



# United States Department of the Interior



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AESO/SE  
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November 21, 2013

## Memorandum

To: Refuge Manager, Cabeza Prieta National Wildlife Refuge, Ajo, Arizona

From: Field Supervisor

Subject: Reinitiation of Intra-Service Section 7 Consultation on the Cabeza Prieta National Wildlife Refuge Comprehensive Conservation Plan, Arizona

This memo is in response to your March 29, 2011 request for reinitiation of formal intra-service consultation on your Cabeza Prieta National Wildlife Refuge (CPNWR) Comprehensive Conservation Plan (CCP), Pima and Yuma counties, Arizona. Your request was received by us on March 30, 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 impacts to the endangered Sonoran pronghorn (*Antilocapra americana sonoriensis*). You found that only the Sonoran pronghorn would be affected by the proposed project; hence our previous analyses and conclusions stand for other species addressed in our original biological opinion.

Our original biological opinion for the CCP, issued on August 22, 2006 addressed the development and maintenance of waters for Sonoran pronghorn. This document, however, addresses in greater depth your proposed water development program. Herein we revise specific sections of the last biological opinion relating to the status and baseline of the Sonoran pronghorn and Sonoran pronghorn waters (in the effects analysis). Sections not addressed or revised herein remain as presented in the last biological opinion.

This biological opinion is based on information provided in your March 29, 2011 Intra-Service Section 7 Biological Evaluation, literature, email correspondence, telephone conversations, and other sources of information as described in the consultation history. Literature cited in this biological opinion is not a complete bibliography of all literature available on Sonoran pronghorn; effects of wildlife waters; or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at this office.

## CONSULTATION HISTORY

- See Biological Opinion #22410-2006-F-0416, dated August 22, 2006 for consultation history prior to March 30, 2011 request.
- March 30, 2011: We received your request for reinitiation of consultation on the CCP and the Intra-Service Section 7 Biological Evaluation Form that specifically addressed additions to your Sonoran pronghorn waters program, previously addressed in your CCP.

- March 31, 2011: We responded to your request, including agreeing with your effects determinations.
- April 21, 2011: We received your request for reinitiation of consultation on the CCP and the Intra-Service Section 7 Biological Evaluation Form that specifically addressed additions to your predator management program, previously addressed in your CCP.
- April 26, 2011: We responded to your request, including agreeing with your effects determinations. Additionally, we notified you that we would address both requests for reinitiation of the CCP (Sonoran pronghorn waters and predator management) in one Biological Opinion.
- April 2011 to January 2012: Our offices continued to correspond regarding the proposed projects and minor changes were made to the description of the proposed action.
- January 12, 2012: We sent you a draft Biological Opinion for your review.
- November 12, 2013: We received your comments on the draft Biological Opinion, including your request to eliminate the predator management portion of the project and only address the Sonoran pronghorn waters program. You also made minor updates to the description of the proposed action for the water program.

## **BIOLOGICAL OPINION**

### **DESCRIPTION OF PROPOSED ACTION**

A complete description of the proposed action is found in your March 29, 2011 Intra-Service Section 7 Biological Evaluation Form and updates to the description of the proposed action sent to us via email; both are incorporated herein by reference. These documents describe the projects' purpose which is to improve existing and develop new water sources for Sonoran pronghorn and implement a supplemental feeding program.

### **Wildlife and Habitat Management**

#### *Waters and Supplemental Feed*

The current distribution of Sonoran pronghorn water catchments within the pronghorn (endangered) range in Arizona is inadequate to sustain an increasing and wide-ranging pronghorn population during hot, dry periods and prolonged drought. Therefore, CPNWR proposes construct five new Sonoran pronghorn waters and improve five existing Sonoran pronghorn waters to increase water collection and storage capacity to ensure water availability for Sonoran pronghorn (endangered population) during hot, dry periods.

Additionally, CPNWR proposes to implement a supplemental feeding program during periods of poor forage production to enhance fawn survival. Water improvement and construction will be completed over a multi-year period beginning in 2014. Water maintenance and the supplemental feeding program will be implemented as required in perpetuity.

#### **Waters**

The five existing waters to be improved include one in the Granite Mountains southeast of the existing forage enhancement plot, one in the Fawn Hills north of Papago Well, and three along the southwest side of the Sierra Pinta Mountains. The five new waters for Sonoran pronghorn include one on the west side of the Granite Mountains north of the existing Granite Mountains pronghorn water, one east of the

Antelope Hills, and three in the vicinity of the Agua Dulce Mountains (one on the southwestern side and two along the northeastern side).

Currently, the storage capacity of the five waters to be improved ranges from 1,870 to 5,160 gallons, which is not large enough to prevent the catchments from going dry during periods of prolonged drought. Consequently, they require periodic water hauling missions via helicopter to keep them from going dry during periods critical to the needs of pronghorn. These operations usually occur in the late spring and early summer after the winter rain season. High temperatures during this time limit helicopter lifting capacity which results in more trips to supply enough water to support pronghorn during drought periods. Once the existing waters are improved, they will have the capacity to store up to 11,000 gallons of water and consequently, water hauling will rarely, if ever be required.

The new waters are needed on the refuge to provide water sources for pronghorn within migratory routes and to help offset impacts to pronghorn from human activities such as illegal border crossing, law enforcement, and recreation. Each new catchment will have the capacity to store up to 11,000 gallons of water and include a walk-in trough (4' wide x 7' long x 30" deep) that will be connected to the storage pipes using flexible plumbing. All pipe will be buried at least one foot beneath the surface. During excavation, the top soil surface will be set aside and returned to the surface after storage pipe buried. The surface will be returned as close as possible to the original contour and replanted with native vegetation removed from the site. Based on surveys at the sites, it is unlikely that any columnar cacti will be impacted by water construction; however, if any are located within any excavated area, they will be salvaged and replanted on site. Otherwise, all columnar cacti will be avoided.

A helicopter will be used to ferry work crews and equipment to each of the existing and new waters from staging areas located along the El Camino del Diablo (ECDD). For existing and/or new waters accessible via administrative and/or well established unauthorized roads, two backhoes will be driven to the site and used for primary excavation. For all other sites, hand tools will be used for excavation to the extent possible; however, the presence of subsurface caliche, packed alluvial material, or bedrock may require the use of a generator and jackhammer at these sites.

Equipment and crews will be transported via vehicle to staging areas along the ECDD, the principal route used by the public and U.S. Border Patrol (USBP) agents for access across CPNWR. The ECDD has a speed limit of 25 miles per hour (mph) and receives daily traffic use by a variety of vehicles. All of the staging areas will be located within previously disturbed sites along the ECDD. Work crews will camp at these sites for the duration of each project and will be ferried to and from work sites each day via helicopter.

Since helicopters will be used to sling-load materials and crew to all ten of these project sites, the projects will be subject to delays due to excessive winds or rain. Helicopters will use the same ingress and egress route for each ferry trip and will fly from 200 to 500 feet above the ground, depending on terrain. For new catchments, 40 to 50 ferry trips per water may be needed on the first day to move all of the pipe, equipment, and volunteers to the site from the staging area. Existing catchments will require 30 trips or fewer per water due to the existing structures already in place.

A crew of approximately 10 to 20 people will work at each project site or at the helicopter landing zone. Construction at each of the ten sites will require a minimum of three days and a maximum of seven days to complete depending upon the excavation technique used and the substrates encountered during excavation. Work will be conducted outside of the pronghorn closure season (March 15 through July 31) when possible, but some emergency response actions and construction may occur within this window. Work crews will be comprised of refuge personnel, Arizona Game and Fish Department (AZGFD) staff,

Marines assigned to the Marine Corps Air Station (MCAS)-Yuma, and volunteers from the Yuma Valley Rod and Gun Club.

Refuge and AZGFD trucks will be used to transport all associated equipment, supplies, and personnel to the staging areas. Work trucks accessing the staging areas and/or work sites will remain on authorized roads at all times. To minimize disturbance to pronghorn, the minimum number of work trucks practicable will be used and the minimum number of trips to work sites will be made to complete the job in the fastest and most efficient manner. Additionally, the refuge biologist will accompany refuge and AZGFD trucks out to the work site on all trips. Although pronghorn are not anticipated to be in the vicinity of the access roads to the site, to further reduce possible disturbance to pronghorn, the number of vehicle trips to the staging area will be minimized. Additionally, speed limits of 25 mph or less will be adhered to. 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.

Helicopter flight routes will be chosen to avoid areas used by pronghorn as determined by the most recent AZGFD bi-weekly pronghorn monitoring flights and other pronghorn monitoring efforts. Furthermore, a biologist will participate in all flights and will scan for pronghorn. If pronghorn are observed from the helicopter, the helicopter will fly away from any pronghorn sighted in an attempt to avoid further disturbance.

To minimize degradation of pronghorn and lesser long-nosed bat foraging habitat, impacts to native vegetation will be avoided to the greatest extent possible. Additionally, non-native, invasive vegetation will be removed at the project sites.

Annual maintenance of all waters will be accomplished during the winter months and prior to the Sonoran pronghorn fawning season (i.e., prior to March 15) via two people walking in from the nearest access point from one of the existing roads or trails. Maintenance will include inspecting and, if needed, cleaning the collection points and/or the trough and will take about one day to complete per water.

### Supplemental Feeding Program

A supplemental feeding program for Sonoran pronghorn will be implemented as needed during periods of poor forage production to enhance fawn survival. Baled alfalfa will be transported via helicopter to areas where fawns are present in proximity to the waters. Depending on the duration and timing of non-forage producing periods, up to five helicopter missions may be needed per period (season) to initially stock and replenish alfalfa at the selected waters. During each mission, three helicopter ferry trips per water may be needed to move one to two dozen bales of alfalfa to each of the selected feed sites. As described above, the helicopter will attempt to avoid pronghorn; however, because feed is involved, pronghorn may linger near the feed station as the helicopter approaches. As the helicopter nears the feed site, any pronghorn in the vicinity will likely be forced away until the feed replenishment is completed and the helicopter has left.

## **SONORAN PRONGHORN STATUS OF THE SPECIES**

### **A. Description, Legal Status, and Recovery Planning**

The U.S. Fish and Wildlife Service (FWS) 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**

No changes.

## **C. Distribution and Abundance**

### *United States*

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). 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 cross-border violator (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 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). 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 & Berger 1994, Primm 1996; as cited by Kerley *et al.* 2002) or increasing the likelihood of fatal encounters with humans (Kasworm & Manley 1990, Saberwal *et al.* 1994, Khrantsov 1995, Mattson *et al.* 1996; as cited by Kerley *et al.* 2002). Between 2010 and 2012, the wild pronghorn population (of nearly 100) 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 facility

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 September 2013) 92 pronghorn in the enclosure. Since establishing the program, 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 2013, a total of 91 individuals have been released, 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 Barry M. Goldwater (BMGR) East, east of Highway 85. The additional populations are being established as an experimental, nonessential population under section 10(j) of the Act. A final Environmental Assessment and final 10(j) rule were published in April and May, 2011, respectively. 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, leaving 12 (10 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. As of November, 2013 the Kofa pen contains 25 pronghorn (14 adults, 9 yearlings and 2 fawns). The released animals were released in the King Valley (Kofa NWR) in January 2013 and five are known to still be alive. Three of these (two does and a buck) have recently been documented using a water source on the Yuma Proving Ground and two bucks were recaptured in the Kofa breeding pen because their collars prematurely failed and there was no way to track them. They will be re-released this winter.

### *Mexico*

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).

## **E. 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 recently; 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 (FWS 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). More recently, 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.

#### *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; cross-border violator (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, Organ Pipe Cactus National Monument (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<sup>net</sup> 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 Forward Operating Base (FOB), located within the current range of the pronghorn, was established in 2005. In 2011, FWS completed an analysis of whether the Camp Grip FOB resulted in impacts on Sonoran pronghorn movement patterns. FWS 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 SBI net 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, Krausman et al. 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 & Berger 1994, Primm 1996; as cited by Kerley *et al.* 2002) or increasing the likelihood of fatal encounters with humans (Kasworm & 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, Landon et al. 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 (2003). 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 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).

#### *Habitat Disturbance*

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 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. For instance, all the valleys at CPNWR are now criss-crossed with a network of unauthorized north-south routes and trails, even although those areas are designated as Wilderness. A mapping effort conducted by CPNWR showed almost 8,000 miles of illegal routes as of 2008. Similar levels of impacts are expected to exist at OPCNM, and a report summarizing existing impacts is being produced (electronic mail from Mark Sturm, OPCNM, August 31, 2011); however, we have not yet received this report. A cooperative effort was completed recently by CBP, FWS, 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 roads and the associated impacts to Sonoran pronghorn.

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). 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 roads ("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 significantly alleviated the adverse effects of this traffic on pronghorn and their habitat. USBP, however, continues to respond (by vehicle, horseback, foot, and aircraft) to ongoing CBV activity (mostly foot traffic) 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. Because of concern over the dramatic increase in disturbance since 2005/2006, NPS has collected data over time to document the trend. The proliferation of unauthorized roads is a major impact on multiple resources, and provides an index of the level of human activity currently taking place in pronghorn habitat.

### *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. 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 21<sup>st</sup> century and beyond (Intergovernmental Panel on Climate Change 2007). Most of the observed increases in globally averaged temperatures since the mid-20<sup>th</sup> 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.

#### *Small Population Size and Random Changes in Demographics*

At 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 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 in 2013, the U.S. wild endangered population has dramatically increased but is still below desired numbers. At an estimated 25 in 2002 and 52 in 2011, the Pinacate population is also well below desired numbers. At 189 in 2011, the third population (southeast of Highway 8) is 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.

## ENVIRONMENTAL BASELINE

### A. Action Area

No changes.

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

No changes.

### C. Status of the Sonoran Pronghorn in the Action Area

#### *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. The October 2013 long-term (48-months) drought status report (<http://www.azwater.gov/azdwr/StatewidePlanning/drought/DroughtStatus2.htm>) indicates that southwestern Arizona is experiencing conditions of abnormally dry to extreme drought conditions.

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 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."

#### *Recent 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 10 emergency water sources (7 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). Construction of additional waters (the subject of this consultation) is currently undergoing environmental review. Four 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. Construction of an additional plot is nearly complete and additional plots may be constructed in the future if warranted. 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 and as of November 2013, contains 94 pronghorn (56 adults and 38 fawns). As described above, these facilities will be 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 FWS, 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.

#### **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 Sector, 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. 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. 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, and March 8, 2007. 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, and December 10, 2009. 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, and May 3, 2010. 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 a reinitiation issued on January 7, 2013.
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. SBInet 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. No incidental take was anticipated.
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.

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 adverse effects to the pronghorn and its habitat. As described above, the current 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; and 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. 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 resulting from the Federal actions described here (although a pronghorn may have been strafed near one of the targets on BMGR-East). 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 grave 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 10 emergency waters, three permanent catchments, and four forage enhancement plots, with additional waters and forage enhancement plots 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 94 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.

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 in the action area. 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 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.

### Wildlife and Habitat Management

As stated in the previous biological opinion, implementation of the "Wildlife and Habitat Management Element" of the CCP, including construction and maintenance of Sonoran pronghorn waters, may result in degradation of pronghorn habitat and/or disturbance to pronghorn. Adverse effects to pronghorn could result from vehicular and foot traffic associated with construction and maintenance of waters; helicopter

flights for construction and management of waters; and management of wildlife waters (if water-borne diseases are transmitted to pronghorn through wildlife waters and/or if predators key-in on the waters and predate upon pronghorn using the waters or if the waters increase the carrying capacity of predators in the area). These activities may disturb pronghorn and/or degrade their habitat in a number of ways, such as from associated noise and visual disturbance; disturbance of soils; and crushing, destruction, or removal of vegetation that may provide forage and cover to pronghorn. Additionally, there is a potential for pronghorn to be killed or injured through collision with vehicles.

Although the waters program may result in some adverse effects, avoidance and minimization measures should reduce disturbance to pronghorn and degradation of their habitat. Additionally, these programs will greatly aid in the recovery and conservation of pronghorn. Overall, implementation of these programs will be beneficial to pronghorn on the CPNWR and throughout their range.

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. Krausman *et al.* (2001) documented 149 direct overflights and 263 other overflights (in which the aircraft passed  $\geq 328$  feet to the side of the animal). Pronghorn changed their behavior (e.g., from standing to trotting or running, or bedded to standing) 39 and 35 percent of the time during direct and other overflights, respectively.

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.

#### *Waters and Supplemental Feed*

Continuing to provide perennial water through enhancing and constructing new waters and providing supplemental feed should benefit the pronghorn population by increasing adult and fawn survival and fawn recruitment (the survival of fawns to breeding age) during periods of drought and poor forage production (Hervert *et al.* 2000, Bright and Hervert 2005, CPNWR 2006). Providing water for pronghorn is a widespread, accepted management practice (O’Gara and Yoakum 1992, Yoakum 1994)

and use of free-standing water sources by Sonoran pronghorn is well documented (Hervert *et al.* 2000, Morgart *et al.* 2005). Fox *et al.* 2000 suggested Sonoran pronghorn water intake from forage was not adequate to meet minimum water requirements. The availability of free water to pronghorn is vital, particularly during drought periods when preformed water (i.e. water bound in plant tissue) is scarce. Access to water is essential for digestion of food and for keeping the body cool. Drinking free-standing water also enables pronghorn to consume and use forage of higher nutritional quality. Historically, Sonoran pronghorn had much greater access to greenbelts and perennial water sources, such as the Gila and Sonoyta rivers. Currently, however, lack of access to these areas, drought conditions, and significant amounts of human activities throughout the pronghorn range make it necessary to augment the natural supply of water and forage to avoid extirpation of pronghorn in the U.S. Given that fawns, pregnant does, and lactating does have greater water and energy requirements than the species on average (Krausman 2004), the need for perennial water and enhanced forage to maintain population recruitment is apparent. A study suggested that selective foraging on chainfruit cholla cactus by pronghorn during droughts (due to its high water content) may reduce recruitment in the population as this plant has little nutritional value, and, while it may keep pronghorn alive longer in drought, it is probably not sufficient for growing fawns (Bright and Hervert 2005). Supplemental feed should provide nutritious forage and aid in fawn growth and survival.

Implementation of certain components of the water and supplemental feed program may, however, result in disturbance to pronghorn and their habitat. Pedestrian, vehicle, and helicopter activity associated with construction of waters will likely result in disturbance (visual and auditory) to Sonoran pronghorn. 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. Vehicles associated with development and maintenance of the waters could also collide with pronghorn causing injury and/or death. However, because there is a 25 mph speed limit on the CPNWR (5 to 15 mph if pronghorn are detected near access roads), we believe the chances of such collisions are low.

Additionally, as previously analyzed in the 2006 biological opinion, developed waters could adversely affect pronghorn if they harbor and spread harmful pathogens to pronghorn and/or if predators key-in on the waters and predate upon pronghorn using the waters or if the waters increase the carrying capacity of predators in the area (as this was addressed in the 2006 biological opinion, it will not be discussed further in this opinion).

Short term disturbance to pronghorn from construction activities may occur. Noise and visual impacts associated with work crews (of up to 20 people), vehicles (including the use of a backhoe), and other equipment (i.e., jackhammer and generator) associated with construction of the waters may cause pronghorn to flee from or temporarily avoid areas at or near construction, staging, or access sites. This disturbance, however, will be relatively short-term in duration as each water site will take three to seven days to complete. Furthermore, disturbance to pronghorn from work crews and vehicles will be minimized by a number of measures. For example, staging will be at previously disturbed sites along the ECDD, the principal road used by the public and USBP agents for access across CPNWR. Compared to baseline activity on the ECDD, we anticipate vehicle access to staging sites along the ECDD and staging along the ECDD will result in only a negligible amount of disturbance. Additionally, to minimize disturbance, work trucks accessing the staging areas and/or work sites will remain on authorized roads at all times; the minimum number of work trucks practicable will be used; the minimum number of trips to work sites will be made to complete the job in the fastest and most efficient manner; and the refuge biologist will accompany refuge and AZGFD trucks out to the work site on all trips. Although pronghorn are not

anticipated to be in the vicinity of the access roads to the site, to further reduce possible disturbance, 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. Disturbance will also be minimized because construction will occur outside of the fawning season when possible.

Short-term disturbance to pronghorn may occur from helicopter activity associated with water construction. Up to 40 to 50 trips (per site) may be needed for new waters and up to 30 for existing waters. Helicopters may fly as low as 200 feet which may cause pronghorn to flee. This disturbance, however, should be minimized as helicopter routes will be chosen to avoid areas used by pronghorn as determined by the most recent AZGFD bi-weekly pronghorn monitoring flights and other pronghorn monitoring efforts. Furthermore, a biologist will participate in all flights and will scan for pronghorn. If pronghorn are observed from the helicopter, overflights will be avoided and the helicopter will fly away from any pronghorn sighted in an attempt to avoid further disturbance. Additionally, disturbance will be minimized because construction will occur outside of the fawning season when possible.

Long-term, intermittent disturbance may occur from work crews during periodic maintenance of waters. This disturbance should be minimized as it will occur outside of the fawning season and because work crews will access the sites on foot from the nearest road or trail. Disturbance from vehicle activity may still occur during ingress and egress along the primary access road.

Long-term, intermittent disturbance may also occur from helicopter use associated with filling the waters. This disturbance, however, should be minimal as waters seldom, if ever, will need to be filled due to their large storage capacity. Overall, disturbance from this aspect of the project should be reduced in comparison to the current water program as the number of annual water hauling trips will be reduced.

Helicopter use associated with the supplemental feed program may also result in long-term, intermittent disturbance to pronghorn. Up to five helicopter missions with about three ferry trips per mission may be needed per season to initially stock and replenish alfalfa at selected waters. During these missions, pronghorn along travel routes and at the sites may be disturbed (both auditorily and visually) and caused to flee. Disturbance to pronghorn from this helicopter activity, however, should be minimized by the implementation of the aforementioned helicopter-associated conservation measures (i.e., routes will be chosen to avoid pronghorn, a biologist will participate in all flights, etc.). Because feed and water are involved (i.e., an attractant of pronghorn), it is more likely that disturbance will occur to pronghorn lingering in the vicinity of the water/feed sites during helicopter ingress and egress. Although pronghorn may flee from these sites, this disturbance should be very short term. Based on previous observations at existing feed stations, pronghorn return to these sites soon (within several hours to a day) after feed replenishment is completed. Furthermore, adverse physiological effects of this temporary disturbance should be more than offset by the water and food provided by the program.

Some habitat disturbance will occur as a result of construction and enhancement of wildlife waters. This disturbance, however, will be minimal as the physical footprint of each water is small; native vegetation will be avoided to the greatest extent possible; and because the soil surface will be returned as close as possible to the original level and replanted with the native vegetation that was removed from the site prior to construction. Additionally, non-native, invasive vegetation will be removed at the project sites. Furthermore, habitat disturbance from vehicle ingress and egress will be minimized as all vehicles will stay on authorized roads, with the exception that a backhoe will be driven to sites accessible via well-established unauthorized routes (only if not accessible via authorized road).

Although certain aspects of the water and supplemental feed program may have adverse effects on pronghorn, overall the program will greatly benefit the species. The program will provide water and food

sources for pronghorn within migratory routes and help buffer the effects of human disturbance on the U.S. pronghorn population, particularly during stressful drought periods. Furthermore, the program should increase adult and fawn survival and recruitment, which is critical to recovery of the species.

## CUMULATIVE EFFECTS

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 (current range of the endangered Sonoran pronghorn within Arizona) 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 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.

## CONCLUSION

After reviewing the current status of the Sonoran pronghorn, the environmental baseline for the action area, the effects of the proposed activities associated with implementation of the CCP, and the cumulative effects, we reaffirm 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 rationale given in our August 22, 2006 biological opinion, and our discussion found in the **Effects of the Action** section above.

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, as well as the appropriate conservation measures found in the original biological opinion.

## **INCIDENTAL TAKE STATEMENT**

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**

The amount or extent of take anticipated remains the same as in the original biological opinion in which we anticipated that the project would not result in any incidental take of Sonoran pronghorn.

## **Disposition of Dead or Injured Listed Species**

Upon locating a dead, injured, or sick listed species, initial notification must be made to the FWS's Law Enforcement Office (USFWS OLE, Resident Agent In Charge, 4901 Paseo del Norte NE, Suite D, Albuquerque, New Mexico 87113; telephone: (505) 248-7889) 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 if possible, 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 sick or injured animals to ensure effective treatment and care, and in handling dead specimens to preserve the biological material in the best possible state.

## **CONSERVATION RECOMMENDATIONS**

Our conservation recommendations remain the same as in the original biological opinion in which recommended that CPNWR 1) continue to implement recovery and conservation actions for Sonoran pronghorn and lesser long-nosed bats and 2) develop a fire management plan for the CPNWR in conjunction with our office as well as the MCAS, LAFB, BLM, and OPCNM.

## **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, 02EAAZOO-2012-F-0170 in future correspondence concerning this project.

*/s/ Scott Richardson 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):

Superintendent, Organ Pipe Cactus National Monument, Ajo, Arizona (Attn: Tim Tibbitts)  
Director, 56<sup>th</sup> Range Management Office, Luke Air Force Base, Gila Bend, AZ  
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Director, Range Management Department, Marine Corps Air Station, Yuma, AZ  
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## REFERENCES CITED

- Alford, E.J., and J.H. Brock. 2002. Effects of fire on Sonoran Desert plant communities. Page 20 in W.L. Halvorson and B.S. Gebow (eds.), *Creative Cooperation in Resource Management: Fourth Conference on Research and Management in the Southwestern Deserts*, extended abstracts. USGS Sonoran Desert Field Station, University of Arizona, Tucson, AZ.
- Bright, J.L., and J.J. Hervert. 2005. Adult and fawn mortality of Sonoran pronghorn. *Wildlife Society Bulletin* 33:43-50.
- Bright, J.L., J.J. Hervert, L.A. Piest, R.S. Henry, and M. T. Brown. 1999. Sonoran pronghorn 1998 aerial survey summary. Nongame and Endangered Wildlife Program Technical Report No. 152. Arizona Game and Fish Department, Phoenix, AZ.
- Bright, J.L., J.J. Hervert, and M.T. Brown. 2001. Sonoran pronghorn 2000 aerial survey summary. Technical Report No. 180. Arizona Game and Fish Department, Phoenix, AZ.
- Brown, D. E. and R. A. Ockenfels. 2007. *Arizona's Pronghorn Antelope, A Conservation Legacy*. Arizona Antelope Foundation. 190 pp.
- Brown, D.E., and R.A. Minnich. 1986. Fire and changes in creosote bush scrub of the western Sonoran Desert, California. *American Midland Naturalist* 116(2):411-422.
- Cabeza Prieta National Wildlife Refuge. 2006. *Comprehensive Conservation Plan Working Final Cabeza Prieta National Wildlife Refuge Comprehensive Conservation Plan Environmental Impact Statement and Draft Wilderness Stewardship Plan*, June 2006. Ajo, Arizona.
- Carr, J.N.. 1974. Complete report-Endangered species investigation. Sonoran pronghorn. Arizona Game and Fish Department, Phoenix, AZ.
- Cherkovich, G.M., and S.K. Tatoyan. 1973. Heart rate (radiotelemetric registration) in macaques and baboons according to dominant-submissive rank in a group. *Folia Primatol* 20:265-273.
- Defenders of Wildlife. 1998. Population viability analysis workshop for the endangered Sonoran pronghorn (*Antilocapra americana sonoriensis*) in the United States. Defenders of Wildlife unpublished manuscript, Washington, D.C.
- Ehrlich, P.R., and J. Roughgarden. 1987. *The Science of Ecology*. MacMillan Publishing Co., New York, N.Y.
- Fox, L.M., P.R. Krausman, M.L. Morrison, and R.M. Kattnig. 2000. Water and nutrient content of forage in Sonoran pronghorn habitat, Arizona. *California Fish and Game* 86(4): 216-232.
- Geist, V. 1971. A behavioral approach to the management of wild ungulates. In E. Duffey and A.S. Watts, eds., *The Scientific Management of Animal and Plant Communities for Conservation*. Symposium of the British Ecological Society No. 11. Blackwell Science Publications, Oxford, U.K.
- Gerstenzang, J. 2006. Bush visits border, urges Senate action. *Los Angeles Times*, May 19, 2006.

- Harlow, H.J., E.T. Thorn, E.S. Hilliams, E. L. Belden, and W.A. Gern. 1987. Cardiac frequency: a potential predictor of blood cortisol levels during acute and chronic stress exposure in Rocky Mountain bighorn sheep (*Ovis canadensis canadensis*). *Canadian Journal of Zoology* 65:2028-2034.
- Hecht, A. and P.R. Nickerson. 1999. The need for predator management in conservation of some vulnerable species. *Endangered Species Update* 16:114-118.
- Hervert, J.J., J.L. Bright, M.T. Brown, L.A. Piest, and R.S. Henry. 2000. Sonoran pronghorn population monitoring: 1994-1998. Nongame and Endangered Wildlife Program Technical Report No. 162. Arizona Game and Fish Department, Phoenix, AZ.
- Hughes, K.S., and N.S. Smith. 1990. Sonoran pronghorn use of habitat in Southwest Arizona. Report to Cabeza Prieta National Wildlife Refuge, Ajo, AZ.
- Intergovernmental Panel on Climate Change. 2007. Summary for policymakers of the synthesis report of the IPCC fourth assessment report. Draft copy, 16 November 2007.
- Jorgenson, J.T. Environmental impact of the 1988 winter Olympics on bighorn sheep of Mt. Allan. *Biennial Symposium of the Northern Wild Sheep and Goat Council* 6:121-134.
- Kerley, L. L., J. M. Goodrich, E. N. Smirnov, D. G. Miquelle, H.B. Quigley, and M.G. Hornocker. Effects of roads and human disturbance on Amur tigers. *Conservation Biology* 16(1):97-108.
- Kindschy, R.R., C. Sundstrom, and J.D. Yoakum 1982. Wildlife habitats in managed rangelands - the Great Basin of southeastern Oregon: pronghorn. General Technical Report PNW-145. U.S. Department of Agriculture, Northwest Forest and Range Experimental Station, Portland, OR.
- Klein, K. 2000. Mass smugglings of immigrants on the increase. March 13, *Desert Sun*, Palm Springs, [www.thedesertsun.online.com](http://www.thedesertsun.online.com).
- Krausman, P.R., L.K. Harris, C.L. Blasch, K.K.G. Koenen, and J. Francine. 2004. Effects of military operations on behavior and hearing of endangered Sonoran pronghorn. *Wildlife Monographs* 157:1-41.
- Krausman, P.R., L.K. Harris, S.H. Haas, K.K.G. Koenen, P. Devers, D. Bunting, and M. Barb. 2005. Sonoran pronghorn habitat use on landscapes disturbed by military activities. *Wildlife Society Bulletin* 33(1):16-33.
- Krausman, P.R., L.K. Harris, and J. Francine. 2001. Long-term study of the noise effects of military overflights on the Sonoran pronghorn, Barry M. Goldwater Range, Luke Air Force Base, Arizona. U.S. Air Force Contract F41624-98-C-8020-P00003.
- Landon, D.M., P.R. Krausman, K.K.G. Koenen, and L.K. Harris. Pronghorn use of areas with varying sound pressure levels. *The Southwestern Naturalist* 48(4):725-728.
- Leftwich, T.J., and C.D. Simpson. 1978. The impact of domestic livestock and farming on Texas pronghorn. *Pronghorn Antelope Workshop Proceedings* 8:307-320.

- Luz, G.A., and J.B. Smith. 1976. Reactions of pronghorn antelope to helicopter overflight. *Journal of Acoustical Society of America* 59(6): 1514-1515.
- Milstead, B, and B. Barns. 2002. Life on the border: monitoring the effects of border-crossing and law enforcement on natural resources. W.L. Halvorson and B.S. Gebow, eds., *Meeting resource management information needs: fourth conference on research and resource management in the southwestern deserts*, extended abstracts. USGS Sonoran Desert Field Station, University of Arizona, Tucson: 87-88.
- Moen, A.N., M.A. DellaFera, A.L. Hiller, and B.A. Buxton. 1978. Heart rates of white-tailed deer fawns in response to recorded wolf howls. *Canadian Journal of Zoology* 56:1207-1210.
- Monson, G. 1968. The desert pronghorn. *In Desert Bighorn Council Transactions*. Las Vegas, NV.
- Morgart, J.R., J.J. Hervert, P.R. Krausman, J.L. Bright, and R.S. Henry. 2005. Sonoran pronghorn use of anthropogenic and natural waters. *Wildlife Society Bulletin* 33(1):51-60.
- Nelson, F.W. 1925. Status of the pronghorn antelope, 1922-1924. U.S. Department of Agriculture Bulletin No. 1346.
- O’Gara, B.W. and J.D. Yoakum. 1992. Pronghorn management guides. Pronghorn Antelope Workshop, Rock Springs, Wyoming. 101pp.
- Officer, J.E. 1993. Kino and agriculture in the Pimeria Alta. *Journal of Arizona History* 34:287-306.
- Organ Pipe Cactus National Monument. 2001. Draft supplemental environmental impact statement, re-analysis of cumulative impacts on the Sonoran pronghorn. Organ Pipe Cactus National Monument, Ajo, AZ.
- Richter-Dyn, N., and N.S. Goel. 1972. On the extinction of a colonizing species. *Theoretical Population Biology* 3:406-433.
- Rowlands, P.G. 2000. Low temperature and other climatic trends at Organ Pipe Cactus National Monument. *In* W.L. Halvorson and B.S. Gebow, eds., *Creative Cooperation in Resource Management*, extended abstracts. U.S. Geological Survey, Western Ecological Research Center, Sonoran Desert Field Station, University of Arizona, Tucson, AZ.
- Rutman, S. 1997. Dirt is not cheap: livestock grazing and a legacy of accelerated soil erosion on Organ Pipe Cactus National Monument, Arizona. *In* J. M. Feller and D. S. Strouse, eds., *Environmental, economic, and legal issues related to rangeland water developments*. The Center for the Study of Law, Science and Technology, Arizona State University, Tempe, AZ.
- Schwalbe, C.R., T.C. Esque, P.J. Anning, and W.L. Halvorson. 2000. Exotic grasses, long-lived species, and managing desert landscapes: a case history at Saguaro National Park. Page 87 *in* W.L. Halvorson and B.S. Gebow (eds), *Creative Cooperation in Resource Management: Third Conference on Research and Management in the Southwestern Deserts*, extended abstracts. USGS Sonoran Desert Field Station, University of Arizona, Tucson, AZ.

- Seager, R., M. Ting, T. Held, Y. Kushnir, J. Lu, G. Vecchi, H. Huang, N. Harnik, A. Leetmaa, N. Lau, C. Li, J. Velez, and N. Naik. 2007. Model projections of an imminent transition to a more arid climate in southwestern North America. *Science* 316:1181-1184.
- Sheridan, T.E. 2000. Human ecology of the Sonoran Desert. *In* S.J. Phillips and P.W. Comus, eds., *A natural history of the Sonoran Desert*. Arizona-Sonora Desert Museum Press, Tucson, AZ.
- Thompson, R.D., C.V. Grant, E.W. Pearson, and G.W. Corner. 1968. Cardiac response of starlings to sound: effects of lighting and grouping. *American Journal of Physiology* 214:41-44.
- U.S. Fish and Wildlife Service. 1998. Final revised Sonoran pronghorn recovery plan. U.S. Fish and Wildlife Service, Albuquerque, NM.
- Weiss, J.L., and J.T. Overpeck. 2005. Is the Sonoran Desert losing its cool? *Global Change Biology* 11:2065-2077.
- Workman, G.D., T.D. Bunch, J.W. Call, F.C. Evans, L.S. Neilson, and E.M. Rawlings. 1992. Sonic boom and other disturbance impacts on pronghorn antelope (*Antilocapra americana*). Report to the U.S. Air Force, Hill Air Force Base, UT.
- Wright, R.L. and J.C. deVos. 1986. Final report on Sonoran pronghorn status in Arizona. Contract No. F0260483MS143, Arizona Game and Fish Department, Phoenix, AZ
- Yoakum, J.D. 1994. Water requirements for pronghorn. *Proceedings of the Pronghorn Antelope Workshop* 16:143-157.
- Yoakum, J.D., B.W. O’Gara, and V.W. Howard, Jr. 1996. Pronghorn on western rangelands. *In* P.R. Krausman, ed., *Rangeland wildlife*. The Society for Range Management, Denver, CO.

## 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 <sup>a</sup> )	Source
1925	105	Nelson 1925
1941 <sup>b</sup>	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 <i>et al.</i> 1999
1994	282 (205-489)	Bright <i>et al.</i> 1999
1996	130 (114-154)	Bright <i>et al.</i> 1999
1998	142 (125-167)	Bright <i>et al.</i> 1999
2000	99 (69-392)	Bright <i>et al.</i> 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 <sup>c</sup>	Unpublished data
2010	85	Unpublished data
2012	159	Unpublished data

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

<sup>b</sup> Population estimate for southwestern Arizona, excluding Organ Pipe Cactus National Monument.

**Table 2.** Comparison of U.S. Sonoran pronghorn population surveys, 1992-2010.

Date	<u>Pronghorn observed</u>		<u>Population estimates</u>			
	On transect	Total observed	Density estimate using DISTANCE (95 percent CI <sup>a</sup> )	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 <sup>b</sup> )	216 (82-579)	162 (4-324)	130 (114-154)	
Dec 98	74	86 (98 <sup>b</sup> )	---	172 (23-321)	142 (125-167)	
Dec 00	67	69 <sup>b</sup>	N/A	N/A	99 (69-392)	
Dec 02	18	18	N/A	N/A	21 (18-33) <sup>c</sup>	
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 <sup>d</sup>
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

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

<sup>b</sup> Includes animals missed on survey, but located using radio telemetry.

<sup>c</sup> Jill Bright, Arizona Game and Fish Department, pers. comm. 2003

<sup>d</sup> 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.