



United States Department of the Interior



Fish and Wildlife Service
Arizona Ecological Services Office
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 Fax: (602) 242-2513

In Reply Refer to:
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Memorandum

October 2, 2014

To: Superintendent, Organ Pipe Cactus National Monument

From: Field Supervisor

Subject: Formal Section 7 Consultation on Implementation of the Ecological Restoration Plan on Organ Pipe Cactus National Monument, Cabeza Prieta National Wildlife Refuge, and Bureau of Land Management Ajo Block, Pima County, Arizona

This letter is in response to your August 15, 2014, request for formal consultation for implementation of your Ecological Restoration Plan on Organ Pipe Cactus National Monument, Cabeza Prieta National Wildlife Refuge, and Bureau of Land Management Ajo Block, Pima County, Arizona. Your request was received by us on August 15, 2014, and was made pursuant to section 7 of the Endangered Species Act of 1973 (ESA) as amended (16 U.S.C. 1531 *et seq.*). At issue are the impacts to Sonoran pronghorn (*Antilocapra americana sonoriensis*). You have determined that the project will have no effect on the lesser long-nosed bat (*Leptonycteris curasoae yerbabuanae*); therefore effects to this species are not addressed in this BO.

Part of Organ Pipe Cactus National Monument (west of Highway 85) is located within the endangered range of the Sonoran pronghorn (Figure 4); however, part of it (east of Highway 85) is within the nonessential experimental population (or 10(j)) range of the Sonoran pronghorn. Therefore, for section 7 consultation purposes, Sonoran pronghorn occurring or that may occur on the west side of Highway 85 within Organ Pipe Cactus National Monument are treated as a threatened species¹. Accordingly, this biological opinion addresses the effects of the proposed action on both the endangered and nonessential experimental populations of pronghorns within the action area.

¹ From USFWS 2011 (Final rule for the establishment of a nonessential experimental population (NEP) of Sonoran Pronghorn in southwestern Arizona): For the purposes of section 7 of the Act, we treat an NEP as a threatened species when the NEP is located within a National Wildlife Refuge or unit of the National Park Service, and section 7(a)(1) and the consultation requirements of section 7(a)(2) of the Act apply. Section 7(a)(1) requires all Federal agencies to use their authorities to carry out programs for the conservation of listed species. Section 7(a)(2) requires that Federal agencies, in consultation with the Service, ensure that any action authorized, funded, or carried out is not likely to jeopardize the continued existence of a listed species.

This biological opinion is based on the project proposal, literature, telephone conversations, field investigations, and other sources of information. Literature cited in this biological opinion is not a complete bibliography of all literature available on the Sonoran pronghorn, effects of ecological restoration on this species, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at this office.

CONSULTATION HISTORY

- February 11, 2008: We issued Customs and Border Protection a biological opinion for the Proposed Installation of 5.2 Miles of Primary Fence near Lukeville, Arizona (# 22410-2008-F-0011). One of the conservation measures included in this biological opinion (to help offset impacts to lesser long-nosed bats, Sonoran pronghorn, and other natural resources) was for Customs and Border Protection to provide funding to Organ Pipe Cactus National Monument to restore 84 acres, including illegal roads and trails within the Monument. This biological opinion for implementation of the Ecological Restoration Plan analyzes the effects of the restoration associated with the aforementioned offsetting measure.
- December 10, 2009: We issued Customs and Border Protection and Organ Pipe Cactus National Monument a biological opinion on the implementation of the SBInet Ajo-1 Tower Project, Pima County, Arizona (#22410-F-2009-0089). One of the offsetting measures for Sonoran pronghorn included in this biological opinion was the restoration of unauthorized vehicle routes (See “Offsetting Measure for Sonoran Pronghorn #1 in the biological opinion for SBInet Ajo-1 Tower Project, Ajo Area of Responsibility, U.S. Border Patrol, Tucson Sector, Arizona, #22410-F-2009-0089). This biological opinion for implementation of the Ecological Restoration Plan analyzes the effects of the restoration of unauthorized vehicle routes associated with the aforementioned offsetting measure.
- 2014: We regularly corresponded via conference calls, electronic mail, and meetings to discuss the proposed action.
- August 15, 2014: We received your request for formal consultation.
- August 2014 to September 2014: Our office regularly corresponded regarding the proposed action.

BIOLOGICAL OPINION

DESCRIPTION OF PROPOSED ACTION

A complete description of the proposed action is found in your August 15, 2014 Ecological Resources Plan (ERP) Biological Assessment. The proposed action includes restoration of disturbed lands on Organ Pipe Cactus National Monument (OPCNM), Cabeza Prieta National Wildlife Refuge (CPNWR) and Bureau of Land Management (BLM) Ajo Block. The project area includes all of OPCNM, all CPNWR lands east of the Pima County line, and a portion of the Ajo Block of BLM that is considered Sonoran pronghorn habitat (Figure 1).

This project supports the long term conservation needs of Department of Interior (DOI) agencies and specific conservation measures called for in the following two Biological Opinions: 1) Biological Opinion for the Proposed Installation of 5.2 Miles of Primary Fence near Lukeville, Arizona (#22410-2008-F-0011, issued February 11, 2008); and 2) Biological Opinion on SBInet Ajo-1 Tower Project, Ajo Area of Responsibility, U.S. Border Patrol, Tucson Sector, Arizona (#22410-F-2009-0089, 22410-1989-0078-R6, issued December 10, 2009).

In recent years, border-related activities (i.e., illegal border crosser and pursuant law enforcement activities) have increased in the project area, which has resulted in a proliferation of foot trails, single vehicle tracks, and established Undesignated Vehicle Routes (UVRs). UVRs are those vehicle routes occurring in the project area that do not form part of each respective DOI agency's administrative road system. The locations of many UVRs throughout the project area have been documented by the U.S. Fish and Wildlife Service (USFWS) and National Park Service (NPS). Recently, UVRs, new construction roads, and other disturbances within the project area were mapped using GIS technology and 2008, 2010, 2012, and 2013 aerial photography and other imagery (the UVR assessment was one of the offsetting measures called for in the SBInet Ajo-1 biological opinion). About 9,367 miles (15,075 kilometers (km)) of UVRs were documented in the project area and assigned to one of four condition classes indicating level of disturbance (1=least disturbed, 4=most disturbed) (Howard *et al.* 2014). Class I UVRs include routes used once or twice and some vegetation may be present within the vehicle tracks. Class II roads are generally dirt two-tracks with vegetation left and right as well as in the middle of the road still being intact. Class III and IV roads do not have much, if any vegetation, remaining in the middle and are usually multiple lanes wide. Ninety-two percent of UVR mileage was categorized as Class I (usually single-use vehicle tracks); 3.1% was Class II; 4.7% was Class III; and 0.2% was Class IV. There were 742.5 miles (1,195 km) of Class >1 UVRs documented. For UVR classes I, II, III, and IV respectively, the average UVR widths were estimated to be 7.2 feet (2.2 meters (m)), 7.9 feet (2.4 m), 8.4 feet (2.6 m), and 148.3 feet (45.2 m). The Growler Valley, which is shared between CPNWR and OPCNM, had the highest UVR density in the project area.

UVR inventories will continue to be periodically updated and this information will be used to help identify UVR restoration opportunities throughout the project area. For example, most recently, NPS began mapping new UVRs with GPS and confirming road classes by personnel on the ground. The new UVRs are not apparent on the 2013 satellite imagery, so it is likely that these UVRs have been created since the date of the imagery. This more recent information is not included in Howard *et al.*'s (2014) report.

The ERP describes the restoration of UVRs and other disturbed areas within the project area. The objectives of this project are to: 1) restore degraded natural areas to conditions that approximate their pre-disturbance states or alternate stable states; 2) preserve and protect natural conditions, ecological processes, and wilderness character; 3) preserve and protect archeological and historical sites and cultural landscapes; and 4) implement environmentally sound, cost effective restoration strategies and treatments.

Ecological restoration in the project area will use a full range of restoration techniques and types of treatments that achieve maximum effectiveness in restoring the health of ecological communities while minimizing risks to humans and natural and cultural resources. It will allow for site specific strategies and treatments to prevent or limit further disturbance, establish plant cover, decompact soils, establish natural contours and drainage patterns, manage invasive plants, reduce visibility of disturbed areas, and restore habitat for a number of species including the endangered Sonoran pronghorn and lesser long-nosed bat.

Project activities will begin immediately. Due to funding availability from Customs and Border Protection (CBP), a large amount of restoration will occur from fall 2014 through spring 2015 (considered the initial phase); however, restoration will continue into the foreseeable future as funding and resources become available. The total number of acres and miles of areas to be restored will depend on funding and resources to accomplish the work; however, the initial phase targets about 300 miles of UVRs with an average of 10 feet in width. Priority restoration zones A to G (Figure 2) within the project have been defined by USFWS (with concurrence from the Sonoran Pronghorn Restoration Team), with Zone A being the highest priority and Zone G being the lowest priority for Sonoran pronghorn habitat restoration. Habitat containing columnar cacti are priority areas for restoration for lesser long-nosed bat and include areas within zones E, F, A, and G in priority order. Restoration in high priority Sonoran pronghorn zones will take precedence over high priority bat zones (i.e., restoration will begin in Zone A and proceed accordingly). Project work plans will include site specific restoration actions and descriptions of anticipated invasive plant management activities and will typically be developed with input from all affected agencies and stakeholders.

Restoration treatment duration will depend on the condition of the UVR being treated. For Class II roads, the average estimated duration of treatment using hand crews is two days per mile. Treatment types are explained in detail below, but for example, Class II road treatment may include 1) placing wattles and restoration signs at the beginning of roads, 2) planting vegetation, and/or 3) placing vertical mulch available in the immediate area. For Class III and IV roads, where equipment would be used to try to approximate grade conditions prior to disturbance, the average estimated duration of treatment is two to three days per mile. Class III and IV road treatment may include 1) placing wattles and restoration signs at the beginning of roads, 2) planting vegetation and seeds, and/or 3) placing vertical mulch and possibly water to create a crust on the soil surface. Wattles will be used to re-establish natural hydrological function and some heavy machinery will be required to grade and level paths.

Ingress and egress for restoration and invasive plant management will be mainly by authorized roads, as defined by the interagency atlas (SW Arizona Regional Road Network, June 2012), and routes identified as authorized by each agency; however, access of UVRs will be necessary to restore them. Speed limits of 25 miles per hour or less for all project vehicles will be enforced. If, however, pronghorn are detected near the access roads, vehicles will slow to 5 to 15 mph until they are a safe distance from the pronghorn. Equipment and vehicles will be staged in previously disturbed areas, like the U.S. Border Patrol (USBP) Forward Operating Base (FOB), a previously used staging area located on BLM land adjacent to OPCNM's northern boundary (used during construction of the FOB), Papago Well on El Camino del Diablo on CPNWR, and/or the "tiger cage" (a maintenance storage area) on OPCNM.

It is anticipated that hand crews will be federal employees and/or contractors working with agencies. Most of the large-scale leveling work will be done by contracted crews. Work crews will likely only work within one zone at a time, but occasionally multiple crews may be simultaneously deployed and work in more than one zone. About 8 to 24 people per zone are anticipated to be working at the same time. Federal crew members will be mainly stationed/housed at OPCNM headquarters; however, they may also stay at the FOB on the boundary of OPCNM and CPNWR or Camp Titan at the Ajo Border Patrol Station. Contractors will likely be housed in Ajo.

Invasive Plant Management

In addition to restoration activities described further below, invasive plant management actions, an integral component of ecological restoration within the project area, will include: 1) creating and maintaining a geospatial database that contains information about the known locations of invasive plants and site specific management actions; 2) documenting the location and level of infestation of colonizing

species; 3) surveying areas where new species are commonly found, such as roadways and near large source populations on neighboring lands; 4) surveying areas that have never been surveyed; and 5) treatment of invasive species if resources are available or if the species become established on or adjacent to restoration plots.

Restoration and Invasive Plant Control Treatment Types

The restoration approach is to select the most appropriate treatment or combination of treatments with the least environmental impact to restore a site or control an invasive plant infestation, the latter using an integrated pest management approach. A number of different restoration treatments can be used to restore disturbed lands including: 1) behavioral, 2) manual, 3) chemical, and 4) mechanical as defined below.

Behavioral treatments include actions that promote native plant growth and prevent or discourage further site disturbance (e.g., sign placement, fencing, road delineation, placing slash/debris, and implementation of Best Management Practices). Behavioral treatments can be cost effective and useful on large areas. Behavioral treatments for invasive plants include public education and rigorous restrictions on introducing equipment or material that might contain invasive seeds into the project area.

Manual treatments include the use of non-motorized equipment on disturbed areas to decompact soil in small areas, recontour disturbed surfaces, scarify the soil before seeding, and dig holes to install nursery grown plants. To check surface flow, wattles, rocks or other natural materials will be placed in areas undergoing accelerated erosion or deposition due to the original disturbance. Invasive species control may involve digging or pulling plants (including roots) out of the ground or top killing to exhaust root reserves. Examples of manual treatments include: seeding, planting, hand pulling, raking, digging, picking, shoveling, and sawing.

Chemical treatments for invasive plants include the use of herbicides to kill or injure invasive plants and may be applied as pre- and post-emergent. Compared with manual treatments, herbicides help increase the amount of area that can be treated annually and reduce soil disturbance. Herbicides are more effective than manual control for invasive plants growing on bedrock or rocky substrates where root removal is difficult, and on species where manual and mechanical methods are not effective.

Mechanical treatments include the use of mechanized equipment throughout the project area. This treatment is often essential for decompacting soils or site leveling to prepare disturbed soils for seeding and planting, particularly at large sites. Site preparation is critical to restoration success, especially the establishment and growth of plants. Examples of mechanical treatments and tools including brush cutters and yard trimmers, chain saws, augers, backhoes, road graders, tractors, and other motorized equipment.

Strategy Types

Three restoration strategies will be employed: 1) passive, 2) facilitated, and 3) active. Each strategy uses a mixture of treatments and tools to restore a disturbed area. A site is defined as a single whole disturbed area, an entire UVR, a section of UVR, or a small or large area infested with invasive plants. The goal of a **passive** strategy is to prevent or discontinue further disturbance, and relies on behavioral treatments with some minor manual treatments. Education and compliance with area closures are the cornerstones of a passive strategy. If results from passive restoration are poor, the strategy would be reconsidered and transitioned to facilitated or active restoration.

The **facilitated** strategy uses behavioral, manual, and chemical treatments, but not mechanical treatments, to restore disturbed areas. Compared with a passive strategy, facilitated restoration involves more active intervention. Facilitated restoration involves activities such as manually removing invasive plants,

treating invasive plants with chemicals, seeding, planting nursery grown plants, using hand tools to decompact soils and smooth out areas to reestablish original contours, grades, and hydrology in small areas, and others. Sources for seeds and nursery grown plants are local to the project area and have been collected and grown over the last four years. The **active** strategy may be applied on moderately to severely disturbed sites with few or no remaining living plants. On these sites, intervention with all types of treatments will speed the successful recovery of the area. This strategy will use a combination of behavioral, manual, chemical, and mechanical treatments. Restoration activities will include, among others, mechanically decompacting soils, reestablishing hydrology and grade, and planting and seeding of native plants.

Project Tracking, Effectiveness Monitoring, and Reporting

All restoration efforts will be mapped in GIS and linked to a database containing site specific information. Selected indicators of vegetation, soils, and disturbance will be monitored at restoration sites to evaluate effectiveness. Restoration monitoring techniques may include: 1) taking repeat photos at permanent photopoints, 2) collecting data at plots and transects; and 3) aerial imagery. Techniques to monitor the effectiveness of invasive plant management may include: 1) documenting treated and untreated sites in surveyed areas using a GPS, 2) documenting negative search results, 3) revisiting treated sites to record and treat reinfestations, and 4) using a geospatial database in managing and evaluating treatment success. Compliance with road closures may be monitored with equipment such as traffic counters, trail cameras, and acoustic recorders. OPCNM will produce annual reports on the restoration program; the reports will include the mileage/acres of UVRs and disturbed areas treated per Restoration Zone, results from effectiveness monitoring, and other relevant statistics.

UVR Prevention

To help prevent the creation of new UVRs and further use of UVRs under restoration, the DOI agencies are working closely with USBP. Methods to reduce UVR creation or re-use include placement of woody debris, wattles, and/or signs at the access points of UVRs.

Conservation Measures

To avoid or minimize the potential impacts to Sonoran pronghorn, other wildlife, and native plants from personnel, equipment, or activities/actions associated with implementation of the ERP, the following measures will be implemented (a complete list of conservation measures can be found on page 20 of the ERP BA).

1. To reduce noise and emissions, vehicles will not be permitted to idle for long periods of time.
2. Care will be taken not to disturb wildlife found nesting, hibernating, or otherwise living in or immediately nearby the work sites.
3. The smallest number of vehicles and ingress/egress trips to the restoration sites will be used to accomplish the restoration work.
4. During the planning of restoration activities, the results from OPCNM and AGFD Sonoran pronghorn monitoring surveys will be used to identify areas where Sonoran pronghorn have occurred recently. This will help identify areas where pronghorn are likely to occur and avoid those areas should animals be present.
5. To the extent possible, no mechanical treatments will be conducted in Sonoran pronghorn habitat during the fawning season, usually mid-March to mid-July.
6. Outside of the fawning season, each morning prior to the implementation of planned mechanical restoration work, a 20-minute survey (e.g., visual, telemetry) for Sonoran pronghorn will be conducted by a trained biologist using spotting scope and binoculars. This survey will be conducted from elevated locations (e.g. hill top or man-made platform) that overlook the planned

- restoration site. If Sonoran pronghorn are detected, no mechanical treatments will begin until pronghorn move on their own volition to a distance greater than one mile from the restoration site.
7. If mechanical work must be conducted during the fawning season, each morning prior to the implementation of planned mechanical restoration work, as well as at mid-day (i.e., after lunch), a 20-minute survey (e.g., visual, telemetry) for Sonoran pronghorn will be conducted by a trained biologist using spotting scope and binoculars. These surveys will be conducted from elevated locations (e.g. hill top or man-made platform) that overlook the planned restoration site. If Sonoran pronghorn are detected, no mechanical treatments will begin until pronghorn move on their own volition to a distance greater than one mile from the restoration site. The mid-day survey will be conducted because project activities will move throughout the day (for example, along a linear UVR path) away from the original survey site, thus warranting a new survey.
 8. During the implementation of manual, behavioral, or chemical treatments, a pronghorn monitoring and avoidance protocol will be followed. This protocol will be developed and agreed upon by the NPS, BLM, and FWS (CPNWR and AESO).
 9. Most behavioral, chemical, and manual treatments will be conducted outside of the fawning season; however, they may be conducted in Sonoran pronghorn habitat during the fawning season, usually mid-March to mid-July, in areas within 300 feet from centerline of administrative roads.
 10. When range conditions are appropriate during the fawning season (as determined by Sonoran Pronghorn Recovery Team), behavioral, chemical, and manual treatments may be carried out in Sonoran pronghorn habitat in areas greater than 300 feet from centerline of administrative roads in accordance with the protocol.
 11. Field staff will be trained to identify and look for pronghorn and notify the trained biologist if pronghorn are detected. The trained biologist will follow the established protocol regarding appropriate actions to take when pronghorn are detected in proximity to the restoration site.
 12. Speed limits of 25 miles per hour or less for all project vehicles will be enforced. If, however, pronghorn are detected near the access roads, vehicles will slow to 5 to 15 mph until they are a safe distance from the pronghorn.
 13. All known populations of Quitobaquito pupfish (*Cyprinodon eremus*) within the action area and all designated critical habitat for this species will be buffered from all ERP treatment activities by 50 meters.
 14. To protect forage resources for the lesser long-nosed bat, no saguaros (*Carnegiea gigantea*) or organ pipe cacti (*Stenocereus thurberi*) will be killed or disturbed by restoration activities.
 15. All project work will be conducted during daylight hours.
 16. Pesticide applicators will receive training on identification of threatened, endangered, or candidate plants.
 17. Herbicides that are of low toxicity to wildlife and/or that will degrade before wildlife are likely to encounter them will be used, to the extent practicable, and applied in a manner that uses the least amount, but still remains effective.
 18. Ground based equipment, including backpack herbicide sprayers and spray units on trucks will be used in low wind conditions, and only applied using coarse sprays to minimize the potential for drift.
 19. All relevant conservation measures will be included in contracts with groups conducting the restoration work.

STATUS OF THE SPECIES - SONORAN PRONGHORN

A. Description, Legal Status, and Recovery Planning

The Sonoran subspecies of pronghorn (*Antilocapra americana sonoriensis*) was first described by Goldman (1945) and is the smallest of the four subspecies of pronghorn (Nowak and Paradiso 1983, Brown and Ockenfels 2007). The subspecies was listed throughout its range as endangered on March 11, 1967 (32 FR 4001) under the Endangered Species Preservation Act of October 15, 1966 without critical habitat. Four populations of the Sonoran pronghorn are extant: 1) a U.S. population in southwestern Arizona on CPNWR, OPCNM, BLM – Ajo Block, and Barry M. Goldwater Range (BMGR) (endangered population), 2) a population in southwestern Arizona on Kofa NWR, YPG, and surrounding areas (nonessential experimental 10(j) population) (established in 2013), 3) a population in the Pinacate Region of northwestern Sonora, and 4) a population on the Gulf of California west and north of Caborca, Sonora. The four populations are predominantly geographically isolated due to barriers such as roads and fences. Recently in Arizona 2014, several individuals (from the endangered population) crossed Highway 85 and spent some time on the east side of OPCNM within the nonessential essential experimental range of the species. Although animals that cross Highway 85 into the eastern portion of OPCNM (i.e., within the nonessential experimental boundary) are biologically considered part of the endangered population in Arizona, for section 7 purposes they are treated as part of the nonessential experimental population (USFWS 2011).

The 1982 Sonoran Pronghorn Recovery Plan (U.S. Fish and Wildlife Service 1982) was revised in 1998 (U.S. Fish and Wildlife Service 1998). The recovery criteria presented in the revised plan entailed the establishment of a population of 300 adult pronghorn in one self-sustaining population for a minimum of five years, as well as the establishment of at least one other self-sustaining population in the U.S. to reclassify the subspecies to threatened. Actions identified as necessary to achieve these goals include the following: 1) enhance present sub-populations of pronghorn by providing supplemental forage and/or water; 2) determine habitat needs and protect present range; 3) investigate and address potential barriers to expansion of presently used range and investigate, evaluate, and prioritize present and potential future reintroduction sites within historical range; 4) establish and monitor a new, separate herd(s) to guard against catastrophes decimating the core population, and investigate captive breeding; 5) continue monitoring sub-populations and maintain a protocol for a repeatable and comparable survey technique; and 6) examine additional specimen evidence available to assist in verification of taxonomic status. In 2001 a supplement and amendment to the 1998 Final Revised Sonoran Pronghorn Recovery Plan was prepared (U.S. Fish and Wildlife Service 2001). We concluded that data do not yet exist to support establishing delisting criteria. Tasks necessary to accomplish reclassification to threatened status (as outlined in the 1998 plan) should provide the information necessary to determine if and when delisting will be possible and what the criteria should be.

The USFWS and the Sonoran Pronghorn Recovery Team (Team) are currently revising the Sonoran Pronghorn Recovery Plan. The revised plan will address Sonoran pronghorn populations both in Mexico and the U.S. and will be finalized in 2015.

B. Life History and Habitat

Sonoran pronghorn inhabit one of the hottest and driest portions of the Sonoran Desert. They forage on a large variety of perennial and annual plant species (Hughes and Smith 1990, Hervert *et al.* 1997b, U.S. Fish and Wildlife Service 1998). During drought years, Hughes and Smith (1990) reported cacti were the major dietary component (44 percent). Consumption of cacti, especially chain fruit cholla

(*Cylindropuntia fulgida*, Pinkava 1999), provides a source of water during hot, dry conditions (Hervert *et al.* 1997b). Other important plant species in the diet of the pronghorn include pigweed (*Amaranthus palmeri*), ragweed (*Ambrosia* sp.), locoweed (*Astragalus* sp.), brome (*Bromus* sp.), and snakeweed (*Gutierrezia sarothrae*) (U.S. Fish and Wildlife Service 1998). Pronghorn will move in response to spatial limitations in forage availability (Hervert *et al.* 1997a). Water intake from forage is not adequate to meet minimum water requirements (Fox *et al.* 2000), hence pronghorn need and readily use both natural and artificial water sources (Morgart *et al.* 2005).

Sonoran pronghorn rut during July-September, and does have been observed with newborn fawns from February through May. Parturition corresponds with annual spring forage abundance. Within the endangered Arizona pronghorn range, fawning may occur throughout the range. Does usually have twins, and fawns suckle for about two months. Does gather with fawns, and fawns sometimes form nursery groups (U.S. Fish and Wildlife Service 1998). Sonoran pronghorn form small herds of up to 21 animals (Wright and deVos 1986).

Telemetry locations of 35 Sonoran pronghorn within the endangered Arizona range demonstrated that during 1995-2002, pronghorn used creosote/bursage and palo verde/mixed cactus vegetation associations less than expected or equal to availability. Pronghorn use of palo verde/chain fruit cholla associations and desert washes occurred more than expected. However, during the cool and wet winter on 1997-1998, pronghorn (also in the Arizona endangered range) were found in creosote/bursage associations more than expected (Hervert *et al.* 2005). In contrast, during 1983-1991, pronghorn used creosote/bursage and palo verde mixed cacti associations more than expected (deVos and Miller 2005). Differences between these study results may be due in part to differences in precipitation and forage patterns between these periods. The earlier period was wetter with greater forage availability in flats and valleys where creosote/bursage associations predominate. In the endangered Arizona pronghorn range, in wet winters and early spring pronghorn are often found in flats and valleys, such as Pinta Sands, the Mohawk Dunes west of the Mohawk Mountains, and the west side of the Aguila Mountains. In late spring and summer, pronghorn then move from the flats and valleys upslope into bajadas and often south or southeast where palo verde associations, chain fruit cholla, and washes are more common. Movements are most likely motivated by the need for thermal cover provided by leguminous trees and water available in succulent chain fruit cholla (Hervert *et al.* 1997b). Home range size of Sonoran pronghorn in the endangered Arizona range during 1995-2002 ranged from 16.6 to 1,109 mi², with an average of 197 ± 257 mi² (Hervert *et al.* 2005).

From 1995-2002, adult mortality rates varied from 11-83%. Adults were killed by coyotes, bobcats, mountain lions, capturing efforts, drought, and unknown causes (Bright and Hervert 2005). However, during 1983-1991, apparently a more favorable period for pronghorn during which the population grew significantly, mean annual survival of females and males was $96\% \pm 0.04$ and $92\% \pm 0.04$ (deVos and Miller 2005). Disease may affect mortality, but has not been thoroughly investigated (Bright and Hervert 2005). Hervert *et al.* (2000) found that the number of fawns surviving until the first summer rains was significantly correlated to the amount of preceding winter rainfall, and negatively correlated to the number of days without rain between the last winter rain and the first summer rain. Drought may be a major factor in the survival of adults and fawns (Bright and Hervert 2005). Three radio-collared pronghorn died in July and August of 2002 with no obvious cause of death. Given that 2002 was one of the driest years on record, the proximate causes of these mortalities were likely heat stress and/or malnutrition resulting from inadequate forage conditions due to drought.

C. Distribution and Abundance

United States

Endangered Wild Population

Historically, the Sonoran pronghorn ranged in the U.S. from approximately the Santa Cruz River in the east, to the Gila Bend and Kofa Mountains to the north, and to Imperial Valley, California, to the west (Mearns 1907, Nelson 1925, Monson 1968, Wright and deVos 1986, Paradiso and Nowak 1971; Figure 3). Bright *et al.* (2001) defined the present U.S. range of the Sonoran pronghorn as bordered by Interstate 8 to the north, the International Border to the south, the Copper and Cabeza mountains to the west, and SR 85 to the east (see Figure 4). This area encompasses 2,508 mi² (Bright *et al.* 2001).

While Mearns (1907) suggested that pronghorn may have been common in some areas in the late 1800s, evidence suggests that the sub-population declined dramatically in the early 20th century. Sub-population estimates for Arizona, which only began in 1925, have never shown the pronghorn to be abundant (Table 1). Repeatable, systematic surveys were not conducted in Arizona until 1992. Since 1992, Sonoran pronghorn in the United States have been surveyed biennially (Bright *et al.* 1999, 2001) using aerial line transects (Johnson *et al.* 1991). Sub-population estimates from these transects have been derived using three different estimators (Table 2). Table 2 presents observation data from transects and compares estimates derived from the different population models from 1992 through 2006, plus other estimates 2008 to 2012. The sightability model population estimates from 1992 to 2000 showed a 45 percent decrease in sub-population size (Table 2). The estimates indicate a steady decline in sub-population size, with the exception of the 1994 survey. The 1994 estimate may be somewhat inflated due to inconsistencies in survey timing (U.S. Fish and Wildlife Service 1998, Bright *et al.* 2001).

High fawn mortality in 1995 and 1996 and the death of half (8 of 16) of the adult, radio-collared pronghorn during the 13 months preceding the December 1996 survey corresponded to five consecutive six-month seasons of below normal precipitation (summer 1994 through summer 1996) throughout most of the Sonoran pronghorn range, which likely contributed, in part, to observed mortality (Bright *et al.* 2001, Hervert *et al.* 1997b). Mortality of Sonoran pronghorn in 2002 was exceptionally high (Bright and Hervert 2005). At the start of the year, seven radio-collared Sonoran pronghorn were at large in the U.S. sub-population. By December 2002, all but one of these had died. For most, drought stress was considered to be the proximate cause. For those animals that may have succumbed to predation, it was suspected that drought stress was again a factor, by making the animal more vulnerable to predation, due to an emaciated physical condition and being forced into predator habitats by drought. The 2002 drought was one of the driest on record. As an example, annual rainfall at the OPCNM visitor center was only 2.54 inches in 2002 (Tim Tibbitts, Organ Pipe Cactus National Monument, personal communication 2002); average annual rainfall for the visitor center is 9.2 inches (Brown 1982). The November/December 2002 population survey revealed the U.S. sub-population had declined to the lowest level ever recorded. A total of 18 pronghorn were observed, in three groups (8, 9, and 1). The sightability model resulted in a population estimate of 21 animals, or a 79% decline from 2000. Also, very few fawns survived in 2002 to replace these dying adults.

Although drought was likely the proximate cause of the dramatic decline of the U.S. endangered sub-population in 2002, anthropogenic factors almost certainly contributed to or exacerbated the effects of the drought. Historically, pronghorn likely moved to wetted areas and foraged along the Río Sonoyta, Sonora, and the Gila and probably Colorado rivers during drought. These areas are no longer accessible to the U.S. population due to fences, Interstate 8, Mexico Highway 2, and other barriers. The rate of

decline in the U.S. sub-population from 2000-2002 (79 percent) was also much greater than that observed in either the sub-population southeast of Highway 8 (18 percent decline) or the El Pinacate sub-population (26 percent) during the same period (see discussion of Mexican sub-populations in the next section). Observations of forage availability suggest the El Pinacate sub-population experienced the same severe drought that occurred on the Arizona side (T. Tibbitts, J. Morgart, personal communication 2003). Yet that sub-population fared much better than its U.S. counterpart. The high level of human activities and disturbance on the U.S. side, particularly in regard to cross-border violator (CBV) traffic, smugglers, and required law enforcement response, as compared to what occurs in the El Pinacate area, was a likely contributing factor in the differing rates of decline observed north and south of the border. See the section entitled “Drought” in the Environmental Baseline and “Cumulative Effects” for further discussion.

The December 2004, 2006, 2008, 2010, and 2012 aerial surveys resulted in an estimated 58, 58, 68, 85, and 159, respectively, pronghorn in the U.S. endangered population (Tables 1 and 2), a substantial increase brought on by the implementation of ongoing recovery measures and improved range conditions since 2002. The 2006, 2008, and 2012 estimates included a number of captive-born individuals that were newly released into the wild (see below for more information on the captive breeding programs). During the 2008 and 2010 surveys, observers noted a skewed sex ratio (approximately 2:1) with more males than females; this affects the rate at which the population may increase.

Since 2002, when the Sonoran pronghorn population in Arizona declined to about 21 animals, recovery efforts of the Team and its partners have helped the wild population in Arizona increase nearly eight-fold. Key recovery actions include implementing captive breeding, waters, and supplement feeding programs, as well as operating forage enhancement plots. Although the U.S. Sonoran pronghorn population has increased significantly, until the most recent survey of 2012, the increase was not as great as the Team had predicted given the adequate to favorable range conditions since 2002, as well as the previously mentioned recovery efforts. Some members of the Team believe that this slow pronghorn population growth (caused by low fawn recruitment) is likely correlated with high CBV and USBP activity within the pronghorn range. Strong evidence of this correlation has been seen during the biennial aerial surveys where, since 2000, off-road vehicle tracks have been seen progressively increasing in extent and density, throughout the endangered pronghorn’s U.S. range (electronic mail from Tim Tibbitts, Organ Pipe Cactus National Monument and member of the Sonoran Pronghorn Recovery Team, September 21, 2009). Between 2010 and 2012, the wild pronghorn population benefitted from better than average rainfall during 2011 and 2012 which resulted in a robust fawn crop of 78 fawns per 100 does during 2012.

In addition to the endangered population described above, a wild population is currently being reestablished at the Kofa NWR as an experimental, nonessential population under section 10(j) of the Act (see more detailed information below).

Semi-captive Breeding Facilities and 10(j) Wild Population

As part of a comprehensive emergency recovery program, a total of 11 adult pronghorn (10 females and one male) were initially captured (from Sonora and Arizona) and placed into a semi-captive breeding pen at CPNWR in 2004. The breeding program has been very successful and there are currently (as of January 2014) 61 pronghorn in the enclosure at CPNWR. Since establishing the program, about 19 pronghorn older than current year have died in the pen due to various causes, including one confirmed case of epizootic hemorrhagic disease, two from malnutrition prior to the introduction of alfalfa hay in the pen, two from bobcat predation, one from entanglement in the fence, and two from capture operations. Eight deaths were from unknown causes and although disease was suspected, it could not be confirmed. Sonoran pronghorn have been released from the pen every year since 2006. As of January 2014, about

100 individuals have been released into the endangered population, many of which are known to still be alive.

The objective is to produce at least 20 fawns each year to be released into the current U.S. population, and to establish additional U.S. populations at Kofa NWR and BMGR East, east of Highway 85. The additional populations are being established as experimental, nonessential populations under section 10(j) of the Act. A final Environmental Assessment and final 10(j) rule (USFWS 2011) were published in April and May, 2011, respectively. See Figure 5 for a map of 10(j) Nonessential Experimental Population area for Sonoran pronghorn in southwestern Arizona. In December 2011, 13 Sonoran pronghorn were moved from the CPNWR breeding pen to the newly built breeding pen in the King Valley on Kofa NWR. One of the animals died due to capture myopathy and one died of unknown causes, leaving 11 (9 does and 2 bucks) in the pen for breeding purposes. In December 2012, 11 additional pronghorn were moved to the Kofa NWR from the CPNWR breeding pen, including two replacement breeder does for the Kofa breeding pen and nine pronghorn (three does and six bucks) for release into the wild. In September 2012, one adult doe was killed by a bobcat in the Kofa breeding pen. In December 2013, 16 additional pronghorn were moved to the Kofa NWR from the CPNWR, all of which were for release into the wild (one doe, however, had to be moved back into the breeding pen). As of February 2014, the Kofa pen contains 17 pronghorn.

Sonoran pronghorn have now been released in the King Valley on Kofa NWR in January 2013 (nine animals) and January 2014 (24 animals, including 9 from the Kofa pen and 15 from the CPNWR pen). Of the nine released in 2013, five are known to still be alive, one is unaccounted for. Three of these (two does and a buck) have been documented using a water source on the Yuma Proving Ground; most recently, in January 2014, they were documented near the Neversweat Mountains in King Valley. Two bucks released in 2013 were recaptured in the Kofa breeding pen because their collars prematurely failed and there was no way to track them. One of them was re-released in 2014. All 24 of the animals released in 2014 are still alive and nine wild-born fawns were documented in April. Therefore, in total there should be 27 wild adult pronghorn and nine fawns in the 10(j) population, as of April 2014.

Additionally, recently in Arizona 2014, several individuals (from the endangered population) crossed Highway 85 and spent some time on the east side of OPCNM within the nonessential essential experimental range of the species. Although animals that cross Highway 85 into the eastern portion of OPCNM (i.e., within the nonessential experimental boundary) are biologically considered part of the endangered population in Arizona, for section 7 purposes they are treated as part of the nonessential experimental population (U.S. Fish and Wildlife Service 2011).

Mexico

Historically, Sonoran pronghorn ranged in Sonora from the Arizona border south to Hermosillo and Kino Bay, west to at least the Sierra del Rosario, and east to the area south of the Baboquivari Valley on the Tohono O'odham Nation (Nelson 1925, Carr 1974, Monson 1968). The distribution in Baja California is less clear, but observations by Mearns (1907) indicate they occurred in the Colorado Desert west of the Colorado River, as well. Sonoran pronghorn are currently extant in two sub-populations in Mexico, including: (1) Pinacate sub-population west of Highway 8 near the Pinacate Lava flow; and (2) north and west of Caborca and southeast of Highway 8.

Sub-populations of Sonoran pronghorn in Sonora had not been thoroughly surveyed until the December 2000 surveys (Bright *et al.* 2001), at which time 346 pronghorn were estimated to occur in Sonora. Although the 1993 estimate was approximate, survey results suggested a decline in the sub-populations of 16 percent from 1993 to 2000 (Table 3). Since 2000, the two Mexico sub-populations have been

resurveyed biennially, with the exception of the winters of 2004/05 and 2005/06, when they were surveyed both years, and the winter of 2013/2014 when the Pinacate sub-population could not be surveyed. In December 2002, a total (both El Pinacate and southeast of Highway 8) of 214 pronghorn in 32 groups were seen for a tentative population estimate of 280, indicating further decline. Only 19 pronghorn were observed in the Pinacate area for an estimate of 25, which is a decline of 26% from the 2000 estimate. Surveys conducted in December 2004 and February 2005 demonstrated that the population southeast of Highway 8 increased to 625 (439 observed), while the Pinacate population increased to 59 (30 observed) (684 total estimated, 469 total observed). In 2004, several capture-related mortalities occurred in Sonora associated with efforts to capture pronghorn to stock the breeding pen in Arizona. Since then, capture protocols were examined and improved. In January 2006, surveys indicated that pronghorn numbers remained relatively steady with an estimated total of 634 (486 observed) individuals (combined for both populations). Nine of these were captured, of which five were fitted with radio-collars and released and four were transferred to the semi-captive breeding facility in the U.S.

In December 2007, surveys indicated pronghorn numbers declined with an estimated total of 404 (360 observed) individuals combined for both populations (including 354 pronghorn [325 observed] in the area southeast of Mexico Highway 8 and 50 [35 observed] to the west of the highway). Of these pronghorn, four pronghorn (three does and 1 buck) from the Pinacate Biosphere Reserve were captured and fitted with GPS radio collars. The male was found dead during a subsequent telemetry flight; his death was likely capture-related as his temperature rose dangerously high during the collaring effort. The decrease in Sonoran pronghorn population in Sonora from 2006 to 2007 is likely attributable, at least in part, to drought conditions in the pronghorn range in Mexico. During the aerial surveys, observers noted many extremely dry areas and some areas where the vegetation appeared dead in the pronghorn range. Additionally, an increasing number of fences and mine expansion within the range of the southeastern pronghorn population may be adversely affecting this population. In December 2009, surveys indicated pronghorn numbers increased somewhat with an estimated total of 482 (311 observed) individuals combined for both populations (including 381 pronghorn [258 observed] in the area southeast of Mexico Highway 8 and 101 [53 observed] to the west of the highway). In December 2011, surveys indicated pronghorn numbers drastically decreased with an estimated total of 241 (197 observed) individuals combined for both populations (including 189 pronghorn [167 observed] in the area southeast of Mexico Highway 8 and 52 [30 observed] to the west of the highway). In December 2013, surveys could not be conducted for the Sonoran pronghorn population west Mexico Highway 8 (Pinacate region) due to aircraft shortage; however, surveys of the population in the area southeast of Mexico Highway 8 indicated pronghorn numbers increased since 2011, with an estimated 2013 total of 434 (372 observed) (Table 3).

D. Threats

Barriers that Limit Distribution and Movement

Highways, fences, railroads, developed areas, and irrigation canals can block access to essential forage or water resources. Brown and Ockenfels (2007) report that numerous railroad and highways bisect what was former contiguous pronghorn habitat, often dividing these rangelands into parcels too small to support, viable, long-term populations of pronghorn in Arizona. Furthermore, they state railroads and paved highways are especially restrictive, as in addition to acting as intimidating barriers in their own right, they are often fenced on both sides of the right-of-way.

Highways 2 and 8 in Sonora, and SR 85 between Gila Bend and Lukeville, Arizona support a considerable amount of fast-moving vehicular traffic, are fenced in some areas, and are likely a substantial barrier to Sonoran pronghorn (one pen-raised radio-collared male crossed SR 85 and Mexican Highway 2; however, this is considered highly unusual). Interstate 8, the Wellton-Mohawk and Palomas

Canals, agriculture, a railroad, and associated fences and human disturbance near the Gila River act as barriers for northward movement of pronghorn.

Canals have been the cause of six pronghorn deaths since 2008. Three pen-raised pronghorn drowned in the Palomas Canal in 2008, one pen-raised pronghorn drowned in the Wellton Canal in 2010, and two pen-raised pronghorn (part of the 10(j) population) died due to falling in the Wellton-Mohawk Canal in 2013 (specifically, one drowned and one died within days after being rescued from the canal).

De-watering of reaches of the Río Sonoyta and lower Gila River has also caused significant loss of habitat and loss of access to water (Wright and deVos 1986). Agricultural, urban, and commercial development at Sonoyta, Puerto Peñasco, and San Luis Río Colorado, Sonora; in the Mexicali Valley, Baja California; and at Ajo, Yuma, and along the Gila River, Arizona, have further removed habitat and created barriers to movement.

Vehicular Collision with Sonoran Pronghorn

Although vehicle collisions with Sonoran pronghorn are rare, it has been documented. An adult male pronghorn was struck and killed by a vehicle near kilometer post 29 on Mexico Highway 8 in July of 1996 (U.S. Fish and Wildlife Service 2002). National Park Service records include a Sonoran pronghorn found dead just east of SR 85 along Ajo Mountain Drive in 1972. It was suspected to have been struck and killed by a vehicle (electronic mail from Tim Tibbitts, OPCNM, September 1, 2011). In 2003/2004 John Hervert (AGFD) investigated a Sonoran pronghorn mortality found a few hundred feet from Interstate 8. It had a broken leg, and so vehicle collision was suspected. In 2013, a doe was found dead east of Tacna on private property; based on initial examination it appears she may have been hit by a vehicle along a high speed dirt road. We are trying to open a USFWS investigation so that the animal can be sent to our forensics lab for further investigation.

Human-caused Disturbance

A variety of human activities occur throughout the range of the pronghorn that have the potential to disturb pronghorn or its habitat, including livestock grazing in the U.S. and Mexico; military activities; recreation; poaching and hunting; clearing of desert scrub and planting of buffelgrass (*Pennisetum ciliare*) in Sonora; gold mining southeast of Sonoyta, dewatering and development along the Gila River and Río Sonoyta; CBV activity across the international border and associated required law enforcement response; and roads, fences, canals, and other artificial barriers.

Of the aforementioned human activities, in the U.S. range of the pronghorn, CBV activity and required law enforcement response is the most significant current source of disturbance to Sonoran pronghorn and its habitat. As a result of increased presence of the USBP in more developed areas, CBV traffic has shifted into remote desert areas, such as CPNWR, OPCNM, and BMGR (Klein 2000). In 2001, estimates of CBVs reached 1,000 per night in OPCNM alone (Organ Pipe Cactus National Monument 2001), and an estimated 150,000 people entered the monument illegally from Mexico (Milstead and Barns 2002). Apprehensions of CBVs in the USBP Tucson Sector-Ajo Station's Area of Responsibility peaked to 22,504 in 2006. However, after construction of the border vehicle fences on OPCNM in 2006 and CPNWR in 2009, apprehensions declined to 17,385 in Fiscal Year 2011. Illegal drive-throughs in particular declined after the construction of the fences. Since the *SBI*net towers and infrastructure became operational in late 2010 in the Ajo Station's Area of Responsibility, the number of apprehensions has increased. This increase is believed to be attributable to increased CBV activity, as well as increased USBP effort, tactical infrastructure, and technology in the area which have improved USBP's ability to detect and apprehend CBVs (personal communication with USBP, September 1, 2011).

In fiscal year 2005, the Yuma Sector of the USBP apprehended record numbers of CBVs, and from October 1, 2005 to May 2006, 96,000 arrests were made, which was a 13% increase over the same time period in 2005 (Gerstenzang 2006). The Wellton Station of the Yuma USBP Sector made 2,080 apprehensions in fiscal year 2005 and 3,339 apprehensions from October 2005 to February 2006 (personal communication with USBP, February 10, 2006). USBP officials have indicated, however, that apprehensions in recent years have dramatically declined in the Yuma Sector, particularly in the western portions of the sector, due to USBP presence at Camp Grip, increased numbers of agents, and recently completed tactical infrastructure.

Both CBV and USBP activities have resulted in increased human presence in and widespread degradation of Sonoran pronghorn habitat. Much of the CBV traffic travels through the southern passes of the Growler Mountains that lead either through or by all of the forage enhancements and the captive rearing pen in the Child's Valley, with potential to impact these recovery projects and use of the area by pronghorn (personal communication with Curtis McCasland, CPNWR, 2007).

There is anecdotal evidence that pronghorn are avoiding areas of high CBV traffic and law enforcement activities (personal communication with Curtis McCasland, CPNWR, 2007). This may be especially true during periods of poor range conditions. For example, according to Customs and Border Protection (CBP) records, a drag road adjacent to the current Granite Forage Enhancement Plot (FEP) in the Wellton Station Area of Responsibility was created in 1996 and has been in use since before the FEP was installed. However, at the time the FEP was being planned, this was only a two-track trail with little use (electronic mail communication with John Hervert, AGFD, October 3, 2012). Wellton Station has confirmed that USBP use of this drag road has increased in recent years in response to an increase in illegal activities in the area. In spring of 2009, AGFD reported that they believe that three does with fawns abandoned the Granite Forage Enhancement Plot (FEP) due to the high amount of USBP activity at the site (electronic mail from John Hervert, AGFD, September 16, 2009). The does were later observed at OPCNM; however, the fawns died (electronic mail from John Hervert, AGFD, September 16, 2009). Instances such as these are more likely to occur during periods of poor range conditions and the impacts are likely exacerbated, regardless of the source of disturbance or impact on the pronghorn.

The Camp Grip FOB, located within the current range of the pronghorn, was established in 2005. In 2011, USFWS completed an analysis of whether the Camp Grip FOB resulted in impacts on Sonoran pronghorn movement patterns. USFWS analyzed available AGFD Sonoran pronghorn location data from radio-collared animals and results of this analysis were inconclusive as to whether Camp Grip had any impact on Sonoran pronghorn movement; however, documenting pronghorn movement can be difficult, particularly when only a very small portion of the wild population is radio-collared. These inconclusive results were also in part due to the many complex factors involving Sonoran pronghorn movement, including artificial feeding and watering of the animals across the species' range. Initial data from radio-collared pronghorn locations appeared to indicate a potential reduction in use of areas in the vicinity of Camp Grip (electronic mail from Mark Sturm, OPCNM, August 31, 2011). Data from 2012 have shown several occurrences of pronghorn in the vicinity of Camp Grip. This may be due to the increased number of pen-reared pronghorn that have been released and that have been exposed on a more regular basis to human activity at the pens (electronic mail from Jim Atkinson, CPNWR, October 5, 2012). Data also indicate a northerly shift in habitat use since Ajo-1 SBInet implementation, which coincides with a documented increase in impacts. This result is despite the presence of abundant and good habitat conditions in areas nearer the border during 2011.

Another FOB, the Bates Well FOB, was exclusively occupied by USBP from 2005 to 2011. During the operation of the FOB, no pronghorn were documented entering the Valley of the Ajo through the Bates

Well pronghorn migration corridor. The establishment of the FOB coincides with a drastic decline in pronghorn (attributable to drought and an increase in border activity); therefore, changes in use of Bates Well area by pronghorn may be in part due to decreased population size, however the increased human presence at Bates Well, particularly during the fawning period, may have acted to prevent Sonoran pronghorn movements through the area and into the Valley of the Ajo. Even as the pronghorn population increased, they continued to avoid the Bates Well migration corridor while the Bates Well FOB was still in operation. Considering the sensitivity of pronghorn to human activity, it is likely that pronghorn avoided use of the area due to the high level of human activity currently associated with the site. During 2011, the USBP relocated the Bates Well FOB to a new site in the far western portion of the OPCNM along the ECDD at the CPNWR boundary. The new FOB is centrally located within the southern Growler Valley, an area that pronghorn generally avoid during the summer months. Since the Bates Well FOB was relocated, a holding pen for pronghorn releases was constructed near the site and in 2012 released pronghorn moved from that location back into the Valley of the Ajo.

While specific studies related to the physiological effects of disturbance on Sonoran pronghorn are extremely limited, some information regarding how these effects are manifest in other wildlife may be helpful in assessing the potential effects to pronghorn. Physiological effects of noise on wildlife can include stresses to neural, endocrine, digestive, cardiovascular, and immune systems as well as reproductive function, causing changes such as increased blood pressure, available glucose, and blood levels of corticosteroids (Manci *et al.* 1988, Kaseloo and Tyson 2004, Keay *et al.* 2006). However, available research evaluating physiological impacts of human stressors on wild animal populations also indicates that the responses of species are variable (Manci *et al.* 1988, Larkin 1996, Radle 1998, Kaseloo and Tyson 2004, Stankowich 2008). We believe that, given the information in the above studies, it is possible that Sonoran pronghorn could have a physiological stress response to disturbance without showing an overt behavioral response. To have a population effect, behavioral and physiological responses to disturbance must ultimately affect survival and productivity, and to date, no research efforts have supported or refuted population level impacts on pronghorn from physiological stress. At some point, increased energetic costs resulting from a stress-related increase in metabolic rate, reduced foraging efficiency due to interrupted feeding, and alarm and flight responses could jeopardize survival and productivity if the disturbance is stressful enough and chronic (Bright and Hervert 2005, deVos and Miller 2005).

It has been well documented that human presence in wildlands can disturb animals, causing them to unnecessarily expend energy avoiding people, thereby potentially reducing reproductive success (e.g., Manville 1983, van Dyke *et al.* 1986, Goodrich and Berger 1994, Primm 1996; as cited by Kerley *et al.* 2002) or increasing the likelihood of fatal encounters with humans (Kasworm and Manley 1990, Saberwal *et al.* 1994, Khramtsov 1995, Mattson *et al.* 1996; as cited by Kerley *et al.* 2002). Range abandonment has been documented in response to human disturbance (Jorgenson 1988), and investigators have shown that heart rate increases in wildlife in response to auditory or visual disturbance in the absence of overt behavioral changes (Thompson *et al.* 1968, Cherkovich and Tatoyan 1973, Moen *et al.* 1978).

Studies of captive pronghorn, other than the Sonoran subspecies, have shown that they are sensitive to disturbance such as human presence and vehicular noise. Human traffic, such as a person walking or running past pronghorn in an enclosed pen, a motorcycle driving past, a truck driving past, a truck blowing its horn while driving past, or a person entering a holding pen, caused an increased heart-rate response in American pronghorn in half-acre holding pens (Workman *et al.* 1992). The highest heart rates occurred in female pronghorn in response to a person entering a holding pen, or a truck driving past while sounding the horn. The lowest heart rates occurred when a motorcycle or truck was driven past their pen. Pronghorn were more sensitive to helicopters, particularly those flying at low levels or hovering, than

fixed wing aircraft. Luz and Smith (1976) observed pronghorn reactions to overhead helicopter flights which suggested mild disturbance (muscle tensing and interruption of grazing) by helicopter noise levels at approximately 60 dBA and strong reaction (running) at approximately 77 dBA.

Disturbances that cause pronghorn to startle and run would energetically have a more significant effect during times of drought. Such energetic expenditures, particularly during times of stress, may lead to lower reproductive output and/or survival of individual animals (Geist 1971). Landon et al. (2003) evaluated whether Sonoran pronghorn used areas, as defined by noise levels produced by military aircraft, in proportion to their availability on the BMGR. Using 15% of the Arizona Sonoran pronghorn population, they studied pronghorn use of areas with varying sound pressure (ambient sound) levels and found that pronghorn did not use the areas with different ambient sound levels in proportion to their availability. In general, they found that Sonoran pronghorn select areas with the lower noise levels and avoid areas with the higher noise levels; however, they did not consider habitat in their analysis. Whether pronghorn avoid these areas because of the noise or because of some other human-related factor is unknown; however, the various potential factors (i.e. noise levels, human presence, reduced vegetation or cover, disturbance) are interrelated. Hughes and Smith (1990) found that Sonoran pronghorn immediately ran 1,310- 1,650 feet from a vehicle, and that military low-level flights (less than 500 feet above the ground) over three pronghorn caused them to move about 330 feet from their original location.

Krausman et al. (2001, 2004, 2005) examined effects of military aircraft and ground-based activities on Sonoran pronghorn at the North and South tactical ranges (TACs) on the BMGR and concluded that military activities, both ground-based and aerial, were associated with some changes in behavior (e.g., from standing to trotting or running, or bedded to standing). In response to stimuli, on days without stimuli, pronghorn foraged more and bedded less than on days with stimuli; the opposite was true for fawns (Krausman et al. 2001). Krausman et al. (2001) only considered a change in behavior to trotting or running in response to stimuli as biologically significant. Eighty-seven (4.1%) of the 2,128 events with ground-based stimuli resulted in pronghorn changing their behavior to trotting or running; often moving > 10 m (Krausman et al. 2004). Pronghorn tend to exhibit a predator response to human activities, but can habituate to chronic human disturbance in some instances (Krausman et al. 2004). The authors concluded that these changes were not likely to be detrimental to the animals; however, sightings of Sonoran pronghorn were biased towards disturbed habitats on the TACs and other areas of military activities, which also corresponded to areas of favorable ephemeral forage production (Krausman et al. 2005). No specific conclusions could be drawn about effects of military activities on fawns during the Krausman et al. study, but the data suggests that fawns and their mothers may be more sensitive to anthropogenic stimuli than other pronghorn (Krausman et al. 2004). In general, the study did not detect differences in the behavior of pronghorn with and without anthropogenic stimuli; however, Krausman et al. (2004) recommends that all ground stimuli and activities that alerts or startles females and their fawns should be terminated. However, the long-term behavioral and physiological effects of military activities have not been quantified (Krausman et al. 2004).

Staff at OPCNM (2013) documented that during their typical morning activity period (post-sunrise), pronghorn on OPCNM experienced some form of potential disturbance once every 4 hours 10 minutes (even though monitoring was only conducted for 3 hours after sunrise each day, the results were calculated by summing the total number of observation hours and dividing by them by the total number of disturbance events). Actual disturbance responses took place once every 6 hours 15 minutes. Potential disturbance events resulted in the pronghorn running, about once every 8 hours 20 minutes. Helicopter overflights took place once every 6 hours 15 minutes; one out of four overflights resulted in pronghorn running, and one in four resulted in vigilance (standing, alert, watching disturbance source). Vehicles approaching within one mile occurred once every 12 hours 30 minutes. Half of these resulted in

pronghorn running, but for the other half, the driver was contacted by radio and advised to drive slowly (<10 mph) past the observation area. These observations only represent pronghorn and human activity in the first 3 hours after sunrise, in a specific area of OPCNM. Types and intensities of activities likely vary through the 24-hour cycle, and across the landscape. These observations led to speculation that the levels of illegal border-related traffic in the area, and interdiction efforts, may have been sufficient to inhibit use of the area and 3-Jack Tank by Sonoran pronghorn.

Preliminary information from a study on the effects of human disturbance on Sonoran pronghorn indicates that pronghorn consistently exhibit visual responses to human activity, particularly vehicles traveling on a road within several kilometers. Although some instances have been noted where a pronghorn did not exhibit a visual response (for example, one buck did not appear disturbed by three vehicles driving at least 25 miles per hour about 1.5 kilometers away); most observations indicate that pronghorn exhibit a spectrum of responses, from standing vigilant to running from the stimulus. For example, eight Sonoran pronghorn were observed running a short distance and then vigilant towards utility vehicle noise 3.4 kilometers away. Another eight Sonoran pronghorn were observed running from several trucks traveling fast (> 25 mph). Pronghorn were initially vigilant when the vehicles were 1.3 kilometers away but soon started running, travelling over 3.6 kilometers in under five minutes until they were out of sight of the observers (email from Stephanie Doerries, University of Arizona, May 7, 2014).

Habitat Disturbance

A number of threats, including livestock grazing, mining, and off-road vehicle and pedestrian activity can alter or destroy Sonoran pronghorn habitat. Livestock grazing has the potential to significantly alter pronghorn habitat and behavior (Leftwich and Simpson 1978, Kindschy *et al.* 1982, Yoakum *et al.* 1996). Overgrazing well into the 19th century by Spaniards and their descendants caused widespread habitat changes throughout much of the Sonoran Desert, particularly in more settled areas such as central Sonora, Mexico (Sheridan 2000). The effects of cattle grazing are largely historical; cattle were removed from OPCNM, CPNWR, and the BMGR in 1979, 1983, and 1986, respectively (U.S. Fish and Wildlife Service 1998, Rutman 1997). In 2004, the BLM closed the Cameron Allotment on the borders of CPNWR and OPCNM, but grazing still occurs in the nearby Childs and Coyote Flat allotments near Ajo. In Sonora, livestock grazing occurs at Pozo Nuevo and at Ejido Puerto Peñasco, but cattle typically stay close to feed and water except in seasons with abundant annual growth when cattle range widely in the Pinacate region.

Mining occurred historically throughout much of the U.S. range of the pronghorn, but it is currently not a significant threat to Sonoran pronghorn in the U.S. During recent pronghorn surveys in Mexico, increasing effects from gold mining activities were noted in habitats used by the sub-population located southeast of Highway 8.

As discussed above, CBV activities and required USBP response have resulted in increased human presence in remote areas and widespread habitat degradation. Prior to the completion of the vehicle fences on OPCNM and CPNWR (construction was started on these fences in late 2003 and 2007 and completed 2006 and 2009, respectively), CBVs frequently crossed the border in vehicles and created countless illegal routes, many of which were continuously used both by CBVs and responding USBP agents. Subsequent to the construction of the vehicle fences on OPCNM and CPNWR, CBV vehicular traffic was significantly reduced (there are occasional breaches in the fence; however, this CBV vehicular activity represents a fraction of that prior to the presence of the fences and are usually limited to smaller all-terrain vehicle (ATV) like vehicles). NPS notes that CBV vehicle activity has decreased at OPCNM since about 2004 (electronic mail, Tim Tibbitts, OPCNM, 2009 and 2011); however, the number of off-road tracks, and new unauthorized vehicle routes in OPCNM continues to increase (electronic mail, Tim Tibbitts, OPCNM, September 1, 2011). Decreased CBV vehicle traffic in pronghorn habitat as a result of

the fences has alleviated the adverse effects of this traffic on pronghorn and their habitat. USBP, however, continues to respond (mostly by truck, but also by ATV, horseback, foot, and aircraft) to ongoing CBV activity in these areas. Frequently, this required response involves driving off of authorized roads which, when conducted in pronghorn habitat, results in significant degradation of pronghorn habitat and disturbance to pronghorn as discussed above. For instance, all the valleys at CPNWR and OPCNM are now criss-crossed with a network of unauthorized vehicle routes and trails, even though those areas are designated as wilderness. A mapping effort conducted by CPNWR showed almost 8,000 miles of unauthorized routes as of 2008. A mapping effort conducted by OPCNM documented the following number of miles on each land management unit from 2008 to 2010: 7876.2 on CPNWR, 1209.8 on OPCNM, and 240.9 on the BLM Ajo Block. Unauthorized route creation continues to occur on all three of these important pronghorn areas. The proliferation of unauthorized vehicle routes is a major impact on multiple resources, and provides an index of the level of human activity currently taking place in pronghorn habitat.

A cooperative effort was completed recently by CBP, USFWS, NPS, and BLM to map and mark roads within the range of the Sonoran pronghorn to indicate those roads that are open for use by these agencies, and roads that are closed to vehicle traffic. It is hoped that this effort will reduce the use of unauthorized and the associated impacts to Sonoran pronghorn. To date, however, it does not appear that the map is functioning as intended.

Fire

The winter and spring of 2004/2005 were very wet, resulting in some of the highest productivity of cool season annual plants in recent memory. As these annual plants dried out, they created fuel for wildfire. In 2005, Mediterranean grass combined with high densities of the native woolly plantain (*Plantago ovata*) and other species created fuels adequate to carry fire. Military training, such as strafing and bombing in the tactical ranges, as well as fires set by CBVs, provided the ignition sources. Exact numbers are unknown; however, in 2005 roughly 7,500 acres of pronghorn habitat burned on the CPNWR (personal communication with Curtis McCasland, CPNWR, February 15, 2006) and more than 63,000 acres burned on the BMGR-East during that time. From 2012-2014, numerous fires were set by CBVs in OPCNM in an attempt to draw attention from illegal trafficking and as desperate measures to draw attention to individuals in duress. Approximately 29,260 acres of pronghorn habitat burned as a result of these fires.

Most Sonoran Desert trees, shrubs, and cacti are poorly adapted to fire (Brown and Minnich 1986, Schwalbe *et al.* 2000, Alford and Brock 2002). If areas burn repeatedly, permanent changes are likely in the flora. Even in the best scenario it is likely to be many years before trees once again provide thermal cover in wash communities and cholla recover to a point that they are useful forage plants for pronghorn. This said, from 2007 to 2010 pronghorn were attracted to the burned areas, which often supported better growth of annual plants and forbs than adjacent unburned areas. However, in the long term and if these areas continue to burn, removal of thermal cover (trees) and chain fruit cholla, which they depend on in drought, would likely adversely affect pronghorn and probably limit the use of these areas to wetter and cooler periods and seasons.

Drought and Climate Change

As discussed, drought may be a major factor in the survival of adults and fawns (Bright and Hervert 2005), and the major decline in 2002 was driven by drought. Mean annual temperatures rose 1.8-3.6 °F in the American Southwest from 1970-2004, that trend is accelerating, and is predicted to continue through the 21st century and beyond (Intergovernmental Panel on Climate Change 2007). Most of the observed increases in globally averaged temperatures since the mid-20th century are very likely due to the observed increases in anthropogenic greenhouse gas concentrations (Intergovernmental Panel on Climate Change

2007). In the Sonoran Desert, anthropogenic climate change is causing warming trends in winter and spring, decreased frequency of freezing temperatures, lengthening of the freeze-free season, and increased minimum temperatures in winter, which will likely cause changes in vegetation communities (Weiss and Overpeck 2005). These increases in temperature are predicted to be accompanied by a more arid climate in the Southwest (Seager *et al.* 2007, Intergovernmental Panel on Climate Change 2007). As a result, the Sonoran pronghorn is expected to be confronted with more frequent drought, which increases the importance of recovery actions, such as forage enhancement plots and water developments, which can offset the effects of drought. Bright and Hervert (2005) indicated that periods of drought may force Sonoran pronghorn to use areas of available forage where predators may be more effective. Thus, climate change and drought may also exacerbate the effects of predation on the Sonoran pronghorn population and management actions should be focused in areas where predation is likely to be less successful.

Historically, pronghorn populations must have weathered severe droughts in the Sonoran Desert, including many that were more severe and longer term than what has occurred recently. Given that pronghorn populations survived the droughts of the 1890s, 1950s, 1970s, and others before those, it is unreasonable to solely attribute declines in the U.S. pronghorn population to drought. OPCNM (2001) concluded, “If (individual) recent dry years have had an impact on Sonoran pronghorn, it is most likely because in recent decades Sonoran pronghorn have much more limited options for coping with even brief moderate drought. Because of restrictions on their movements and range, and increasing human presence within their range, pronghorn are less able to employ their nomadic strategy in search of relief. It is not that drought itself is an impact, but possibly that drought has *become* an impact, due to other factors confounding the species’ normal ecological strategy.”

Small Population Size and Random Changes in Demographics

In populations of fewer than 100 pronghorn, population viability declines at an increasingly steep rate. To maintain genetic diversity over the long term, a population of at least 500 is desirable (Defenders of Wildlife 1998). At an estimated 21 pronghorn in 2002, the U.S. wild endangered population was critically endangered and likely experienced a substantial loss of genetic diversity resulting from the 2002 bottleneck. At an estimated 159 pronghorn in 2013, the U.S. wild endangered population has dramatically increased but is still below desired numbers. At an estimated 25 pronghorn in 2002 and 52 pronghorn in 2011, the Pinacate population is also well below desired numbers. At an estimated 434 pronghorn in 2013, the third population (southeast of Highway 8) is much closer to, but still below the desired size to maintain genetic diversity. Loss of the U.S. population would dramatically reduce our ability to manage or recover this subspecies. Populations at low levels may experience random variations in sex ratios, age distributions, and birth and death rates among individuals, which can cause fluctuations in population size and possibly extinction (Richter-Dyn and Goel 1972). In very sparse populations, males may have trouble finding females, reducing productivity (Ehrlich and Roughgarden 1987). Small populations are also sensitive to variations in natural processes, such as drought and predation (Hecht and Nickerson 1999).

Disease

Sonoran pronghorn can potentially be infected by a variety of viral and bacterial diseases, as well as parasites. Epizootic hemorrhagic disease and Bluetongue virus are the most common cause of disease caused die-off in wild pronghorn (Brown and Ockenfels 2007). Blood testing has shown pronghorn exposure to these diseases by increases in antibody titers over time. The diseases relevant to pronghorn can be transmitted indirectly through vectors, such as infected midges or ticks, or directly via aerosolized or direct contact of infected fluids or tissues. Diseases that potentially infect pronghorn are all serious diseases of cattle, which can act as vectors. Cattle within the current range of the pronghorn have not been tested for these diseases.

E. Recovery Actions

A number of critically important recovery projects have been implemented in an attempt to reverse the decline of the U.S. endangered population of the Sonoran pronghorn. These projects are designed to increase availability of green forage and water during dry periods and to offset to some extent the effects of drought and barriers that prevent pronghorn from accessing greenbelts and water, such as the Gila River and Río Sonoyta. Many developed and nine emergency water sources (six on CPNWR, one on OPCNM, and two on BMGR West) have been constructed in recent years throughout the range of the U.S. endangered population. Additionally, within the past two years, three permanent catchments for Sonoran pronghorn were constructed in the non-wilderness portion of CPNWR (one) and the BMGR East (two). Additionally, one existing water (Sierra Pinta # 3) within the refuge was recently redeveloped resulting in increased storage capacity from 1,800 gallons to over 10,000 gallons. In 2015, one new water for Sonoran pronghorn within the refuge will be constructed (Agua Dulce # 2) and one existing water (Fawn Hills) will be redeveloped to increase storage. Five forage enhancement plots, each consisting of a well, pump, pipelines and irrigation lines, have been developed to irrigate the desert and produce forage for pronghorn. Additionally, starting in 2009, temporary, experimental feed and water stations were placed strategically within the South TAC to enhance pronghorn fawn survival and recruitment during periods of prolonged drought. The primary purpose was to draw pronghorn away from active military targets as an offset to the target closure distances that were in place at that time. These stations were heavily used by pronghorn during times with poor range conditions brought on by drought.

Plots and waters located in areas with little human activity and better range conditions appear to be more effective (i.e., contribute to fawn and adult survival to a greater degree) than those located in areas of high human activity and poor range condition (i.e., experiencing drought) (personal communication with John Hervert, AGFD, September 16, 2009). Therefore, to ensure success of these measures, it is critical that human activity is avoided or significantly minimized near the plots and waters.

A semi-captive breeding facility at CPNWR was first stocked with pronghorn in 2004; as of January 2014, it contains 61 pronghorn. As described above, these facilities are being used to augment the current U.S. population and the new population north of I-8, as well as to establish additional herds elsewhere within suitable portions of historical range in Arizona and potentially in southeastern California. These crucial projects, which are helping pull the U.S. population back from the brink of extinction, have been cooperative efforts among many agencies and organizations, including USFWS, AZGFD, MCAS-Yuma, Luke Air Force Base (LAFB), OPCNM, CBP, Arizona Desert Bighorn Sheep Society, Arizona Antelope Foundation, the Yuma Rod and Gun Club, the University of Arizona, the Los Angeles and Phoenix Zoos, and others.

ENVIRONMENTAL BASELINE – SONORAN PRONGHORN

The environmental baseline includes past and present impacts of all Federal, state, or private actions in the action area; the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation; and the impact of state and private actions which are contemporaneous with the consultation process. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform from which to assess the effects of the action now under consultation.

A. Action Area

The “action area” means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. Within the U.S. portion of the endangered Sonoran pronghorn’s range, pronghorn interact to form one population in which interbreeding may occur. The U.S. endangered population is effectively separated from populations in the Kofa NWR region by Interstate 8; and populations in the El Pinacate Region and on the Gulf Coast of Sonora by Mexico Highways 2 and 8. Activities that may affect animals in any portion of the U.S. range of the endangered pronghorn (plus individuals within OPCNM to the east of Highway 85 which are legally part of the nonessential experimental population, but biologically part of the endangered population) may affect the size or structure of the U.S. endangered population, or habitat use within the U.S. endangered population range. Therefore, the action area for this biological opinion is defined as the current range of the endangered pronghorn population in the U.S. (Figure 4), plus the portion of OPCNM to the east of Highway 85 where Sonoran pronghorn individuals that may occur are legally part of the nonessential experimental population.

Management of the action area is almost entirely by Federal agencies. The BMGR (roughly 1.6 million acres) is managed by Luke Air Force Base and the Marine Corps Air Station (MCAS)-Yuma primarily for military training. OPCNM manages 329,000 acres in the southeastern corner of the action area for scenic, ecological, natural, and cultural values. CPNWR lies along the border west of OPCNM and encompasses 860,000 acres. CPNWR is managed to protect, maintain, and restore the diversity of the Sonoran Desert. Most of the refuge and OPCNM are designated as wilderness. The BLM manages lands near Ajo for recreation, grazing, and other multiple uses in accordance with the Lower Gila Resource Management Plan. OPCNM and CPNWR are critically important for Sonoran pronghorn recovery because of their management for protection of natural resources. Lands on the BMGR are managed primarily for military training, and although important recovery is ongoing on these lands and the Department of Defense has generously contributed to the recovery program both on and off the BMGR, changing military priorities could, in the future, limit the value of the BMGR for Sonoran pronghorn recovery.

B. Terrain, Vegetation Communities, and Climate in the Action Area

The action area is characterized by broad alluvial valleys separated by block-faulted mountains and surface volcanics. The Yuma Desert on the western edge of the BMGR is part of a broad valley that includes the Colorado River. Major drainages and mountain ranges run northwest to southeast. Major drainages flow mostly northward to the Gila River, although southern portions of OPCNM and the southern slope of the Agua Dulce Mountains drain south to the Río Sonoyta.

Climate is characterized by extreme aridity, mild winters, and hot summers. Approximately 2.7 inches of precipitation fall annually at Yuma, with slightly more than half of this occurring in the winter months (Brown 1982). Annual precipitation increases from west to east across the BMGR; at Aguajita/Quitobaquito, precipitation is 10.5 inches annually.

The vegetation community of the western portion of the BMGR has been classified as the lower Colorado River Valley subdivision of Sonoran Desert scrub (Brown 1982). It is the largest and most arid subdivision of Sonoran Desert scrub. The Arizona Upland subdivision of Sonoran Desert scrub is found in the Growler, Puerto Blanco, Ajo and Bates mountains, and surrounding bajadas.

C. Status of the Sonoran Pronghorn in the Action Area

Distribution, Abundance, and Life History

The distribution and abundance of the Sonoran pronghorn in the action area is the same as that described above in the Status of the Species for the U.S. endangered sub-population. Life history, including demographics, chronology of breeding and movements, diet, and other factors were also described above for the U.S. endangered population.

Drought

As discussed in the Status of the Species, climate change in the Southwest and the Sonoran Desert is predicted to result in warming trends and drier conditions, with accompanying changes in vegetation communities (Weiss and Overpeck 2005, Seager *et al.* 2007). Rowlands (2000) examined trends in precipitation for southwestern Arizona and OPCNM from 1895-1999. For southwestern Arizona, no trend in precipitation was found for the period, but low precipitation occurred around 1895 and during the 1950s. Periods of high precipitation occurred in 1915-1920 and in the 1980s. For OPCNM, there was a slightly increasing trend in monthly and annual precipitation over the period 1895-1999, a strong drought occurred in the 1950s, and a lesser drought occurred in the 1970s. No discernable trend in precipitation in southwestern Arizona or OPCNM was found in the 1990s, which is when the current decline in the U.S. pronghorn population began.

Since Rowland's analysis, there was one year characterized by above-average rainfall and abundant ephemeral forage (2001) followed by a year with virtually no precipitation or ephemeral forage (2002). Recruitment and survival were high in 2001 and very low in 2002 (Bright and Hervert 2005). Based on the lack of forage and water, and the condition of pronghorn observed, drought is considered the proximate cause of the 79% decline in the U.S. pronghorn population from 2000 to 2002. From 2003 to 2013, rainfall and Sonoran pronghorn range conditions have varied, but have improved overall when compared to 2002. Both the August 2014 short-term and the July 2014 long-term drought status maps indicate that southwestern Arizona is experiencing conditions of abnormally dry to severe drought conditions (<http://www.azwater.gov/azdwr/StatewidePlanning/drought/DroughtStatus2.htm>). However, the current Sonoran pronghorn range conditions, as of September 2014, are very good.

Historically, pronghorn populations must have weathered severe droughts in the Sonoran Desert, including many that were more severe and longer term than what has occurred recently. Given that pronghorn populations survived the droughts of the 1890s, 1950s, 1970s, and others before, it is unreasonable to solely attribute recent declines in the U.S. pronghorn population to drought. OPCNM (2001) concluded, "If (individual) recent dry years have had an impact on Sonoran pronghorn, it is most likely because in recent decades Sonoran pronghorn have much more limited options for coping with even brief moderate drought. Because of restrictions on their movements and range, and increasing human presence within their range, pronghorn are less able to employ their nomadic strategy in search of relief. It is not that drought itself is an impact, but possibly that drought has *become* an impact, due to other factors confounding the species' normal ecological strategy."

Recovery Actions (Formerly "Emergency Recovery Actions")

A number of critically important recovery projects have been implemented in an attempt to reverse the decline of the U.S. endangered population of the Sonoran pronghorn. These projects are designed to increase availability of green forage and water during dry periods and to offset to some extent the effects of drought and barriers that prevent pronghorn from accessing greenbelts and water, such as the Gila River and Río Sonoyta. Many developed and nine emergency water sources (six on CPNWR, one on OPCNM, and two on BMGR West) have been constructed in recent years throughout the range of the

U.S. endangered population. Additionally, within the past two years, three permanent catchments for Sonoran pronghorn were constructed in the non-wilderness portion of CPNWR (one) and the BMGR East (two). Additionally, one existing water (Sierra Pinta # 3) within the refuge was recently redeveloped resulting in increased storage capacity from 1,800 gallons to over 10,000 gallons. In 2015, one new water for Sonoran pronghorn within the refuge will be constructed (Agua Dulce # 2) and one existing water (Fawn Hills) will be redeveloped to increase storage. Five forage enhancement plots, each consisting of a well, pump, pipelines and irrigation lines, have been developed to irrigate the desert and produce forage for pronghorn. Additionally, starting in 2009, temporary, experimental feed and water stations were placed strategically within the South TAC to enhance pronghorn fawn survival and recruitment during periods of prolonged drought. The primary purpose was to draw pronghorn away from active military targets as an offset to the target closure distances that were in place at that time. These stations were heavily used by pronghorn during times with poor range conditions brought on by drought.

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D. Past and Ongoing Non-Federal Actions in the Action Area

The Status of the Species section describes a variety of human activities that have affected the Sonoran pronghorn since initiation of livestock grazing over 300 years ago (Officer 1993). Many non-Federal activities that have affected the pronghorn are historical in nature, and pronghorn have been all but extirpated from private, state, and Tribal lands. However, increased illegal activities have likely had a significant impact on Sonoran pronghorn in the U.S. in recent times, particularly since the turn of the millennium. See the “*Human-caused Disturbance*” and “*Habitat Disturbance*” portions of the “Threats” section under “Status of the Species” above for further detail.

E. Past and Ongoing Federal Actions in the Action Area

Because of the extent of Federal lands in the action area, with the exception of CBV activities, most activities that currently, or have recently, affected the U.S. population or their habitat are Federal actions. The primary Federal agencies involved in activities in the action area include the MCAS-Yuma, Luke Air Force Base, FWS, BLM, OPCNM, and USBP. In the following discussion, we have categorized Federal actions affecting the pronghorn as: 1) those actions that have not yet undergone section 7 consultation (although in some cases consultation has been completed on components of the Federal activity), and 2) Federal actions that have undergone consultation.

Federal Actions For Which Consultation Has Not Been Completed

Examples of Federal actions for which consultation has not been completed include:

- 1) U.S. Border Patrol Activities in the Tucson and Yuma Sectors, Arizona
- 2) CBP Hybrid Fence on BMGR and Vehicle Fence on CPNWR
- 3) CBP Vehicle Fence on CPNWR (another small portion of the fence)

Federal Actions Addressed in Section 7 Consultations

As part of our discussion of all past and present actions affecting pronghorn within the action area, we list below all biological opinions issued to date on actions that may affect the pronghorn; we also explain any incidental take associated with the opinions. All of these formal consultations can be viewed on our website at <http://www.fws.gov/arizonaes/Biological.htm>.

1. Capture and collaring of pronghorn for research purposes, consultation number 02-21-83-F-0026. No incidental take was anticipated.
2. Capture and collaring of pronghorn for research purposes, consultation number 02-21-88-F-00060. No incidental take was anticipated.
3. Installation of a water source in the Mohawk Valley for pronghorn, consultation number 02-21-88-F-0081. No incidental take was anticipated.
4. Implementation of the CPNWR Comprehensive Conservation Plan, consultation number 22410-2006-F-0416, with reinitiations issued on November 21, 2013 and March 14, 2014. No incidental take was anticipated.
5. Change in aircraft type from the F-15A/B to the F-15E on BMGR-East [F-15E Beddown Project], consultation number 02-21-89-F-0008. Incidental take was anticipated only for the Beddown Project in the form of harassment as a result of aircraft overflights. This project was later incorporated into the biological opinion on Luke Air Force Base's activities on the BMGR, listed below.
6. Widening of North Puerto Blanco Road, consultation number 02-21-01-F-0109, with a reinitiation issued on March 14, 2014. No incidental take was anticipated.
7. Improvements to SR 85 roadway and drainages, consultation 02-21-01-F-0546. No incidental take was anticipated.
8. Construction of a vehicle barrier on OPCNM, consultation number 02-21-02-F-237. No incidental take was anticipated.
9. U.S. Border Patrol Activities in the Yuma Sector, Wellton Station, Yuma, Arizona, consultation number 02-21-96-F-0334, issued September 5, 2000. Incidental take was anticipated in the form of harassment that is likely to injure up to one pronghorn in 10 years.
10. The BLM Lower Gila South Resource Management Plan-Goldwater Amendment, consultation number 02-21-90-F-0042, issued April 25, 1990. No incidental take was anticipated.
11. The BLM Lower Gila South Habitat Management Plan, consultation number 02-21-89-F-0213 issued on May 15, 1990. No incidental take was anticipated.
12. BLM Lower Gila South Resource Management Plan and Amendment, consultation number 02-21-85-F-0069, issued on March 27, 1998. No incidental take was anticipated.
13. BLM grazing allotments in the vicinity of Ajo, Arizona, consultation number 02-21-94-F-0192, issued on December 3, 1997, with reinitiations issued on November 16, 2001, September 30, 2002, June 21, 2004, March 3, 2005, March 8, 2007, and March 14, 2014. No incidental take was anticipated.
14. Organ Pipe Cactus National Monument General Management Plan, consultation number 02-21-89-F-0078, issued June 26, 1997, with reinitiations issued on November 16, 2001, April 7, 2003,

- March 10 and August 23, 2005, March 8, 2007, December 10, 2009, and March 14, 2014. In the latest versions of the opinion, no incidental take of pronghorn was anticipated.
15. U.S. Marine Corps Air Station-Yuma in the Arizona Portion of the Yuma Training Range Complex, consultation number 02-21-95-F-0114, issued on April 17, 1996, with reinitiations issued on November 16, 2001, August 6, 2003, and October 21, 2009. In the 2003 and 2009 versions of the biological opinion, no incidental take of pronghorn was anticipated.
 16. Luke Air Force Base Use of Ground-Surface and Airspace for Military Training on the BMGR, consultation number 02-21-96-F-0094, issued August 27, 1997, with reinitiations issued on November 16, 2001, August 6, 2003, May 3, 2010, and March 2014. In 2010 opinion, we anticipated take of one wild Sonoran pronghorn every 10 years, one pen-raised (free ranging) female pronghorn every 10 years, and four pen-raised (free ranging) male pronghorn every 10 years in the form of direct mortality or injury; and one wild Sonoran pronghorn of either sex, one pen raised (free ranging female) every 10 years, and two pen-raised (free ranging) male pronghorn every 10 years in the form of harassment.
 17. Western Army National Guard Aviation Training Site Expansion Project, consultation number 02-21-92-F-0227, issued on September 19, 1997; however, Sonoran pronghorn was not addressed in formal consultation until reinitiations and revised opinions dated November 16, 2001 and August 6, 2003. No incidental take was anticipated.
 18. BMGR Integrated Natural Resources Management Plan, consultation number 22410-2005-F-0492, issued on August 26, 2005, with reinitiations issued on January 7, 2013 and March 14, 2014.
 19. CBP and USBP Permanent Vehicle Barrier from Avenue C to OPCNM, Arizona, consultation number 22410-2006-F-0113, issued September 15, 2006. No incidental take was anticipated. Subsequent to issuing the biological opinion, the action was changed to include the installation of a section of hybrid-style fence designed to prevent the passage of pedestrians. Because all environmental laws were waived (as permitted by the Real ID Act of 2005) by Secretary of the Department of Homeland Security, CBP never reinitiated consultation with us regarding this change to their proposed action.
 20. CBP and USBP 5.2-Mile Primary Fence near Lukeville, Arizona, consultation number 22410-2008-F-0011, issued February 11, 2008. No incidental take was anticipated.
 21. *SBI*net Ajo-1 Tower Project, Ajo Area of Responsibility, USBP Tucson Sector, Arizona, consultation number 22410-F-2009-0089, issued December 10, 2009, with reinitiations issued on March 15, 2010, April 29, 2011, September 16, 2011, and December 15, 2011. We anticipated take of three Sonoran pronghorn due to harassment within the first year of towers becoming operational and two every 5 years thereafter; and one due to direct mortality over the life of the project.
 22. Tactical Infrastructure Maintenance and Repair Program (TIMR) along the U.S./Mexico international border in Arizona, consultation number 02EAAZOO-2012-F-0170, issued on November 6, 2012. We anticipated incidental take of one Sonoran pronghorn every 10 years for the duration of the TIMR Program in the form of harassment; and one Sonoran pronghorn over the total duration of the TIMR Program in the form of direct mortality.
 23. Land Mobile Radio Modernization for Tactical Communications at Buck Peak, Christmas Pass, Granite Mountain (CPNWR), and Cobre along the U.S./Mexico international border in Pima, Santa Cruz, and Yuma counties, Arizona, consultation number 02EAAZOO-2012-F-0200, issued April 23, 2013. No incidental take was anticipated.

In summary, the current biological opinions that anticipate incidental take are: 1) the Yuma Sector opinion, in which we anticipated take in the form of harassment that is likely to injure up to one pronghorn in 10 years; 2) the Ajo 1 Tower opinion, in which we anticipated take of three Sonoran

pronghorn due to harassment within the first year of towers becoming operational and two every 5 years thereafter; and one due to direct mortality over the life of the project; 3) the Luke Air Force Base Opinion, in which we anticipated take of one wild Sonoran pronghorn every 10 years, one pen-raised (free ranging) female pronghorn every 10 years, and four pen-raised (free ranging) male pronghorn every 10 years in the form of direct mortality or injury; and one wild Sonoran pronghorn of either sex, one pen raised (free ranging female) every 10 years, and two pen-raised (free ranging) male pronghorn every 10 years in the form of harassment; and 4) the TIMR opinion, in which we anticipated take of one Sonoran pronghorn every 10 years for the duration of the TIMR Program in the form of harassment; and one Sonoran pronghorn over the total duration of the TIMR Program in the form of direct mortality. With the exception of likely capture-related deaths during telemetry studies (which were addressed in 10(a)(1)(A) recovery permits), we are unaware of any confirmed incidental take in the form of direct mortality or injury resulting from the Federal actions described here (although a pronghorn may have been strafed near one of the targets on BMGR-East). That said, we are aware of numerous instances of harassment of Sonoran pronghorn. A study currently being conducted on the effects of human activity will provide details on the origin, amount, and degree of this harassment. Additionally, action agencies, as part of their proposed actions, have committed to implementing or providing funding to implement a variety of recovery projects recommended by the Sonoran Pronghorn Recovery Team. For example, these significant commitments have helped the Team to construct pronghorn waters and forage enhancement plots, build a captive breeding pen at Kofa NWR, collar and monitor pronghorn.

F. Summary of Activities Affecting Sonoran Pronghorn in the Action Area

Historically, livestock grazing, hunting or poaching, and development along the Gila River and Río Sonoyta were all probably important factors in the well-documented Sonoran pronghorn range reduction and apparent population decline that occurred early in the 20th century. Historical accounts and population estimates suggest pronghorn were never abundant in the 20th century, but recently, the estimated size of the wild population in the action area declined from 179 (1992) to 21 (December 2002). Although the proximate cause of the decline during 2002 was drought, human activities limit habitat use options by pronghorn and increase the effects of drought on the population. The U.S. pronghorn population is isolated from other populations in Sonora by a highway and the U.S./Mexico boundary fence, and access to the greenbelts of the Gila River and Río Sonoyta, which likely were important sources of water and forage during drought periods, has been severed. Since 2002, due to improved drought status and implementation of recovery actions, the wild endangered population increased to 159 in 2012. At 159, however, the wild endangered population is still in danger of extirpation due to, among other factors, human-caused impacts, drought, loss of genetic diversity, and predation.

Within its remaining range, the pronghorn is subjected to a variety of human activities that disturb the pronghorn and its habitat, including military training, increasing recreational activities, grazing, significant presence of CBV and subsequent required law enforcement activities. OPCNM (2001) identified 165 human activities in the range of the pronghorn, of which 112 were adverse, 27 were beneficial, 26 had both adverse and beneficial effects, and four had unknown effects. OPCNM (2001) concluded that in regard to the pronghorn, “while many projects have negligible impacts on their own, the sheer number of these actions is likely to have major adverse impacts in aggregate.” MCAS-Yuma (2001) quantified the extent of the current pronghorn range that is affected by select activities and found the following: recreation covers 69.6 percent of the range, military training on North and South TACs covers 9.8 percent, active air-to-air firing range covers 5.8 percent, proposed EOD five-year clearance areas at North and South TACs and Manned Range 1 cover 1.0 percent, and MCAS-Yuma proposed ground support areas and zones cover 0.29 percent.

CBV traffic and responding USBP enforcement activities occur throughout the range of the pronghorn, and evidence suggests pronghorn are avoiding areas of high CBV and enforcement activities. Historically, pronghorn tended to migrate to the southeastern section of their range (southeastern CPNWR, such as south of El Camino del Diablo, and OPCNM, such as the Valley of the Ajo) during drought and in the summer. Within the last several years, very few pronghorn have been observed south of El Camino del Diablo on CPNWR. This suggests CBV and the interdiction of these illegal activities have resulted in pronghorn avoiding areas south of El Camino del Diablo; these areas are considered important summer habitat for pronghorn and may have long-term management and recovery implications (personal communication with Curtis McCasland, CPNWR, 2007). The valleys at CPNWR and OPCNM, which were once nearly pristine wilderness Sonoran Desert, now have many braided, unauthorized routes through them and significant vehicle use by USBP pursuing CBVs. These areas have also been affected by trash and other waste left by CBVs.

Although major obstacles to recovery remain, since 2002, numerous crucial recovery actions have been implemented in the U.S. endangered range of the species, including 9 emergency waters, three permanent catchments, and five forage enhancement plots, with additional waters planned. The projects help to offset the effects of drought and barriers that prevent movement of pronghorn to greenbelts such as the Gila River and Río Sonoyta. A semi-captive breeding facility, built on CPNWR, currently holds 61 pronghorn. This facility provides pronghorn to augment the existing endangered population and to establish additional U.S. nonessential experimental (10(j)) populations. Additionally, vehicle barriers on the international border on CPNWR and OPCNM are facilitating recovery of pronghorn by reducing the amount of CBV vehicle traffic in pronghorn habitat.

Many developed and nine emergency water sources (six on CPNWR, one on OPCNM, and two on BMGR West) have been constructed in recent years throughout the range of the U.S. endangered population. Additionally, within the past two years, three permanent catchments for Sonoran pronghorn were constructed in the non-wilderness portion of CPNWR (one) and the BMGR East (two). Additionally, one existing water (Sierra Pinta # 3) within the refuge was recently redeveloped resulting in increased storage capacity from 1,800 gallons to over 10,000 gallons. In 2015, one new water for Sonoran pronghorn within the refuge will be constructed (Agua Dulce # 2) and one existing water (Fawn Hills) will be redeveloped to increase storage. Five forage enhancement plots, each consisting of a well, pump, pipelines and irrigation lines, have been developed to irrigate the desert and produce forage for pronghorn.

The current range of the endangered pronghorn in the U.S. is almost entirely comprised of lands under Federal jurisdiction; thus, authorized activities that currently affect the pronghorn in the action area are almost all Federal actions. As explained above, changes made in proposed actions and reinitiated biological opinions from 2001 to the present, plus the findings in other recent opinions, reduced the amount or extent of incidental take anticipated to occur from Federal actions. Significantly, action agencies have worked with us to modify proposed actions and to include significant conservation measures that reduce and offset adverse effects to the pronghorn and its habitat. The current opinions that anticipate incidental take are listed above.

We believe the aggregate effects of limitations or barriers to movement of pronghorn and continuing stressors, including habitat degradation and disturbance within the pronghorn's (endangered) current range resulting from a myriad of human activities, exacerbated by periodic dry seasons or years, are responsible for the precarious status of the Sonoran pronghorn. However, collaborative, multi-agency and multi-party efforts to develop forage enhancement plots and waters, reduce human disturbance of pronghorn and their habitat, combined with the success of the semi-captive breeding facility at CPNWR

and the establishment of a second breeding pen and population on Kofa NWR, provide hope that recovery of the Sonoran pronghorn in the U.S. is achievable. Key to achieving recovery in Arizona will be a drastic reduction in human disturbance to pronghorn and their habitat caused by CBV and corresponding enforcement activities.

EFFECTS OF THE PROPOSED ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action that will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

The net effect of proposed restoration activities on Sonoran pronghorn on OPCNM, CPNWR, and BLM will be beneficial; however, restoration activities have the potential to adversely affect Sonoran pronghorn. Specifically, adverse effects to Sonoran pronghorn may include visual and auditory disturbance from human and vehicular presence associated with the proposed action. Some Sonoran pronghorn habitat could be disturbed by herbicide use, ingress and egress to restoration sites, and staging of vehicles and equipment. Additionally, Sonoran pronghorn may also be injured or killed by vehicles associated with project. However, conservation measures included in the proposed action will minimize the risk of disturbance to pronghorn and their habitat, as well as the risk of pronghorn being struck by vehicles. The anticipated long-term benefits of the project include: 1) decreased disturbance to Sonoran pronghorn as a result of UVR closures; 2) increased forage and cover for Sonoran pronghorn; 3) decreased habitat fragmentation; and 4) improved overall habitat conditions (e.g., improved hydrological processes).

The Sonoran pronghorn is sensitive to human presence. Krausman *et al.* (2001) reported that Sonoran pronghorn reacted to ground disturbances (vehicles or people on foot) with a change in behavior 37 percent of the time, resulting in the animals running or trotting away 2.6 percent of the time. The effects of disturbance from vehicular use of roads on Sonoran pronghorn were a more significant impact than disturbance from aircraft (helicopter, jet, and fixed wing) (Krausman *et al.* 2001). Wright and deVos (1986) noted that Sonoran pronghorn exhibit “a heightened response to human traffic” as compared to other subspecies of pronghorn. They noted that “once aware of an observer, Sonoran pronghorn are quick to leave the area. One herd was observed 1.5 hours later 11 miles north of the initial observation in October 1984. Other pronghorn have run until out of the observer’s sight when disturbed.” Hughes and Smith (1990) noted that on all but one occasion, Sonoran pronghorn ran from the observer’s vehicle and continued to run until they were out of sight.

Staff at OPCNM (2013) documented that during their typical morning activity period (post-sunrise), pronghorn on OPCNM experienced some form of potential disturbance once every 4 hours 10 minutes (even though monitoring was only conducted for 3 hours after sunrise each day, the results were calculated by summing the total number of observation hours and dividing by them by the total number of disturbance events). Actual disturbance responses took place once every 6 hours 15 minutes. Potential disturbance events resulted in the pronghorn running, about once every 8 hours 20 minutes. Vehicles approaching within one mile occurred once every 12 hours 30 minutes. Half of these resulted in pronghorn running, but for the other half, the driver was contacted by radio and advised to drive slowly (<10 mph) past the observation area.

Preliminary information from a study on the effects of human disturbance on Sonoran pronghorn indicates that pronghorn consistently exhibit visual responses to human activity, particularly vehicles traveling on a road within several kilometers. Although some instances have been noted where a pronghorn did not exhibit a visual response (for example, one buck did not appear disturbed by three vehicles driving at least 25 miles per hour about 1.5 kilometers away); most observations indicate that pronghorn exhibit a spectrum of responses, from standing vigilant to running from the stimulus. For example, eight Sonoran pronghorn were observed running a short distance and then vigilant towards utility vehicle noise 3.4 kilometers away. Another eight Sonoran pronghorn were observed running from several trucks traveling fast (> 25 mph). Pronghorn were initially vigilant when the vehicles were 1.3 kilometers away but soon started running, travelling over 3.6 kilometers in under five minutes until they were out of sight of the observers (email from Stephanie Doerries, University of Arizona, May 7, 2014).

Disturbance and flight of ungulates are known to result in a variety of physiological effects that are adverse, including elevated metabolism, lowered body weight, reduced fetus survival, and withdrawal from suitable habitat (Geist 1971, Harlow *et al.* 1987). Frequent disturbance imposes a burden on the energy and nutrient supply of animals (Geist 1971), which may be exacerbated in harsh environments such as those occupied by Sonoran pronghorn. Human presence may cause Sonoran pronghorn to move from an area, thereby denying pronghorn access to that specific site for what may be crucial ecological functions (e.g. foraging, bedding, seeking thermal shelter, seeking mates, seeking fawning sites, seeking areas of relative safety from predators). Causing pronghorn to move also increases their physiological demands by expending calories and metabolic water. These may be critical stressors in seasonal hot-dry periods and in extended periods of low forage availability. Disturbance may also lead to mortality. Causing a pronghorn to be alarmed or agitated, or to flee from a disturbance, may also make it vulnerable to predator attack. This is especially true for fawns and females during the fawning season. Krausman *et al.* (2001) found that fawns and their mothers were more sensitive to human disturbance than other life stages of Sonoran pronghorn.

Effects from Restoration Activities – Disturbance

The net effect of proposed restoration activities on Sonoran pronghorn on OPCNM, CPNWR, and BLM will be beneficial; however, a number of restoration activities, including behavioral, manual, chemical, and mechanical treatments, as well as inventorying and monitoring, may disturb Sonoran pronghorn. More specifically, human activities, vehicles, heavy equipment, and staging of equipment associated with restoration activities may result in visual and auditory disturbance of Sonoran pronghorn. Disturbance to Sonoran pronghorn may occur along ingress and egress routes as well as at restoration or monitoring sites. This disturbance can cause pronghorn to startle and/or flee, travel further distances to find suitable foraging, watering, and resting areas, and result in stress and short-term denial of access to habitat, all of which can result in adverse physiological effects or injury to pronghorn. Fleeing behavior can cause fawns to be abandoned or separated from their mothers, which can leave them vulnerable to predator attack or cause physiological stress that results in death. Due to the auditory and visual stimulus created by heavy equipment, mechanical treatment is most likely to cause disturbance to Sonoran pronghorn. In contrast, behavioral treatment is likely to cause the least amount of disturbance, followed by both manual and chemical treatments.

The initial phase of the proposed action targets about 300 miles of UVRs and will last less than one year; however, restoration will continue into the foreseeable future as funding and resources become available. Potential disturbance to Sonoran pronghorn from project activities will largely occur during the initial phase due to the significant amount of restoration that will occur during this part of the project; however, intermittent potential disturbance will continue for the life of the project. That said, in any particular

restoration area, potential disturbance to Sonoran pronghorn will be relatively short-term in duration. For example, moderately complex restoration of a four-mile long Class III UVR could take two to three days to complete; however, once done, the work will proceed to the next UVR. In most cases, UVRs are separated by a half mile to several miles. Once completed, the UVR will be considered restored and all equipment will be removed. The initial phase includes seven zones within the project area and the zones are separated by miles of habitat. Once a zone has been completed, work will move to the next zone. Therefore, although Sonoran pronghorn may avoid areas being actively restored due to disturbance from human activity, lack of access to any particular restoration site should last only a few days.

Conservation measures incorporated into the project will significantly decrease the risk of disturbance to Sonoran pronghorn. For example, OPCNM will avoid mechanical treatments during the Sonoran pronghorn fawning season to the extent possible and most behavioral, chemical, and manual treatments will be conducted outside of the fawning season as well. These measures will reduce disturbance to pronghorn during a critical time of the year for this species. Behavioral, chemical, and manual treatments may be conducted during the fawning season, but these would only occur when range conditions are appropriate as determined by the Sonoran Pronghorn Recovery Team. To further reduce the risk of disturbance, using the results of OPCNM and AGFD Sonoran pronghorn monitoring surveys, OPCNM will identify areas where Sonoran pronghorn occur and avoid work in those areas. In addition, before mechanical work occurs, OPCNM will conduct surveys in the morning (twice a day if mechanical work must occur during the fawning season) for Sonoran pronghorn and if they are detected, no work will begin until pronghorn move on their own volition to a distance great than one mile from the work site. During the implementation of manual, behavioral, or chemical treatments, a pronghorn monitoring and avoidance protocol will be followed. This protocol will be developed and agreed upon by the NPS, BLM, and FWS (CPNWR and AESO).

As mentioned above, vehicular ingress and egress to project sites may disturb Sonoran pronghorn; however, compared to baseline vehicular activity on authorized ingress/egress roads, we anticipate access to staging and restoration sites will result in a relatively small amount of potential disturbance. To reduce the risk of disturbance from ingress and egress, the minimum number of vehicles and ingress/egress trips to restoration sites will be used to accomplish the restoration work. All field staff will be trained to look for and identify Sonoran pronghorn and if pronghorn are detected near the access roads, vehicles will slow to 5 to 15 mph until they are a safe distance from the pronghorn.

Effects from Restoration Activities – Habitat Disturbance

Although the objective of the project is to restore habitat, some very minor Sonoran pronghorn habitat disturbance could occur from herbicide use (i.e., herbicide drift that could affect forage plants), ingress and egress, and vehicle and equipment staging. Potential habitat disturbance from these sources, however, will be minimized by associated conservation measures. For example, herbicide will only be applied in low wind conditions and using coarse sprays to minimize the potential for drift. Ingress and egress to restoration sites will be along authorized roads or the UVR to be restored, and staging will be at previously disturbed sites, thereby preventing additional damage to habitat.

Effects from Restoration Activities – Direct Mortality or Injury

We do not anticipate that herbicides used to control invasive non-native plants will injure or harm Sonoran pronghorn because herbicides that are of low toxicity to wildlife and/or that will degrade before wildlife are likely to encounter them will be used and applied in a manner that uses the least amount, but still remains effective.

Vehicles associated with restoration, inventorying, and monitoring activities could also collide with pronghorn causing injury and/or death. However, because speed limits of 25 mph (or 5 to 15 mph if pronghorn are detected near the access roads) will be enforced in the project area, we believe the chances of such collisions are very low.

Beneficial Effects from Restoration Activities

Although certain aspects of the restoration project may have adverse effects on Sonoran pronghorn, the overall program will benefit the species by: 1) decreasing disturbance to Sonoran pronghorn as a result of UVR closures; 2) increasing forage and cover for Sonoran pronghorn; 3) decreasing habitat fragmentation; and 4) improving overall habitat conditions (e.g., improved hydrological processes, decreased competition from invasive non-native plants). About 300 linear miles (or about 364 acres assuming an average width of 10 feet) of Sonoran pronghorn habitat will be restored initially. Furthermore, the DOI agencies will continue working with USBP to prevent the creation of additional UVRs and re-use of UVRs under restoration. Monitoring and reporting on the effectiveness of the project will aid in better understanding the overall benefits of the project to Sonoran pronghorn.

Effects to Sonoran Pronghorn Recovery with the Project

As stated in the “Status of the Species” section above, current downlisting criteria for Sonoran pronghorn are: 1) the establishment of a population of 300 adult pronghorn in one self-sustaining population for a minimum of five years; and 2) the establishment of at least one other self-sustaining population in the U.S. Currently, there are no delisting criteria. The proposed action is likely to positively affect the first downlisting criteria because although certain aspects of the restoration project may have adverse effects on Sonoran pronghorn, the overall program will benefit the species by: 1) decreasing disturbance to Sonoran pronghorn from road closures; 2) increasing forage and cover for Sonoran pronghorn; 3) decreasing habitat fragmentation; and 4) improving overall habitat conditions. These benefits may aid in increasing Sonoran pronghorn population numbers in Arizona. The proposed action will not affect the second downlisting criteria. Delisting criteria have not been established, therefore it is difficult to analyze the potential impacts of the proposed action on Sonoran pronghorn recovery (delisting). That said, because the project will have beneficial effects to pronghorn, it is likely that the project will contribute to both downlisting and recovery (delisting) of the species.

CUMULATIVE EFFECTS - SONORAN PRONGHORN

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Most lands within the action area are managed by Federal agencies; thus, most activities that could potentially affect pronghorn are Federal activities that are subject to section 7 consultation. The effects of these Federal activities are not considered cumulative effects. Relatively small parcels of private and State lands occur within the currently-occupied range of the pronghorn near Ajo and Why, north of the BMGR from Dateland to Highway 85, and from the Mohawk Mountains to Tacna. State inholdings in the BMGR have been acquired by the Department of Defense. Continuing rural and agricultural development, recreation, vehicle use, grazing, and other activities on private and State lands adversely affect pronghorn and their habitat. MCAS-Yuma (2001) reports that 2,884 acres have been converted to

agriculture near Sentinel and Tacna. These activities on State and private lands and the effects of these activities are expected to continue into the foreseeable future. Historical habitat and potential recovery areas currently outside of the current range are also expected to be affected by these same activities on lands in and near the action area in the vicinity of Ajo, Why, Yuma, and along the Gila River.

Of most significant concern to pronghorn is the high level of CBV activity in the action area. CBV activity and its effects to pronghorn and pronghorn habitat is described under the “*Human-caused Disturbance*” and “*Habitat Disturbance*” portions of the “Threats” section under “Status of the Species” for Sonoran pronghorn. CBV activity has resulted in route proliferation, off-highway vehicle activity, increased human presence in backcountry areas, discarded trash, abandoned vehicles, cutting of firewood, illegal campfires and arson fires, and increased chance of wildfire. Habitat degradation and disturbance of pronghorn have resulted from these CBV activities. Although CBV activity levels are still high, the trend in overall CBV apprehensions and drive-throughs has declined in recent years within the action area likely due to increased law enforcement presence, the border fence, and the status of the economy in the U.S. Despite high levels of CBV activity and law enforcement response throughout the action area, pronghorn in the U.S. have managed to increase since 2002 in part due to releases from the captive breeding pen and the construction of forage plots and waters. However, pronghorn use of areas subject to high levels of CBV and law enforcement activity appear to have declined. We expect CBV activities and their effects on pronghorn to continue for the foreseeable future.

CONCLUSIONS - SONORAN PRONGHORN

After reviewing the current status of the Sonoran pronghorn, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the proposed action is not likely to jeopardize the continued existence of the Sonoran pronghorn. No critical habitat has been designated for this species; therefore, none will be affected. Our conclusion is based on the following:

1. The net effect of the proposed action will be beneficial to Sonoran pronghorn. The anticipated long-term benefits of the project include: 1) decreased disturbance to Sonoran pronghorn as a result of UVR closures; 2) increased forage and cover for Sonoran pronghorn; 3) decreased habitat fragmentation; and 4) improved overall habitat conditions. About 300 linear miles of Sonoran pronghorn habitat will be initially restored.
2. Although the proposed action could result in some disturbance to Sonoran pronghorn, conservation measures included in the proposed action will help avoid and minimize disturbance to Sonoran pronghorn. These measures include, but are not limited to, conducting surveys for Sonoran pronghorn and avoiding working in areas where they are detected; conducting mechanical treatments outside of the fawning season to the extent possible; and enforcing speed limits.
3. An insignificant amount of Sonoran pronghorn habitat will be adversely impacted. Conservation measures, such as staging at already disturbed sites, will help avoid and minimize adverse impacts to pronghorn habitat.
4. There is a small risk that project-related activities may injure or kill Sonoran pronghorn; however, this risk will be significantly minimized by enforcing speed limits of 25 mph and slowing to 5 to 15 mph if pronghorn are detected near a road and by using low toxicity herbicide.

5. As explained above, we anticipate that the proposed project may aid in achieving the first downlisting criteria (the establishment of a population of 300 adult pronghorn in one self-sustaining population for a minimum of five years), as well as overall species recovery.
6. The proposed project may have an appreciable beneficial impact on the population at the range wide scale. Thus, the proposed action is expected, directly or indirectly, to increase appreciably the likelihood of both survival and recovery of the Sonoran pronghorn in the wild by increasing the reproduction, numbers, or distribution of the species.
7. Recovery is the process that stops the decline of an endangered or threatened species by removing or reducing threats. Recovery ensures the long-term survival of the species in the wild. At that point, the species is recovered, and protection of the ESA is no longer necessary. The aforementioned effects will increase the likelihood of recovery of the Sonoran pronghorn.

The adverse effects that may occur in the action area do not reach the scale where recovery of the species would be significantly delayed or precluded. The conclusions of this biological opinion are based on full implementation of the project as described in the Description of the Proposed Action section of this document, including any Conservation Measures that were incorporated into the project design.

INCIDENTAL TAKE STATEMENT – SONORAN PRONGHORN

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. “Take” is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. “Harm” is defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering (50 CFR 17.3). “Harass” is defined as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering (50 CFR 17.3). “Incidental take” is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

Amount or Extent of Take Anticipated – Sonoran pronghorn

We do not anticipate the proposed action will result in incidental take of Sonoran pronghorn for the following reasons:

1. Conservation measures and other provisions described in the proposed action will significantly minimize the risk that the proposed project will kill, injure, harm, and/or harass Sonoran pronghorn.
2. Disturbance to Sonoran pronghorn that may occur as a result of the proposed action will be limited in duration and scope. For example, most restoration activities at a particular site will only last a few days.

Disposition of Dead or Injured Listed Species

Upon finding a dead or injured threatened or endangered animal, initial notification must be made to the USFWS's Division of Law Enforcement, 2450 West Broadway, Mesa, Arizona (480-967-7900) within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph, and any other pertinent information. The notification shall be sent to the Law Enforcement Office with a copy to this office. Care must be taken in handling injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible condition.

In addition to the above, the 2014 Final Incident Response Protocol for Sonoran pronghorn will be followed.

CONSERVATION RECOMMENDATIONS – SONORAN PRONGHORN

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. We recommend implementing the following actions:

1. Continue to participate on the Sonoran Pronghorn Recovery Team and in implementing and supporting recovery actions identified by the Sonoran Pronghorn Recovery Team.

In order for the USFWS to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the USFWS requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on the action(s) outlined in the (request/reinitiation request). As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Thank you for your cooperation and assistance throughout this consultation process, as well as your considerable role and leadership in conservation of the Sonoran pronghorn and other important natural resources. Any questions or comments should be directed to Erin Fernandez (520) 670-6150 (x238) or Jean Calhoun (x223). Please refer to the consultation number, 02EAAZ00-2014-F-0538 in future correspondence concerning this project.

/ s / Jean Calhoun for
Steven L. Spangle

cc (hard copy):

Field Supervisor, Fish and Wildlife Service, Tucson, AZ (2 copies)
Jean Calhoun, Assistant Field Supervisor, Fish and Wildlife Service, Tucson, AZ

cc (electronic copy):

Sid Slone, Refuge Manager, Cabeza Prieta National Wildlife Refuge, Ajo, AZ
James Atkinson, Sonoran Pronghorn Recovery Team Leader, Cabeza Prieta National Wildlife
Refuge, Ajo, AZ
Rijk Morawe, Chief of Natural and Cultural Resources Management, Organ Pipe Cactus National
Monument, Ajo, Arizona
Edward Kender, Field Manager, Bureau of Land Management, Phoenix, Arizona
Ron Tipton, Bureau of Land Management, Phoenix, Arizona
Chairperson, Tohono O'Odham Nation, Sells, AZ (Attn: Karen Howe)
Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ, pep@azgfd.gov
Regional Supervisor, Arizona Game and Fish Department, Yuma, AZ (Attn: John Hervert)
Raul Vega, Regional Supervisor, Arizona Game and Fish Department, Tucson, AZ

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TABLES AND FIGURES

Table 1. A summary of population estimates from literature and field surveys for Sonoran pronghorn in the U.S.

Date	Population estimate (95 percent CI ^a)	Source
1925	105	Nelson 1925
1941 ^b	60	Nicol 1941
1957	<1,000	Halloran 1957
1968	50	Monson 1968
1968-1974	50 - 150	Carr 1974
1981	100 - 150	Arizona Game and Fish Department 1981
1984	85 - 100	Arizona Game and Fish Department 1986
1992	179 (145-234)	Bright et al. 1999
1994	282 (205-489)	Bright et al. 1999
1996	130 (114-154)	Bright et al. 1999
1998	142 (125-167)	Bright et al. 1999
2000	99 (69-392)	Bright et al. 2001
2002	21 (18-33)	Bright and Hervert 2003
2004	58 (40-175)	Bright and Hervert 2005
2006	68 (52-116)	Unpublished data
2008	68 ^c	Unpublished data
2010	85	Unpublished data
2012	159	Unpublished data

^a Confidence interval; there is only a 5 percent chance that the population total falls outside of this range.

^b Population estimate for southwestern Arizona, excluding Organ Pipe Cactus National Monument.

Table 2. Comparison of endangered Sonoran pronghorn population surveys in the U.S., 1992-2012.

Date	<u>Pronghorn observed</u>		<u>Population estimates</u>			
	On transect	Total observed	Density estimate using DISTANCE (95 percent CI ^a)	Lincoln-Peterson (95 percent CI)	Sightability model (95 percent CI)	Other estimate
Dec 92	99	121	246 (103-584)	---	179 (145-234)	
Mar 94	100	109	184 (100-334)	---	282 (205-489)	
Dec 96	71	82 (95 ^b)	216 (82-579)	162 (4-324)	130 (114-154)	
Dec 98	74	86 (98 ^b)	---	172 (23-321)	142 (125-167)	
Dec 00	67	69 ^b	N/A	N/A	99 (69-392)	
Dec 02	18	18	N/A	N/A	21 (18-33) ^c	
Dec 04	39	51	N/A	N/A	58	
Dec 06	51	59	N/A	N/A	68 (52-116)	
Dec 08	N/A	N/A	N/A	N/A	N/A	68 ^d
Dec 10	N/A	N/A	N/A	N/A	N/A	85
Dec 12	N/A	N/A	N/A	N/A	N/A	159

^a Confidence interval; there is only a 5 percent chance that the population total falls outside of this range.

^b Includes animals missed on survey, but located using radio telemetry.

^c Jill Bright, Arizona Game and Fish Department, pers. comm. 2003

^d Due to poor visibility and low pronghorn sighting rate (some radio-collared pronghorn were detected from their transmitter signals but not seen during the surveys) caused by inclement weather during the surveys and having to resurvey some areas during better weather, the usual survey estimator was not used because it would have lacked accuracy. The estimate of 68 was based on individual seen and missed on the survey and on several recent telemetry flights.

Table 3. Comparison of Sonoran pronghorn population surveys in Mexico, 2000-2009.

Date	<u>Pronghorn observed</u>		<u>Population estimate</u>			
	West of Highway 8 (Mexico)	Southeast of Highway 8 (Mexico)	Total	West of Highway 8 (Mexico)	Southeast of Highway 8 (Mexico)	Total
Dec 2000						346
Dec 2002			214			280
Dec 2004	30	439	469	59	625	684
Feb 2005						
Jan 2006			486			634
Dec 2007	35	325	360	50	354	404
Dec 2009	53	258	311	101	381	482
Dec 2011	30	167	197	52	189	241
Dec 2013	--	372	372	--	434	434

Figure 1. Ecological Restoration Plan project area (figure from page 6 of the Ecological Restoration Plan).

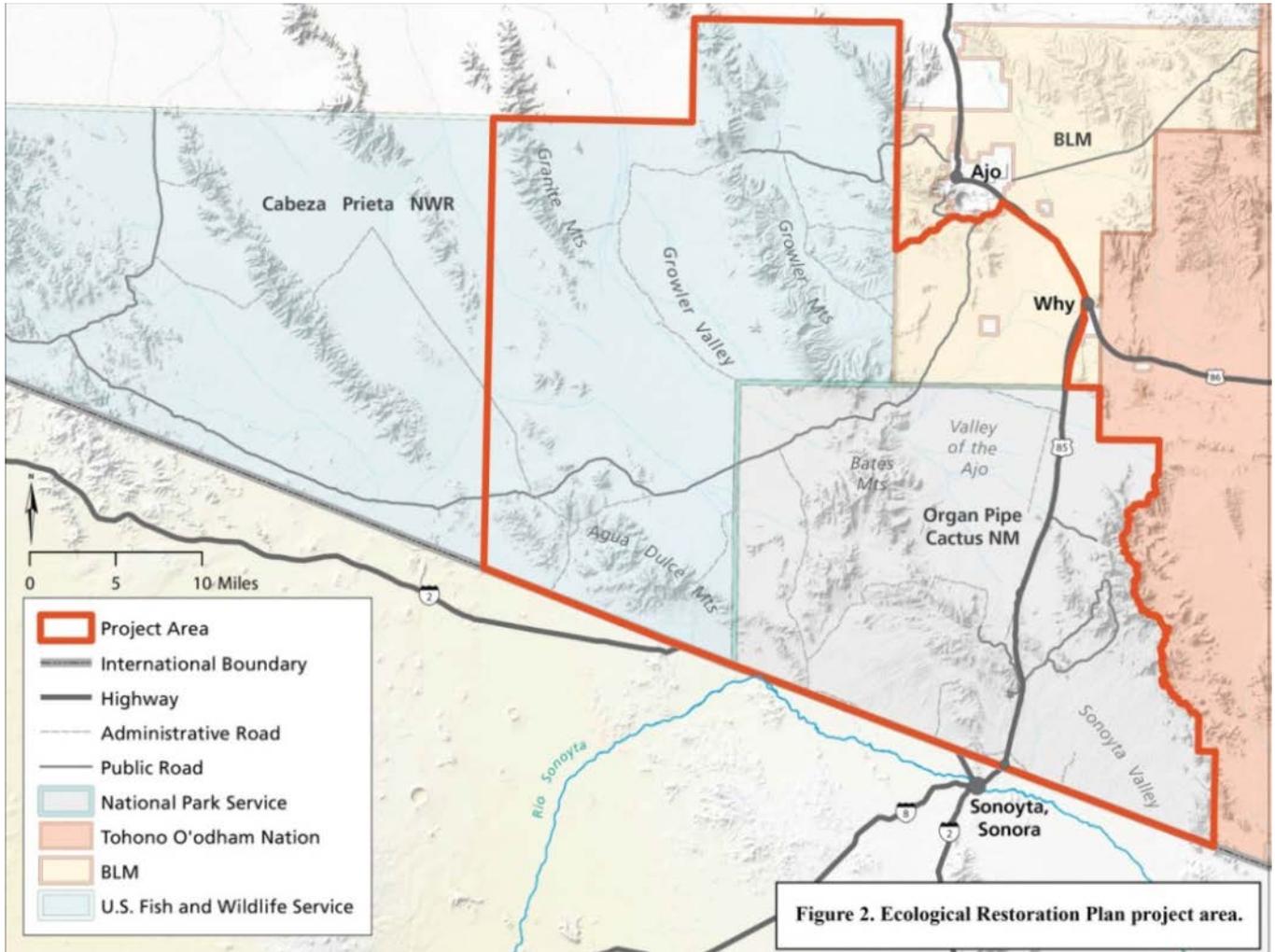


Figure 2. Restoration priority zones, UVRs, and staging areas within the project area.

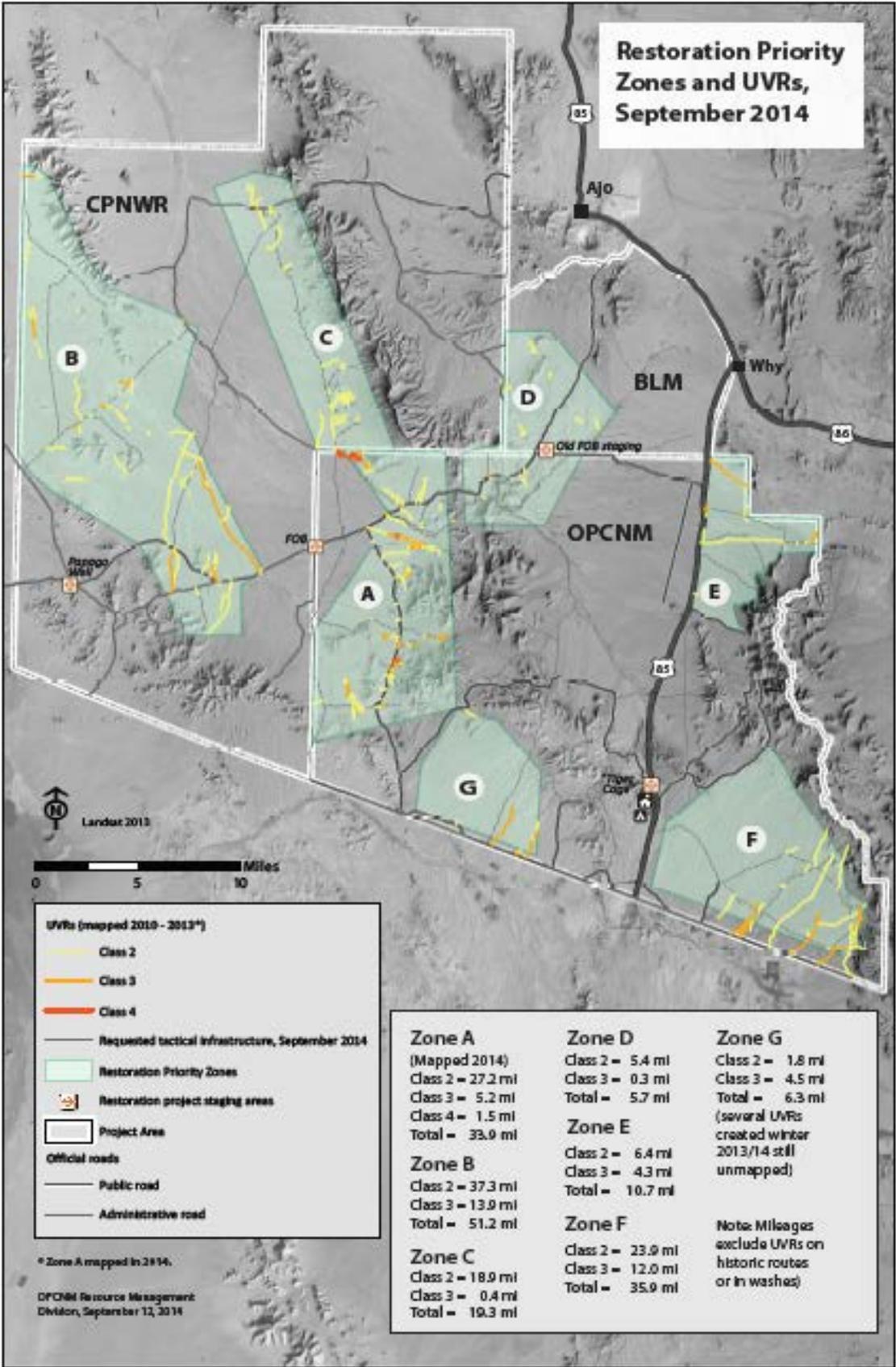


Figure 3. Historical range of Sonoran pronghorn in the United States and Mexico.



Figure 4. Endangered Sonoran pronghorn range in southwestern Arizona, United States.

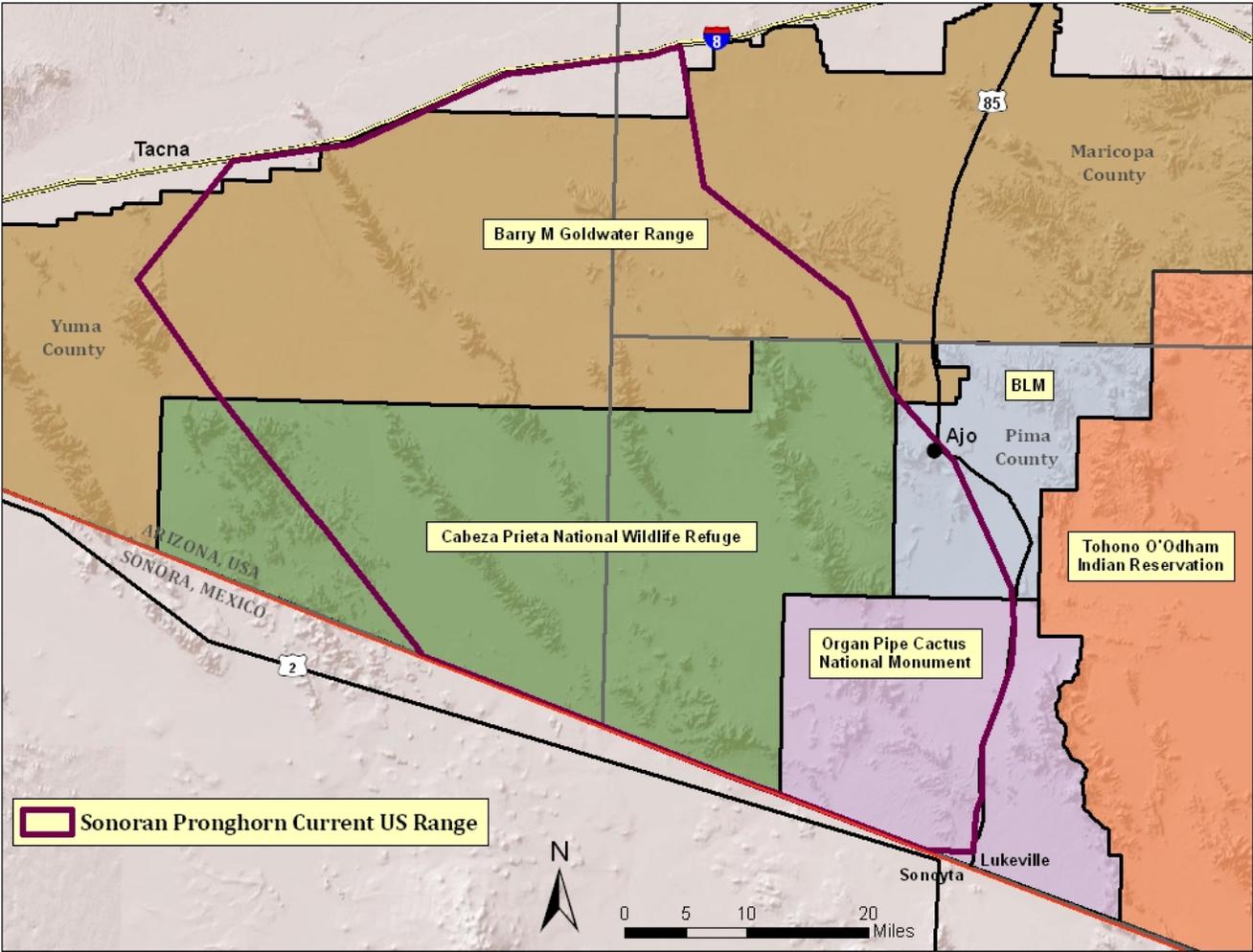


Figure 5. 10(j) Nonessential Experimental Population area for Sonoran pronghorn in southwestern Arizona, United States.

