit take is generally low.

When observed, southwestern willow flycatchers are most often ween in the Arivaca Creek Unit where no hunting is allowed thus disturbance should be minimal.

Alternative B (Proposed Action Alternative)
Under Alternative B, impacts to species of concern are expected to be similar or identical to Alternative A due to a negligible increase in hunter participation (<5 percent). An Intra-Service Section 7 consultation (02EAZZ00-2020-I-0430) determined that the proposed action is unlikely to adversely affect endangered species found on the refuge.

Vegetation

The refuge hunt zone is limited to 105,133 acres of the Semi-desert Grassland unit. No hunting occurs in the Arivaca or Brown Canyon units. The Semi-desert Grassland unit is dominated by large stands of exotic grasses, such as Lehmann's lovegrass (*Eragrostis lehmanniana*), Johnsongrass (*Sorghum halepense*), and several sub-shrub species such as snakeweed (*Gutierrezia sarothrae*), burroweed (*Isocoma tenuisecta*), and Russian thistle (*Salsola kali*). Historically, mesquite (*Prosopis* spp.) was considered to be rare. However, today it dominates as the overstory woody plant species and has displaced native grasses in over 75 percent of the Altar Valley. Lehmann's lovegrass remains the dominant grass on most shallow upland range sites; however, discrete patches of native perennial grasses such as the gramas, cane beardgrass (*Bothriochloa barbinodis*), Arizona cottontop (*Digitaria californica*), and buffalograss (*Buchloe dactyloides*) have increased in size on most uplands. Important native woody species that have increased on uplands include fairy duster (*Calliandra eriophylla)* and white-ball acacia (*Acacia angustissima*) (USFWS 1999). Highly invasive vegetation has dominated the landscape for decades as past land managers introduced several varieties of invasive African grasses for livestock feed. Fire ecology and fine fuels have been permanently altered since the establishment of the first ranch on these lands in the 1860's.

Direct and Indirect Impacts

Alternative A (No Action Alternative)

Under Alternative A, minor long-term adverse impacts to refuge vegetation are expected from continuation of current management. The spreading of invasive plants through hunter access could occur adjacent to parking areas and roadsides. This is considered a minor negative impact due to the low number of hunt participants (approximately 4,000 hunt visits per year), over 105,113 acres during winter when most vegetation is dormant. Current herbivore populations have not had an observable negative affect on vegetation communities through browsing or grazing on the refuge.

Alternative B (Proposed Action Alternative)

Under Alternative B, minor long-term adverse impacts to refuge vegetation are expected similar to Alternative A. Increased take of predator species could lead to increases in herbivore populations, which could have a negative effect on vegetation abundance and composition. Increased take is expected to be minimal as most of the proposed species are not primary targeted species and several are nocturnal. Minimal increases in visitor use/ participation is unlikely to alter the vegetation community or composition.

Soils

Soils in the valley belong to the White House-Bernardino-Caralampi Association, comprised of soils of more than 60 inches in depth. The rock outcrops and ridges have shallow to very shallow soils of the Rock-Outcrop-Lampshire-Cellar Association. The mountainside soils are shallow, steep, and where sufficient soil is present, well drained. Soils formed on uplands/foothills are transitional and show a variety of features that reflect local topography. They are shallow to deep, gently sloping, and well drained. The surface can be deeply dissected and rock outcrops may be exposed.

The soils of the valley slopes are deep, well-drained, and on slopes up to 10 degrees. They form on and from older alluvial layers; sediments are unsorted and have variable textures. The alluvial fan/floodplain soils are level to near level, deep soils formed from older alluvium.

The majority of the refuge is composed of three soil types: Loamy Upland (47 percent), Sandy loam Upland (15 percent), and Loamy Bottom (12 percent).

Direct and Indirect Impacts

Alternative A (No Action Alternative)

Under Alternative A, the potential exists for vehicular traffic on unpaved refuge roads to contribute to erosion through driving on wet roads and disturbing natural drainage patterns especially adjacent to parking areas and roadsides. Refuge maintenance personnel monitor road conditions and frequently repair damaged roads.

Alternative B (Proposed Action Alternative)

Under Alternative B, impacts to soils are expected to be similar or identical to Alternative A due to a negligible increase in visitation (<5 percent).

Air Quality

The refuge is located in Pima County, AZ. It is near, but outside of PM10 non-attainment area in Tucson, AZ.

The Clean Air Act, as amended in 1990, requires the Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for wide-spread pollutants from numerous and diverse sources considered harmful to public health and the environment. Pima County has not been designated by the EPA as Nonattainment Area for the 1997 8-Hour Ozone (O3) NAAQS. PM10 is defined as particulate matter that is 10 micrometers in diameter or smaller. A portion of Pima County, not including the refuge, is designated as a Moderate Nonattainment Area for the PM10 NAAQS.

Direct and Indirect Impacts

Alternative A (No Action Alternative)

Under alternatives A, negligible negative impacts to air quality exist due to vehicle emissions from hunter visits. In 2018, an estimated approximately 4,000 hunt visits took place on the refuge. The addition of several secondary target species hunts are not expected to significantly increase hunt visits in the future (<5 percent or less than 200). Any potential increase in hunter visits compared to overall public use visitors (70,131) on the refuge is considered insignificant.

Alternative B (Proposed Action Alternative)

Under Alternative B, impacts to air quality are expected to be similar or identical to Alternative A due to a negligible increase in hunt visitation (<5 percent or less than 200).

Water Quality
The refuge has a variety of surface water resources including the Arivaca Cienega, Arivaca creek, and more than 150 earthen ponds fed by rain run-off. Additionally there are dozens of wells in varying states of function, many of which have been converted to solar wildlife drinkers (6). There are also 3 wildlife "trick tanks" on refuge lands. A 2013 NPS study indicated that of the baseline water quality parameters tested at Arivaca Cienega, all were within expected values or standards set by the Arizona Department of Environmental Quality or the U.S. Environmental Protection Agency.
Direct and Indirect Impacts Alternative A (No Action Alternative) Hunting activity has little to no impact on water quality on the refuge. Service hydrologist have indicated that they are not aware of any major water quality concerns. The area is remote and has not been developed. Therefore, the Service does not expect serious water quality impairments. Alternative B (Proposed Action Alternative) Under Alternative B, impacts to water quality is expected to be similar or identical to Alternative A due to a negligible increase in visitation (<5 percent).

Affected Visitor Use and Experience Resources and Anticipated Impacts of the No Action and Proposed Action Alternatives

Visitor Use and Experience
The refuge currently receives approximately 70,131visitors per year. These visitors take part in a variety of public use activities, including hunting (4,000), wildlife observation (51,000), wildlife photography (21,548), environmental education (578), interpretation (5,271), and other uses such as hiking, biking, camping (4,466). Current hunting opportunities on Buenos Aires NWR include duck, goose, coot, white-winged dove, mourning dove, Eurasian collared-dove, white-tailed deer, mule deer, javelina, feral hog, jackrabbit, cottontail rabbit, skunk, and coyote hunting. Buenos Aires NWR is one of the top hunting refuges in the southwestern United States with approximately 4,000 hunting visits during the 2018–2019 hunt season.
Direct and Indirect Impacts Alternative A (No Action Alternative) Under Alternative A, there would be no change in existing visitor services and recreational opportunities on the refuge. Hunt zones remain open for other uses during hunts (See Figure 2). Permanent no hunt zones exist in areas of high-public use for participants in non-consumptive activities. Sound disturbance does occur during the hunts, which is minor and temporary. There are no known or anticipated conflicts between refuge user groups. Alternative B (Proposed Action Alternative) This alternative would offer additional recreational opportunities on the refuge. Mitigation measures to minimize impact on non-hunting visitors include not allowing night hunting or pursuit with dogs because of concerns for hunter safety and disturbing camping activities. These measures should reduce the likelihood of visitor conflicts.

Non-hunters would be free to enjoy other wildlife-dependent recreational activities in areas held in reserve to reduce hunting conflicts. It is known that some visitors avoid the refuge during existing hunts. The noise and traffic associated with expanding hunting opportunities may temporarily impact other visitors.

Affected Cultural Resources and Anticipated Impacts of the No Action and Proposed Action Alternatives

Cultural Resources
Various cultural resources exist on the refuge varying from native American artifacts to ranch structures and artifacts. These cultural resources are distributed throughout the refuge. Evidence of prehistoric farming, pottery shards, matates, and morteros are encountered often. Ranching artifacts, structures, corrals, and agricultural equipment litter the landscape. See section 3.13 of the Comprehensive Conservation Plan for BANWR.
Direct and Indirect Impacts Alternative A (No Action Alternative) Under the No Action Alternative, cultural resources may be adversely impacted. Artifacts can be found at specific sites and scattered throughout the landscape. Cultural resources could be affected by collectors and vandals or by hunters traversing the refuge. To minimize the effects of visitor use the public is notified of cultural resource rules and regulations via refuge brochures and on the official website. Alternative B (Proposed Action Alternative) Impacts to cultural resources under Alternative B are expected to be similar to Alternative A because hunter participation is anticipated to increase less than 5 percent (approximately 200 people). We do not anticipate an increase in non-hunting users.

Affected Refuge Management and Operations Resources and Anticipated Impacts of the No Action and Proposed Action Alternatives

Refuge Management and Operations
Land Use The refuge is composed of an intermixture of desert scrub, semi-desert grassland and mesquite/Lehmann's lovegrass communities across nearly 118,000 acres. Management of invasive species, conducted through chemical applications and manual removal, occur periodically during late spring season. More than 250 miles of maintained dirt roads networking the refuge are open to the public. Blading occurs after rainstorms. The Arivaca-Sasabe road bisects the refuge running east to west from its intersection with highway 286 to the town of Arivaca. State highway 286 runs the length of the west side of the refuge for approximately 24 miles (managed by County and State with trash pick-up done by refuge on a quarterly basis.

There are 86 dispersed primitive campsites throughout the refuge, which are maintained throughout fall and winter. Trash and other facilities are not available at the sites. Pack it in and pack it (Leave No Trace) principles are required. Campsite use is free and no reservations are required. There are 17 miles of established trails which are maintained on an as need basis. Brown Canyon is maintained on an annual basis.

Administration

The refuge is funded for four administrative personnel (management, administrative officer), four biology personnel, three law enforcement personnel, four maintenance personnel, and nine fire personnel. Several of these positions are currently vacant.

Current budget expectations are sufficient to manage a hunting program. The refuge is funded to support three full-time law enforcement officers. A portion of their duties are enforcement of hunting regulations, and this enforcement takes most of their time from September through February. The overall cost to run the program is approximately $81,000, which is approximately 6 percent of the total funding for the refuge each year. Costs include, but are not limited to, hunt-related portions of law enforcement staff salaries; vehicle maintenance and repair; fuel; sign maintenance and replacement; and printing of brochures.

Direct and Indirect Impacts

Alternative A (No Action Alternative)

Land use impacts include volunteer and staff time to maintain campsites and roads through trimming encroaching vegetation. The refuge has provided public hunting opportunities since 1985. Large-scale invasive species spraying and manual removal take place during late spring or early summer to avoid hunting and other public use activities. Maintenance of roads are only done after rainstorms to improve access to areas so impacts may affect hunting and other public use activities depending on where the damage to roads occurs. Trail maintenance will not affect hunting activities because they occur in the no hunt zones.

Administrative impacts include staff time and expense to produce brochures and signs. Volunteers maintain the various refuge campsites 2–3 times a week on rotating basis. Law enforcement to support hunt programs takes place mainly from September through February. During hunting season, visitor services staff dedicate 5 percent of their workweek to assist with hunting logistics information.

Alternative B (Proposed Action Alternative)

There is no planned infrastructure development specific to the hunt program. No additional access roads would be constructed. Alternative B may result in a slight increase in traffic on refuge roads. This impact is expected to be negligible as the increase in hunting participants is expected to be minimal and the hunt dates are identical to Alternative A. Refuge roads and trails receive frequent maintenance regardless of the hunt program. Most of this maintenance occurs during the rainy season when few hunts are open. No additional increase in staff time is anticipated. Aside from an initial cost to produce new hunting regulation brochures and maps (<$1,000), no new administrative impacts are anticipated as a result of Alternative B.

Affected Socioeconomic Resources and Anticipated Impacts of the No Action and Proposed Action Alternatives

Socioeconomics

Local and Regional Economies

Buenos Aires NWR is located in Pima County (population 980,263), approximately 7 miles north of the town of Sasabe (population 51), approximately 20 miles west of Arivaca (population 700) and approximately 35 miles south of the town of Three Points (population 5,581). Tucson, with a population of 523,832, is approximately 55 miles northeast of the refuge. Several small towns are within 60 miles of the refuge. Populations are estimates by the U.S. Census Bureau for 2010.

The predominant land use in the vicinity of the refuge is livestock grazing. The refuge averages about 40,000 visitors per year. Wildlife observation visits account for about 90 percent of the total annual visitation. Expenditures on hunting activities accounted for 15 percent of all expenditures, followed by non-consumptive activities at 85 percent. Total expenditures from hunters were $249,000 with non-residents accounting for approximately fifty percent of total expenditures (Banking on Nature 2018).

Direct and Indirect Impacts

Alternative A (No Action Alternative)

There would be no change in revenues to the local economy associated with hunting on the refuge. The refuge does not charge fees for access or hunting. No additional manpower or funding would be required to implement the No Action Alternative.

Alternative B (Proposed Action Alternative)

Under the proposed action, minor positive impacts to local and regional economies are possible due to a potential increase in visitation. Hunting visits may increase slightly. Hunters would likely purchase gas, food, lodging, and other supplies from local merchants.

Environmental Justice

Executive Order 12898, Federal 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 disproportionately high or adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities.

Direct and Indirect Impacts

This EA has not identified any adverse or beneficial effects for either alternative unique to minority or low-income populations in the affected area. Additionally, neither of the alternatives will disproportionately place any adverse environmental, economic, social, or health impacts on minority or low-income populations.

Indian Trust Resources
There are no known Indian trust resources on the refuge.
Direct and Indirect Impacts No direct or indirect impacts.

Cumulative Impact Analysis
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 the overall, net effects on a resource that arise from multiple actions. Impacts can "accumulate" spatially when different actions affect different areas of the same resource. They can also accumulate over the course of time from actions in the past, the present, and the future. Occasionally, different actions counterbalance one another, partially cancelling out each other's effects on a resource. But more typically, multiple effects add up, with each additional action contributing an incremental impact on the resource.

Anticipated Cumulative Impacts of the No Action and Proposed Action Alternatives

Hunting
Other past, present, and foreseeable activity impacting the affected environment
Hunting has been allowed on the refuge since 1985. Hunting occurs throughout the entire state of Arizona and United States.

Migratory bird populations throughout the United States are managed through an administrative process known as flyways. The refuge is located in the Pacific Flyway. In North America, the process for establishing hunting regulations is conducted annually. The refuge follows the regulations set by the state of Arizona and published in the annual Arizona hunting regulations.

The refuge comprises a small portion of three separate GMUs. Access onto the refuge is not controlled so estimating the number of hunters utilizing the refuge is difficult and likely inaccurate. For example, GMU 36B offers 2,400 white-tailed deer permits through four hunts. GMU 36B consists of approximately 560 square miles, approximately 72 square miles (12.86 percent) is on refuge. However, very little of the refuge is white-tailed deer habitat. As such, few whitetail hunters utilize refuge lands. The mule deer hunt (300 permits/2 hunts) is the opposite. Refuge lands within GMU 36B are high-quality habitat for mule deer whereas the remainder of the GMU (off refuge) is more suited for white-tailed deer. Thus, it is likely a disproportionate number of mule deer hunters utilize refuge lands in GMU 36B.

Based on voluntary reporting AZGFD estimated 1,667 mule and white-tailed deer were harvested in GMUs 36A, 36B, and 36C during the 2016 hunting season. This represents 0.0018 deer harvested per acre.

Descriptions of Anticipated Cumulative Impacts
Hunting on the refuge does not add to the cumulative impacts of migratory bird management on local, regional, or Pacific Flyway populations because the percentage taken on the refuge, though possibly additive to existing hunting takes, is an insignificant fraction of the estimated populations. In 2019, breeding duck, Canada goose, and light geese were all at or above the 10-year average (Raftovich et al. 2019). In 2019, only two geese were reportedly seen on the refuge. Water sites are scattered and ephemeral, resulting in fewer than 30 waterfowl hunters per year. In addition, no cumulative impacts are anticipated because overall populations will continue to be monitored and future harvests would be adjusted as needed under the existing flyway and State regulatory processes.

Locally, the impact of harvest at this rate from the Buenos Aires NWR is likely negligible. Mathematically, 185 deer per year could potentially be harvested from the refuge (105,113 acres multiplied by 0.0018 deer/acre). However, as stated above very little of the refuge is whitetail habitat and whitetails account for 83 percent of the deer taken in these GMUs resulting in a realistic take estimate of 32 deer. The refuge will continue to support a healthy deer herd under both alternatives. So, even at the local level, the refuge only adds slightly to cumulative impacts on the resident wildlife, and a negligible amount to regional and statewide populations. Wildlife management of populations is important to ensure the health of the ecosystem, and the refuge's hunt program provides minor, additional beneficial impacts to the cumulative impacts of wildlife management in the State.

Deer are the most pursued species on the refuge resulting in the most hunter use days. All other take of hunted species is expected to result in negligible cumulative impacts on local and regional populations.

Any take under the current or proposed hunt program of any of the other hunted species on the refuge will not incrementally add to the impacts of statewide hunting because harvest on the refuge is expected to be zero or minimal.

U.S. Customs and Border Protection (USCBP) Activities
Other past, present, and foreseeable activity impacting the affected environment
The 117,500-acre Buenos Aires NWR is located in south-central Arizona and shares about 5.26 miles of border with Mexico. A barbed wire barrier along the International Border separated Buenos Aires NWR from Mexico until 2007/2008, when DHS constructed a 15-foot tall iron and concrete bollard-style pedestrian barrier along the south boundary of the refuge. The combination of towers, border barrier and CBP agents, have significantly decreased the volume of discarded trash, allowed restoration of grasslands, and allowed safe public access into refuge areas that were previously closed/deemed dangerous. USCBP agents traverse the landscape in trucks, all-terrain vehicles (ATVs), on horseback, and on foot. Helicopters are frequently used in concert with other patrolling methods.

Descriptions of Anticipated Cumulative Impacts
Border related activities generate disturbance to humans and wildlife. Customs and Border Protection operations that include roads, off-road impacts, border fence, and road maintenance will also likely result in habitat loss and disturbance to wildlife. Vehicles travel at high speeds on refuge roads generating noise and dust pollution. The CBP related activity is likely to temporarily displace wildlife, cause mortality through vehicle strikes, and disrupt normal behavior. The Service will continue to coordinate with CBP on projects impacting national wildlife refuges and through the Endangered Species Act Section 7 process to minimize impacts to trust resources to the extent possible. Hunting has been occurring on the refuge since prior to refuge establishment in 1985. Most of these new species being proposed were previously open to hunt on the refuge as described in the 1988 Hunt Plan. Many of the proposed species are potential predators of quail and their nests. Though hunting and border activities will occur in the same area, the refuge has a long history of hunting and these additional hunting opportunities, which are minimal and temporary in nature, are not likely to have more than an incrementally minor impact on species and habitat when added to border-related activities.

Surrounding Land Uses and Local Economy
Other past, present, and foreseeable activity impacting the affected environment
Nearly all of the lands surrounding the refuge are public and open to hunting, the primary land use is cattle grazing. Most of the refuge is bordered by Arizona State Land Trust lands. The southeast portion of the refuge is bordered by the Coronado National Forest. Recreation activities on the Coronado National Forest include hiking, hunting, camping, birding, horseback riding, picnicking, sightseeing, and visiting historic areas.

There are also several Bureau of Land Management tracts nearby. Unless specifically prohibited, public lands managed by the BLM are open to hunting.

The majority of lands within the refuge boundary were ranch lands and leased grazing allotments hunted as private lands prior to being acquired by the Service. Currently there is no grazing on the refuge. Agriculture is a part of the regional economy. Cattle grazing on this landscape has been occurring for multiple generations. Ranches adjacent to the refuge have active cattle operations or BLM-issued grazing allotments.

Descriptions of Anticipated Cumulative Impacts
Wildlife dependent recreation other than hunting contributes greatly to the local economy in the town of Arivaca. The Arivaca Cienega is a popular birding destination receiving up to 25,000 visits per year. The town also benefits from hunting but primarily from visitors hunting outside refuge lands.

The refuge will use an adaptive management approach for its hunt program to ensure that the refuge will only mitigate and not add to the impacts on surrounding land uses. All surrounding land use activities (grazing, hunting, and other public use) occur on adjacent lands and have occurred for decades, so the brief increase in activity (potential slight increase in hunters from September through February) under the proposed action is not likely to result in any cumulative impacts.

Climate Change

Other past, present, and foreseeable activity impacting the affected environment

The complexity of ecological systems means that there is a tremendous amount of uncertainty about the impact climate change will actually have. In particular, the localized effects of climate change are still a matter of much debate. The USGS Southwest Climate Adaptation Science Centers are examining topics such as how future temperatures will impact streamflow in the Colorado River basin, how severe wildfires might contribute to forest loss and how managers can plan for post-fire recovery. In the coming years, the region is likely to experience changes in precipitation frequency, intensity, and seasonality. These changes will influence key ecological, hydrological, and societal processes. Improved understanding of these linkages will inform decisions about safeguarding ecosystem and infrastructure assets (USGS 2017). The Service's has been working with the U.S. Geological Survey, the academic community, and other natural resource management agencies and interest groups to translate available and emerging science into concrete actions that reduce the impacts of a changing climate on the broadly diverse ecosystems in Arizona, New Mexico, Oklahoma, and Texas.

In an effort to mitigate environmental impacts of persistent drought and climate change the refuge continually maintains water sources on the landscape. Increasing or maintaining available water on the refuge benefits all wildlife. All of the maintained ponds pre-date the establishment of the refuge and wildlife with generations of herd knowledge have relied on them for decades.

Descriptions of Anticipated Cumulative Impacts

Under both alternatives, the refuge would use adaptive management for refuge activities, including hunting. Hunting will be monitored and the refuge has the ability to modify public use activities to ensure they do not further contribute to the effects of climate change including changes in fire ecology, and species distribution and abundance.

Use of Lead Ammunition

Other past, present, and foreseeable activity impacting the affected environment

Lead ammunition is permitted for all species on the refuge with the exception of waterfowl. Lead poisoning has been identified as the leading cause of diagnosed death in endangered condors and the main obstacle to a self-sustaining population in Arizona and southern Utah. Studies suggest that lead shot and bullet fragments found in animal carcasses and gut piles are the most likely source of lead exposure. Many hunters do not realize that the carcass or gut pile they leave in the field usually contains lead bullet fragments. Gut piles from animals harvested with non-lead ammunition provide an important food source for the condors and should be left in the field (AZGFD 2019).

Descriptions of Anticipated Cumulative Impacts

Under both alternatives, the refuge has no restrictions on the use of lead ammunition other than federal requirements for non-toxic shot for waterfowl. The refuge encourages non-toxic ammunition but use is voluntary. When looking at the total number of hunter visits (3,960) on the refuge compared to the surrounding GMUs, the continued use of lead ammunition will not incrementally add to lead in environment.

Summary of Analysis
The purpose of this EA is to briefly provide sufficient evidence and analysis for determining whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI).

Alternative A – No Action Alternative
As described above, this alternative would continue to offer hunting duck, goose, coot, mourning and white-wing doves, Eurasian collared-dove, coyote, skunk (hog-nosed, hooded, spotted, and striped), jackrabbits (black-tailed and antelope), cottontail rabbit, mule and white-tailed deer, javelina, and feral hog on Buenos Aires NWR. Additional hunting opportunities would not be permitted on the refuge. Hunting opportunities would be limited to those interested in only hunting species currently allowed for hunting on the refuge. Effects on wildlife and habitat would be negligible because there would likely be the same amount of use by hunters and hunting has been permitted on the refuge since 1985. There may be some negative impacts to masked bobwhite quail by not allowing additional predator control.

The no action alternative represents a hunt program that has been in place for 25 years with only minor changes. An environmental assessment and FONSI were completed in 1994 and no cumulative impacts have been observed or identified since. There is no record of conflict between hunters and non-consumptive recreational user. The no hunt zones cover areas of high visitor use and the remainder of the refuge is largely undeveloped. There remains the potential for conflict or interaction at water sources outside the no hunt zones as these are popular locations for both hunters and birders but in 25 years of hunting there have no conflicts reported on record.

This alternative also meets the purpose and needs of the Service as described above, because it would provide wildlife-dependent recreation opportunities. However, it does not allow for the variety of hunting opportunities that could be offered nor allow for alignment with state regulations.

Alternative B – Proposed Action Alternative
Under the Proposed Action Alternative, the refuge would expand the hunted species to include badger, bobcat, white-nosed coati, foxes, gallinule, merganser, snipe, mountain lion, raccoon, and ringtail. The hunt program for duck, goose, coot, mourning and white-wing doves, Eurasian collared-dove, mule and white-tailed deer, javelina, feral hog, cottontail rabbit, jackrabbits, coyote, and skunks would remain the same. Hunt seasons, bag limits, and methods of take will continue to be established by AZGFD. The impacts of the proposed action are similar to those of the no action alternative for most areas of consideration. The season dates, hunt locations, and times will not change. The expected increase in visitation is minimal as most of the new species are hunted incidental to other hunts. Additionally, many of the proposed species are nocturnal and night hunting is not proposed on the refuge. Areas around walking trails would remain closed to hunting and may offer other wildlife-dependent public use opportunities during hunting season. The impacts to other wildlife and endangered species are potentially beneficial in many ways. The majority of the species proposed to be opened are predatory and affect many facets of the ecosystem.

This alternative helps meet the purpose and needs of the Service as described above, because it provides additional wildlife-dependent recreation opportunities on the refuge meeting the Service's priorities and mandates. This alternative also helps align Service regulations with State regulations in an effort to making hunting more accessible to the public. The Service has determined that the proposed action is compatible with the purposes of the Buenos Aires NWR and the mission of the NWRS. The Service has the resources necessary to carry out the proposed action.

Monitoring

The AZGFD set harvest limits in each of the adjoining GMUs. AZGFD will continue to establish hunting seasons, method of take, and bag limit for all hunted species within the limits set forth above.

Biological monitoring of masked bobwhite, Pima pineapple cactus, Chiricahua leopard frog, and pronghorn will continue and an adaptive management approach for hunting if it is determined that this activity is impacting a listed species.

List of Sources, Agencies, and Persons Consulted

List of Preparers and Persons Consulted
Smith, Joshua T. Wildlife Refuge Specialist, Buenos Aires NWR
William R. Radke, Buenos Aires, Leslie Canyon, San Bernardino NWR, Refuge Manager
Stan Culling, Buenos Aires NWR, Assistant Refuge Manager
Juli Niemann, FWS Region 2, Landscape Architect
Aníbal Vázquez, FWS Region 2, Natural Resource Planner
Arizona Game and Fish Department

State Coordination
Throughout this planning process, the refuge supervisor for Arizona met with, in person or by telephone, AZGFD on several occasions. Key meetings occurred on May 17, 2019, September 13, 2019, and October 2, 2019. AZGFD supports the proposed action and requests further regulatory alignment outside the scope of this effort. Cooperation between the AZGFD, the Service, and BANWR has resulted in many positive and mutually beneficial outcomes.

Tribal Consultation
The refuge supervisor for Arizona sent a letter advising the leadership of the listed tribes of the proposed action and inviting comment on the Hunt Plan and this Environmental Assessment.

Tribes:

Fort McDowell Yavapai Nation	Cocopah Tribe of Arizona
Hualapai Indian Tribe	Tonto Apache Tribe of Arizona
Salt River Pima-Maricopa Indian Community	White Mountain Apache Tribe
Gila River Indian Community	Navajo Nation
Ak-Chin Indian Community	Yavapai-Prescott Indian Tribe
Tohono O'odham Nation of Arizona	San Carlos Apache Tribe
Colorado River Indian Tribes	Kaibab Band of Paiute Indians

Yavapai-Apache Nation
Havasupai Tribe
San Juan Southern Paiute Tribe
Hopi Tribe of Arizona
Pascua Yaqui Tribe of Arizona

Public Outreach

During informal scoping, public notices were displayed at the refuge visitor center, four kiosks, the library, post office and mercantile in Arivaca, the post office and mercantile in Sasabe, the refuge Facebook page, and the refuge website. During informal scoping the refuge received 21 comments, 18 either supported (11) or opposed (7) the proposed action without modification. Only three offered an alternate suggestion. The alternate offered by those three commenters was to eliminate hunting on the refuge entirely. Hunting is an historic use of this land and in accordance with the National Wildlife Refuge System Improvement Act of 1997 is an appropriate use of refuge lands. Hunting has previously been determined to be compatible with the refuge mission. Our mission has not changed. During the Department wide hunt and fish assessment refuge management considered which species we could and could not open with consideration to compatibility. The proposed action alternative was crafted under those same considerations. Eliminating hunting opportunities on the refuge that are not in conflict with the refuge mission would be inconsistent with Service policy and the mission of the refuge system.

This Environmental Assessment was available for public review and comment, along with the Buenos Aires National Wildlife Refuge Hunt Plan and the compatibility determination during the 69-day period between April 1 and June 8, 2020 via a Public Notice posted at the Sasabe and Arivaca post offices and on three kiosks within the refuge. Copies of this draft compatibility determination were posted on our refuge webpage and hard copies were available to visiting public at the visitor center.

The initial comment period was from April 1–30, 2020. During that time the documents were available on the refuge webpage. On May 1, 2020 the documents page expired and went unnoticed until commenters pointed out the documents were unavailable. This was remedied as quickly as possible (May 24, 2020). All commenters who requested the documents during the gap in availability were provided a pdf via email. During the gap the documents were still available at the refuge headquarters and on the regulations.gov website.

Public Comments

A total of 30 comments were received. Twenty-one were letters of support for the proposed action with no additional suggestions. Two were generally supportive but requested we consider opening the refuge to quail hunting for species other than the masked bobwhite. One was from the Arizona Game and Fish Department, commending the proposed action but requesting further alignment with state regulations. Six were opposed to any expansion of the hunting program especially predator hunting. Substantive comments are addressed in Appendix 3 and appropriate edits have been made within the document to answer or reconcile those concerns.

References

Altemus, Maria. Annual jackrabbit surveys on BANWR and Kings Anvil Ranch. 5 years of unpublished data.

Arizona Game and Fish Department — https://www.azgfd.com/Hunting/Species

Arizona Game and Fish Department. 2017. *Arizona Hunting Regulations 2017-18*. 140 pp.

Arizona Game and Fish Department. 2017. *Hunt Arizona, 2017 Edition: Survey, Harvest and Hunt Data for Big and Small Game*. 206 pp.

Arizona Game and Fish Department. 2017. Mountain Lion Fact Sheet. Understanding Mountain Lion Management in Arizona. 8 pp. Accessed August 13, 2019.

Arizona Game and Fish Department. 2019. Gearing up for a hunt? Don't forget the non-lead ammo. https://www.azgfd.com/gearing-up-for-a-hunt-dont-forget-the-non-lead-ammo-2/. Accessed December, 23, 2019.

Basmajian, Zach. 2017 Feral Swine History of an Expanding North American Threat and Eradication Efforts in Arizona, Colorado River Terrestrial and Riparian (CRTR) meeting. https://www.lcrmscp.gov/crtr/presentations/2017/crtr17_09.pdf

Biota Information System of New Mexico (BISON-M). 2008a. New Mexico Department of Game and Fish Species: Coati, White-nosed. Available at: http://bison-m.org/booklet.aspx?id=050165

Brown, David E. Professor of Wildlife Science, Arizona State University, School of Life Sciences (Retired), pers. comm.

Chapman, Joseph A. and Gerado Ceballos. 1990. The Cottontails. Pp. 95-110. Gland, Switzerland: IUCN.

Census 2010, Census 2000, Census 1990, and Census 1980. U.S. Census Bureau:

Crosswhite, Carol D., 1984, The Significance of Cacti in the Diet of the Javelina (Tayassu tajacu). Desert Plants, Volume 6, Number 1, Pp 4 – 8.

Final Environmental Impact Statement for the Rosemont Copper Project. Volume 2 https://www.rosemonteis.us/files/final-eis/rosemont-feis-vol-2.pdf

Fletcher, K., Aebischer, N.J., Baines, D., Foster, R. and Hoodless, A.N. 2010. Changes in breeding success and abundance of ground-nesting moorland birds in relation to the experimental deployment of legal predator control. Journal of Applied Ecology, 47: 263-272.

Harrington, J. L., and M. R. Conover. 2007. Does removing coyotes for livestock protection benefit free-ranging ungulates? Journal of Wildlife Management 71: 1555– 1560.

Klima, Karen. Terrestrial Wildlife Program Manager, Arizona Game and Fish Department, pers. comm., June 2019.

Posewitz, Jim, 1994. Beyond Fair Chase: The Ethics and Tradition of Hunting, Falcon Press Publishing Company, Inc.

Raftovich, R.V., K.K. Fleming, S. C. Chandler, and C.M. Cain, 2019. Migratory bird hunting activity and harvest during the 2017-18 and 2018-19 hunting seasons. U.S. Fish and Wildlife Service, Laurel, Maryland, USA.

Roberts, N. M. and S. M. Crimmins. 2010. Bobcat Population Status and Management in North America: Evidence of Large-Scale Population Increase. Journal of Fish and Wildlife Management, 1(2):169-174.

Romagosa, C.M. 2002. Eurasian Collard Doves. *The Birds of North America* 629:1-20

Schmalzel, Robert. Ecologist, Independent researcher, pers. comm.

Smith, R.K., Pullin, A.S., Stewart, G.B. and Sutherland, W.J. (2010), Effectiveness of Predator Removal for Enhancing Bird Populations. Conservation Biology, 24: 820-829.

Sowls, Lyle K. 1957. Reproduction in the Audubon cottontail in Arizona, Journal of Mammalogy. Vol. 38, No. 2, pp. 234-243

U.S. Fish and Wildlife Service. 1999. Buenos Aires National Wildlife Refuge Final Comprehensive Conservation Plan. 191 pp.

U.S. Fish and Wildlife Service. 1978 Recovery Plan for the Masked Bobwhite Quail. 24 pp.

U.S. Fish and Wildlife Service. 2013. Issuance of Annual Regulations Permitting the Hunting of Migratory Birds, Final Supplemental Environmental Impact Statement. USFWS, Division of Migratory Birds and Management, Laurel, MD. 418pp.

U.S. Fish and Wildlife Service. 2016. Adaptive Harvest Management: 2017 Hunting Season. U.S. Department of Interior, Washington, D.C.

U.S. Fish and Wildlife Service. 2019. Waterfowl population status, 2019. U.S. Department of the Interior, Washington, D.C. USA.

U.S. Geological Survey. 2017. SOUTHWEST CLIMATE SCIENCE CENTER ANNUAL REPORT 2016–17. https://prd-wret.s3-us-west-2.amazonaws.com/assets/palladium/production/s3fs-public/atoms/files/2016-2017_SWCASC_AnnualReport.pdf. Accessed December 23, 2019.

Appendix 1

OTHER APPLICABLE STATUTES, EXECUTIVE ORDERS & REGULATIONS

STATUTES, EXECUTIVE ORDERS, AND REGULATIONS	
Cultural Resources American Indian Religious Freedom Act, as amended, 42 U.S.C. 1996 – 1996a; 43 CFR Part 7 Antiquities Act of 1906, 16 U.S.C. 431-433; 43 CFR Part 3 Archaeological Resources Protection Act of 1979, 16 U.S.C. 470aa – 470mm; 18 CFR Part 1312; 32 CFR Part 229; 36 CFR Part 296; 43 CFR Part 7 National Historic Preservation Act of 1966, as amended, 16 U.S.C. 470-470x-6; 36 CFR Parts 60, 63, 78, 79, 800, 801, and 810 Paleontological Resources Protection Act, 16 U.S.C. 470aaa – 470aaa-11 Native American Graves Protection and Repatriation Act, 25 U.S.C. 3001-3013; 43 CFR Part 10 Executive Order 11593 – Protection and Enhancement of the Cultural Environment, 36 Fed. Reg. 8921 (1971) Executive Order 13007 – Indian Sacred Sites, 61 Fed. Reg. 26771 (1996)	The proposed action includes no ground-disturbing activities, or other activities that might disturb undocumented paleontological, archaeological, or historic sites.

Fish & Wildlife Bald and Golden Eagle Protection Act, as amended, 16 U.S.C. 668-668c, 50 CFR 22 Endangered Species Act of 1973, as amended, 16 U.S.C. 1531-1544; 36 CFR Part 13; 50 CFR Parts 10, 17, 23, 81, 217, 222, 225, 402, and 450 Fish and Wildlife Act of 1956, 16 U.S.C. 742 a-m Lacey Act, as amended, 16 U.S.C. 3371 et seq.; 15 CFR Parts 10, 11, 12, 14, 300, and 904 Migratory Bird Treaty Act, as amended, 16 U.S.C. 703-712; 50 CFR Parts 10, 12, 20, and 21 Executive Order 13186 – Responsibilities of Federal Agencies to Protect Migratory Birds, 66 Fed. Reg. 3853 (2001)	There are five federal threatened or endangered species on the refuge: the masked bobwhite, Chiricahua leopard frog, Pima pineapple cactus, Kearny's bluestar, and Southwestern willow flycatcher. An Intra-Service Section 7 Consultation was conducted with the Service's Tucson Ecological Services Field Office (02EAZZ00-2020-I-0430). The refuge is not designated critical habitat for any species. The proposed action is consistent with Executive Order 13186 because the Environmental Assessment for Hunting on Buenos Aires NWR evaluates the effects of agency actions on migratory birds.
Natural Resources Clean Air Act, as amended, 42 U.S.C. 7401-7671q; 40 CFR Parts 23, 50, 51, 52, 58, 60, 61, 82, and 93; 48 CFR Part 23 Wilderness Act, 16 U.S.C. 1131 et seq. Wild and Scenic Rivers Act, 16 U.S.C. 1271 et seq. Executive Order 13112 – Invasive Species, 64 Fed. Reg. 6183 (1999)	The Service has evaluated the suitability of the Buenos Aires National Wildlife Refuge for wilderness designation and concluded that the Refuge does not meet the basic criteria for inclusion into the National Wilderness Preservation System. The Service has evaluated the eligibility of streams on Buenos Aires National Wildlife Refuge for wild and scenic river designation and concluded no streams meet the basic criteria for inclusion into the National Wild and Scenic Rivers System. The proposed action would have negligible effects to air quality.

	The proposed action is consistent with Executive Order 13112 because stipulations in permits would be designed to prevent the introduction of invasive species.
Water Resources Coastal Zone Management Act of 1972, 16 U.S.C. 1451 et seq.; 15 CFR Parts 923, 930, 933 Federal Water Pollution Control Act of 1972 (commonly referred to as Clean Water Act), 33 U.S.C. 1251 et seq.; 33 CFR Parts 320-330; 40 CFR Parts 110, 112, 116, 117, 230-232, 323, and 328 Rivers and Harbors Act of 1899, as amended, 33 U.S.C. 401 et seq.; 33 CFR Parts 114, 115, 116, 321, 322, and 333 Safe Drinking Water Act of 1974, 42 U.S.C. 300f et seq.; 40 CFR Parts 141-148 Executive Order 11988 – Floodplain Management, 42 Fed. Reg. 26951 (1977) Executive Order 11990 – Protection of Wetlands, 42 Fed. Reg. 26961 (1977)	The refuge does not lie in a coastal zone, and contains no rivers, harbors, or navigable waters. There would be negligible impacts of the proposed action on water quality or water resources. The proposed action is consistent with Executive Order 11990 because implementation of the Hunt Plan would protect existing wetlands. The proposed action is consistent with Executive Order 11988, because implementation of the Hunt Plan would not result in the modification or destruction of floodplains.

Appendix 2

Hunted Species List

Common Name	Scientific Name
Gallinule	*Gallinula* spp.
Merganser	*Mergus* spp., *Lophodytes cucullatus*
Snipe	*Gallinago delicata*
Mountain lion	*Puma concolor*
Badger	*Taxidea taxus*
Bobcat	*Lynx rufus*
White-nosed coati	*Nasua narica*
Kit fox	*Vulpes macrotis*
Gray fox	*Urocyon cinereoargenteus*
Raccoon	*Procyon lotor*
Ringtail	*Bassariscus astutus*
Duck	*Anatidae*
Goose	*Anser* spp., *Branta* spp.
Coot	*Fulica americana*
White-winged dove	*Zenaida asiatica*
Mourning dove	*Zenaida macroura*
Eurasian collared-dove	*Streptopelia decaocto*
White-tailed deer	*Odocoileus virginianus cousei*
Mule deer	*Odocoileus hemionus*
Javelina	*Tayassu tajacu*
Feral hog	*Sus scrofa*
Black-tailed Jackrabbit	*Lepus californicus*
Antelope jackrabbit	*Lepus alleni*
Cottontail rabbit	*Sylvilagus audubonii*
Coyote	*Canis latrans*
Hooded Skunk	*Mephitis macroura*
Hog-nosed Skunk	*Conepatus mesoleucus*
Spotted Skunk	*Spilogale gracilis*
Striped Skunk	*Mephitis mephitis*

Appendix 3 – Response to Comments

This appendix identifies public comments received on the Buenos Aires National Wildlife Refuge Draft Hunt Plan and Environmental Assessment (EA) and the U.S. Fish and Wildlife Service's response to those comments.

All responses were analyzed using a process called content analysis. Content analysis organizes and groups comments made during the public comment period to reflect different resource issues. A number of issues were identified in the public's response to the Draft Plan/EA. Respondents were self-selected (i.e., they voluntarily provided comments); therefore their comments do not necessarily represent the sentiments of the public as a whole.

Response to Public Comments

The Service's response to public comments is shown in the following table. Some of the Service's response to public comments did not warrant changes to the Hunt Plan while others did. The comment portion of this table may contain a summarized and/or clarified version of the actual comment submitted. All comments are on file in the Buenos Aires National Wildlife Refuge Hunt Plan and EA Administrative File located at the refuge headquarters.

General Opposition to hunting was received in six comments. Generally, commenters mentioned that hunting is not consistent with what a refuge should be, and that it is not compatible with the refuge purpose. We also received comments that the proposed rule is a violation of the Service's mandate to "ensure that the biological integrity, diversity, and environmental health of the System are maintained for the benefit of present and future generations of Americans." (16 U.S.C 668dd(a)(4)(B))
Response: The Administration Act, as amended, stipulates that hunting (along with fishing, wildlife observation and photography, and environmental education and interpretation), if found to be compatible, is a legitimate and priority general public use of a refuge and should be facilitated. The Service prioritizes facilitating wildlife-dependent recreational opportunities, including hunting and fishing, on Service land in compliance with applicable Service law and policy. The Service has adopted policies and regulations implementing the requirements of the Administration Act that refuge managers comply with when considering hunting and fishing programs. We allow hunting of migratory birds and resident wildlife on NWRs only if such activity has been determined compatible with the established purpose(s) of the refuge and the mission of the Refuge System as required by the Administration Act. Hunting of migratory birds and resident wildlife on NWRs generally occurs consistent with State regulations, including seasons and bag limits. Refuge-specific hunting regulations can be more restrictive (but not more liberal) than State regulations and often are more restrictive in order to help meet specific refuge objectives. These objectives include migratory bird and resident wildlife population and habitat objectives, minimizing disturbance impacts to wildlife, maintaining high-quality opportunities for hunting and other wildlife-dependent recreation, eliminating or minimizing conflicts with other public uses and/or refuge management activities, and protecting public safety.

Each refuge manager makes a decision regarding hunting on that particular refuge only after rigorous examination of the available information, consultation and coordination with States and tribes, and compliance with the National Environmental Policy Act (NEPA; 42 U.S.C. 4321 et seq section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). and other applicable laws and regulations.

The many steps taken before a station opens or expands a hunting or fishing opportunity on the refuge ensure that the Service does not allow any opportunity that would compromise the purpose of the station or the mission of the agency. Developing or referencing a comprehensive conservation plan (CCP), a 15-year plan for the refuge, is generally the first step a refuge manager takes. Our policy for managing units of the NWRS is that we will manage all refuges in accordance with an approved CCP, which, when implemented, will achieve refuge purposes; help fulfill the Refuge System mission; maintain and, where appropriate, restore the ecological integrity of each refuge and the Refuge System; help achieve the goals of the National Wilderness Preservation System; and meet other mandates. The CCP will guide management decisions and set forth goals, objectives, and strategies to accomplish these ends. The next step for refuge managers is developing or referencing step-down plans, of which a hunting plan would be one. Part of the process for opening a refuge to hunting after completing the step-down plan would be appropriate compliance with the National Environmental Policy Act (NEPA; 42 U.S.C. 4321 et seq.), such as conducting an environmental assessment accompanied by the appropriate decision documentation (record of decision, finding of no significant impact, or environmental action memorandum or statement). The rest of the elements in the opening package are an evaluation of section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.), copies of letters requesting State and/or tribal involvement, and draft refuge-specific regulatory language. We make available the CCP, hunt plan, and NEPA documents, and request public comments on them, as well as on any proposed rule, before we allow hunting on a refuge.

In sum, this illustrates that the decision to allow hunting on an NWR is not a quick or simple process. It is full of deliberation and discussion, including review of all available data to determine the relative health of a population before we allow it to be hunted.

The word “refuge” includes the idea of providing a haven of safety for wildlife, and as such, hunting might seem an inconsistent use of the NWRS. However, again, the Administration Act stipulates that hunting, if found compatible, is a legitimate and priority general public use of a refuge. Furthermore, we manage refuges to support healthy wildlife populations that in many cases produce harvestable surpluses that are a renewable resource. As practiced on refuges, hunting does not pose a threat to wildlife populations. It is important to note that taking certain individuals through hunting does not necessarily reduce a population overall, as hunting can simply replace other types of mortality. In some cases, however, we use hunting as a management tool with the explicit goal of reducing a population; this is often the case with exotic and/or invasive species that threaten ecosystem stability. Therefore, facilitating hunting opportunities is an important aspect of the Service's roles and responsibilities as outlined in the legislation establishing the NWRS, and the Service will continue to facilitate these opportunities where compatible with the purpose of the specific refuge and the mission of the NWRS.

Note that not all refuges are inviolate sanctuaries. If we acquired a refuge as an inviolate sanctuary, we may open up to 40 percent of that refuge's area for hunting of migratory game birds (16 U.S.C. 668dd(d)(1)(A)). However, if we acquired a refuge without the stipulation that it be an inviolate sanctuary, we may open 100 percent of the refuge's area for hunting.

The Fish and Wildlife Improvement Act of 1978 (16 U.S.C. 742l) amended section 6 of the Administration Act to provide for the opening of all or any portion of an inviolate sanctuary to the taking of migratory birds if taking is determined to be beneficial to the species. Such opening of more than 40 percent of the refuge to hunting is determined by species. This amendment refers to inviolate sanctuaries created in the past or to be created in the future. It has no application to areas acquired for other management purposes.

We do not allow hunting on a refuge if it is found incompatible with that individual refuge's purposes or with the mission of the NWRS. Part of the mission of the National Wildlife Refuge System is to "ensure that the biological integrity, diversity, and environmental health of the System are maintained for the benefit of present and future generations of Americans." (16 U.S.C. 668dd(a)(4)(B)). Therefore, each Service station manager uses his or her "sound professional judgment" in making these inherently complex management decisions to ensure that each proposed action complies with this mandate. Each manager incorporates field experience, knowledge of refuge resources, considerations of the refuge's role within an ecosystem, applicable laws, and best available science in making these decisions. Service biologists and wildlife professionals, in consultation with the State, determine the optimal number of each game animal that should reside in an ecosystem and then establish hunt parameters (e.g., bag limits, sex ratios) based on those analyses. We carefully consider how a proposed hunt fits with individual refuge goals, objectives, and strategies before allowing the hunt. None of the new or expanded hunting opportunities are expected to individually or collectively result in significant adverse direct, indirect, or cumulative impacts to hunted populations of migratory birds and resident wildlife, non-hunted migratory and resident wildlife, T&E species, habitat and plant resources, or other natural resources.

General support to hunting was received in twenty-one comments.

Response: In passing the Improvement Act, Congress reaffirmed that the Refuge System was created to conserve fish, wildlife, plants, and their habitats, and would facilitate opportunities for Americans to participate in compatible wildlife-dependent recreation, including hunting and fishing on Refuge System lands. We did not make any changes as a result of these comments.

Quail Hunting Two commenters requested we evaluate and consider opening the refuge for quail species other than masked bobwhite (Gambel's, Scaled, and Montezuma).

Response: Hunting for Gambel's, Scaled, and Montezuma quail on the refuge was considered by refuge management; however, due to concerns for mistakenly shooting an endangered masked bobwhite quail, no quail species will be hunted at this time.

Reintroduction and recovery of masked bobwhite quail is a purpose of the refuge and quail hunting would not be compatible with the refuge purpose. Recent success in our masked bobwhite recovery efforts, as evidenced by an increasing wild population, would put recovery efforts at risk. Masked bobwhites are occasionally observed comingling with other quail species and the opportunity for accidental take is too high. Therefore, quail hunting is not being further considered at this time. Additional information was added to the EA's "Alternatives Considered, But Dismissed from Further Consideration" section on page 8.

Visitor use conflicts and concerns were voiced in multiple comments. Comments ranged from statements on how hunters will negatively impact other uses, how hunting is no longer popular and many people no longer hunt, while others showed concern that the estimated number of hunters for BANWR would have more than negligible effects on multiple environmental aspects.

Response: Congress, through the Administration Act, as amended, envisioned that hunting, fishing, wildlife observation and photography, and environmental education and interpretation would all be treated as priority public uses of the NWRS. Therefore, the Service facilitates all of these uses on refuges, as long as they are found compatible with the purposes of the specific refuge and the mission of the NWRS. We analyzed impacts of the proposed changes to hunting programs at each refuge through the NEPA process, which included analyzing impacts to other wildlife-dependent uses. We also provided opportunities for the public to comment on the proposed hunt opening and expansions when we developed the CCP, hunt plan, and compatibility determination, and through the NEPA process. The Service has determined that there are no significant impacts to other wildlife-dependent recreation opportunities.

In an effort to reduce user conflict, there are specific hunt seasons and restricting which parts of the refuge are open to hunting. The refuge will also use public outreach tools, such as signs and brochures, to make users aware of hunting and their options for minimizing conflict. The Service is aware of several studies showing a correlation between increased hunting and decreased wildlife sightings, which underscores the importance of using the aforementioned techniques, particularly time and space zoning of hunting, to ensure a quality experience for all refuge visitors.

Lead Use being unsafe/unhealthy was mentioned in one comment.

Response: The Service is concerned about the impacts of spent lead ammunition on scavengers, especially bald eagles and ravens. Lead shot for waterfowl hunting has been illegal on refuges since 1998. The Service continues to research this issue and engage with States and other partners to promote the use of non-lead ammunition. The Administration Act, as amended, directs the Service to make refuge regulations as consistent with State regulations as practicable. We share a strong partnership with the States in managing wildlife, and, therefore, we are proceeding with the phase-out of toxic ammunition in a coordinated manner with AZGFD.

The number of new hunters expected to be using lead bullets as a result of the new or expanded opportunities are expected to be very low and, so the resulting addition of lead into the environment was negligible or minor.

Species and habitat health concerns/comments included subjects such as social structure disruption, ecological impairment, and hunting of select species not being biologically supported.

Response: We disagree with the comments that hunters will have a significant enough impact to affect the gene pool of an entire population. We are not aware of any information that suggests hunting programs are shifting the genetic makeup of a population. In many cases, hunting is a tool used to manage populations and ensure a healthy ecosystem. Hunter participation on the BANWR is less than on adjacent public lands. The species proposed to be opened are generally not primary target species and are most often taken incidentally to other hunting activities. Anticipated take is minimal.

As described above we do not allow hunting on a refuge if it is found incompatible with that individual refuge's purposes or with the mission of the NWRS. Service biologists and wildlife professionals, in consultation with the AZGFD, determine the optimal number of each game animal that should reside in an ecosystem and then establish hunt parameters (e.g., bag limits, sex ratios) based on those analyses. We carefully consider how a proposed hunt fits with refuge goals, objectives, and strategies before allowing the hunt. None of the known, estimated, or projected harvests of species analyzed in this EA is expected to have significant adverse direct, indirect, or cumulative impacts to hunted populations, non-hunted wildlife, endangered or threatened species, plant or habitat resources, wildlife-dependent recreation, prescribed fire, air, soil, water, cultural resources, refuge facilities, or socio-economics.

When determining the compatibility of an activity, Service policy (603 FW 2) directs station managers to utilize all available data in exercising their sound professional judgement in the decision-making process. As detailed in a previous response, we do not take lightly the decision to allow hunting on a refuge, and we never allow hunting if there is evidence that it will impair the purposes of the refuge or the mission of the NWRS. Refuge managers use a variety of techniques to minimize disturbance to non-target species of wildlife. Refuge managers are authorized to suspend a hunt program at any time if it appears as though the hunt is causing unacceptable impacts to refuge values or resources.

Trophy hunting, population control, predators and trapping concerns were voiced stating that the only reason to hunt and trap predators would be for population control or trophy hunting. Concern was shown regarding cumulative impacts to predators biological importance, specifically bobcat, badger, coati and mountain lion. The refuge is not allowing trapping, therefore any comments associated with trapping are not pertinent.

Response: The Service does not attempt to define or authorize "trophy hunting" in any of our laws, regulations, or policies concerning hunting. We follow State hunting and fishing regulations, except for where we are more restrictive on individual stations, including State regulations concerning responsible hunting, or prohibitions on wanton waste (defined as "to intentionally waste something negligently or inappropriately"). As stated previously, we only allow hunting on the refuge when we have determined that the opportunity is sustainable and compatible.

All of the predator species listed, will be restricted to day time hunting hours, trapping will not be allowed, and pursuit with dogs will not be allowed. In regards specifically to bobcat, badger, coati, and mountain lion hunting, hunting of these species is limited by the hunt plan and harvest levels are not expected to have a negative impact on the population or negative impacts to the refuge landscape.

Environmental analysis concerns were voiced in multiple comments, suggesting that the proposed action is of sufficient context and intensity to indicate that it is significant enough to warrant an EIS, and that the Service did not adequately analyze the cumulative impacts.

Response: The Service disagrees with the assertion that we should prepare an EIS before expanding hunting opportunities on the refuge. The NEPA-related analysis of the impacts of the proposed action demonstrated that the hunt plan would not have significant impacts at the local or regional, and the commenter(s) provided no additional information that would change our analysis. As discussed above, we annually conduct management activities on refuges that minimize or offset impacts of hunting on physical and cultural resources, including establishing designated areas for hunting; restricting levels of use; confining access and travel to designated locations; providing education programs and materials for hunters, and other users; and conducting law enforcement activities.

The refuge reviewed readily available data from the State to determine the relative health of populations. The refuge plans to continually monitor refuge populations of hunted species, with the understanding that many hunted species utilize the open area of the refuge only as a portion of their overall range.

Further alignment with the State, additional consultation, and document clarification was requested by the Arizona Game and Fish Department (AZGFD). Generally, requests were made to fully align with State seasons, fully align with State methods of take, and fully align with State regulations.

The hunt plan, code of federal regulations, compatibility determination, and EA were modified for clarification on youth seasons, dove seasons, rabbit season dates and methods of take. Other typographical errors were corrected as identified by AZGFD. Some changes described in the hunt plan may not go fully into effect until they are added to State Hunting Regulations publication. Hunters will be made aware of the hunt program changes through brochures and the refuge website.

Response: The Service appreciates the thorough review of the hunt documents by AZGFD. The suggested edits have contributed to the clarity of the documents. BANWR has aligned our hunting regulations to the extent practicable within the limits of refuge compatibility. We look forward to continuing this mutually beneficial partnership and working together to improve the habitat and other conditions beneficial to all wildlife on the refuge.

Climate Change Three comments expressed concern the effects of climate change and persistent drought were not adequately considered in the cumulative impacts analysis.

Response: The Service considers the impacts of climate change in the management of wildlife and responds to a changing climate through its annual process of setting hunting seasons. Hunting seasons are based on monitoring and in coordination with our State partners.

In some circumstances, seasons may be adjusted based on predicted harvest rates, population levels, seasonal factors, and other assessments. While this process is not necessarily climate-based, over time, as the variables mentioned above change, the Service responds with altering its regulations. Oftentimes these changes are incremental and additive to previous changes and may go largely unnoticed. Any major changes in station or environmental conditions, such as an unsustainable decrease in a species population or sizeable increases in refuge acreage or public uses, would trigger additional planning, NEPA, compatibility, and Section 7 evaluation processes. The Service may reevaluate compatibility at any time if conditions warrant. These required planning and management processes ensure that adverse impacts will not accumulate over time.

We do not believe the minimal increase in hunting pressure will be additive to the impacts of climate change and drought on hunted species. It is likely that even a minimal decrease in the number of animals present will slow the potential long term effects of climate change by reducing the burden on resources. Refuge management takes the threat of climate change seriously. To mitigate the anticipated effects the refuge continually maintains water sources on the landscape. Increasing or maintaining available water on the refuge benefits all wildlife. All of the maintained ponds pre-date the establishment of the refuge and wildlife with generations of herd knowledge have relied on them for decades. Additional information was added to the cumulative impacts analysis in response to these comments.

Attachment 1: Refuge proximity map