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In Reply Refer to:
AESO/SE
22410-1995-F-0114-R005

October 21, 2009

Mr. S. W. Norquist
Marine Corps Installations West
United States Marine Corps
Box 555200
Camp Pendleton, California 92055-5200

RE: West Coast Basing of the MV-22 and Reinitiation of Formal Section7 Consultation on Ongoing Activities at the Barry M. Goldwater Range by the Marine Corps Air Station–Yuma, Yuma and Maricopa Counties, Arizona

Dear Mr. Norquist:

This letter is in response to your June 1, 2009, request for initiation of formal consultation on the West Coast Basing of the MV-22 Project and associated training activities by the Marine Corps Air Station–Yuma, Yuma County, Arizona. Your request was received by us on June 10, 2009, and was made pursuant to section 7 of the Endangered Species Act of 1973 (ESA) as amended (16 U.S.C. 1531 *et seq.*). Because the proposed project represents a change to the existing action described in the Biological Opinion (BO) on Ongoing Activities by the Marine Corps Air Station–Yuma (MCAS-Yuma) in the Arizona portion of the Yuma Training Range Complex (YTRC) on the Barry M. Goldwater Range (BMGR), Yuma and Maricopa counties (02-21-95-F-0114R4, now 22410-1995-F-0114-R004), as agreed upon, we are addressing your request through reinitiation of this biological opinion. At issue are the impacts to the endangered Sonoran pronghorn (*Antilocapra americana sonoriensis*).

In your letter, you requested our concurrence that the proposed action may affect, but is not likely to adversely affect, the endangered lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*). Though we agree that the effects of the proposed West Coast Basing of the MV-22 project to the lesser long-nosed bat are minimal, this species was subject to formal consultation in our previous BOs on the larger action of ongoing activities by MCAS-Yuma on the BMGR. Because low-level night-time helicopter flights will still occur within the range of the bat with the current MV-22 proposal, and it is that component of the larger action that triggered formal consultation on the bat, we have addressed effects to the lesser long-nosed bat herein in formal consultation.

Herein we revise specific sections of the last biological opinion (August 6, 2003) on the Ongoing Activities by MCAS-Yuma in the Arizona portion of the YTRC on the BMGR. Sections not addressed or revised herein remain as presented in that last biological opinion.

## CONSULTATION HISTORY

- See Biological Opinion #02-21-95-F-0114R4 (22410-1995-F-0114-R004, dated August 6, 2003) for consultation history prior to your June 1, 2009 request.
- June 10, 2009: We received your request for initiation of formal consultation.
- June 30, 2009: Via conference call, we discussed the proposed project with you.
- October 15, 2009: We sent you the draft biological opinion.
- October 19, 2009: We received your comments on the draft biological opinion.

## BIOLOGICAL OPINION

### DESCRIPTION OF PROPOSED ACTION

A complete description of the proposed action is found in your May 2009, Final Biological Assessment for the West Coast Basing for the MV-22. The proposed action is to provide medium lift capability to support the I Marine Expeditionary Force (I MEF) and meet West Coast requirements for reserve component medium lift capability. The MV-22 Osprey tilt rotor aircraft (MV-22) is the replacement for the current fleet of less-capable, 1960s-era CH-46 medium-lift helicopters. The proposed action includes three primary components; however, this consultation will only address a part of the third component, specifically training and readiness operations and special exercise operations within Department of Defense (DoD)-controlled airspace and training ranges located on the West Coast, including the BMGR-West, portion of the Bob Stump Training Range Complex. Other components of the complete proposed action are addressed in the BO for the West Coast Basing of the MV-22 and Training Project, Marine Corps Base Camp Pendleton and Marine Corps Air Stations Pendleton and Miramar, San Diego County, California; Marine Corps Air Ground Combat Center, San Bernardino County, California; and the Bob Stump Training Range Complex, Riverside and Imperial Counties, California, and Yuma County, Arizona (# FWS-MCBCP-08B0678-09TA0859) that will be issued by the Carlsbad Fish and Wildlife Office.

The Bob Stump Training Range Complex is composed of airspace and land located in southwestern Arizona and southeastern California, including BMGR-West with approximately 5,000 square miles of airspace designated for military use in southwestern Arizona (Figure II.a-5 and Figure II.a-6 of the BA). The Special Use Airspace consists of R-2301W, which extends from the ground surface to 80,000 feet above mean sea level (MSL). Aviation training facilities include an outlying auxiliary airfield (AUX-2), two bull's eye type bombing targets (Yodaville and Cactus West), and a Tactical Aircrew Combat Training System (TACTS). AUX-2 is a small airfield that supports AV-8B and C-130 training activities. The Yodaville (previously named

Moving Sands) and Cactus West target complexes provide a variety of scored air-to-ground targets for bombing, rocketry, and strafing. AUX-2, Yodaville, and Cactus West are located outside, to the west, of the current Sonoran pronghorn distribution. The TACTS range area, which is about 674 square miles in size, can track and record aircraft operations and simulate air defense threats, such as surface-to-air missiles. The TACTS range encompasses part of the Sonoran pronghorn range.

There will be no construction on BMGR-West in association with the proposed action, and all areas that will be used for landings, take-offs, low-level hovering, or off-loading personnel or equipment are previously established Ground Support Areas (GSAs)/ Lonesome Dove Landing Zone (LZ) (see Figure II.a-5 of the BA) that are currently used for a variety of ground-based and aerial training. There are 41 GSAs on BMGR-West, of which 32 are proposed for use with the MV-22. The GSAs vary in size, but most range from 200 to 300 acres in area; all 41 GSAs comprise about 19.6 square miles. All of the GSAs identified for use by the MV-22 (see Table and Figure III.5 of the BA) lie to the west of longitude 113 degrees and 53 minutes. The north-south line of longitude at 113 degrees and 53 minutes falls roughly along the eastern margins of the Baker Peaks and the Copper Mountains, which is the western extent of the current distribution of Sonoran pronghorn (see the 2003 BO). Seven GSAs proposed for use by the MV-22 (GSAs 40, 41, 43, 44, 48, 49, and 66) lie within or on the edge of western-most portion of the current Sonoran pronghorn range; however, no pronghorn have been detected in these areas since prior to 2002. All other GSAs and Lonesome Dove LZ are located well outside, to the west, of the current Sonoran pronghorn distribution.

The MV-22 aircraft mechanically operates and flies differently than the retiring CH-46 in that it has rotating nacelles, typically flies as a fixed-wing aircraft, both higher and faster than the CH-46. The noise generated by the MV-22 is generally similar to the CH-46 (see Table V-1 of the BA), except that it will generate less noise while cruising in forward operating mode and more noise while landing and taking off. Rotorwash generated by the MV-22 on landings and take-offs will be substantially greater than that generated by the CH-46.

The MV-22 will operate in a training environment similar to that of other existing aircraft within the BMGR-West, and established airspace training footprints will not be expanded or modified with implementation of the proposed action. The MV-22 will use the same four rotor-wing flight corridors as previously established in the 2001 BO (two of these are located over the Cabeza Prieta National Wildlife Refuge and two are over the current habitat of the Sonoran pronghorn within the Mohawk Valley of BMGR-West). MV-22s using these corridors will follow straight-line paths and will fly in forward operating mode (i.e., will not hover). Though the MV-22 may fly at a range of altitudes and speeds along corridors, the minimum altitude allowable is 200 feet above ground level.

The introduction of up to ten squadrons of the MV-22 to the training environment will result in an increase of an estimated 12,290 operations per year due to the associated increase in MV-22 training operations (see Table 1) or a 14 percent increase in overall operations at BMGR-West compared to existing conditions. This increase is primarily due to the estimated increase in use of AUX-2 to conduct MV-22 Field Carrier Landing Practice (FCLP) operations. As stated earlier, MV-22 landing operations only will occur at designated GSAs and the Lonesome Dove

LZ, except under emergency conditions. Flight operations involving the MV-22 aircraft will follow the same procedures as those involving other aircraft currently using the training ranges and airspace. Drops will occur at the designated Drop Zone (DZ) near Aux 2. Two Military Training Routes (MTR) (VR-1267A and VR-1268) are proposed for use by the MV-22 near the BMGR; however, these are located outside of the current Sonoran pronghorn range, but within the range of the lesser long-nosed bat.

Table 1. Proposed Change in Annual Range Operations at BMGR-West

| Operation Area | Addition of MV-22 Operations | Reduction of CH-46 Operations | Change in Operation over Existing Conditions |
|---|---|---|---|
| Yodaville (Bombing) | - | - | - |
| Cactus West (Bombing) | - | - | - |
| Low Altitude Training | - | - | - |
| Air-to-Air & Air-to-Ground | 3,611 | -31 | +3,580 |
| Aerial Combat Maneuvers | 50 | -167 | -117 |
| Confined Area Landing and Tactics | 5,664 | - | +5,664 |
| Free Play | - | - | - |
| WTI | 96 | -4,882 | -4,786 |
| AUX 2* | 8,521 | -572 | +7,949 |
| Total | 17,942 | -5,652 | +12,290 |

*Notes:*
* Based on noise analysis for the 8-Squadron Alternative, which is the maximum proposed operations at AUX-2 by the MV-22.
WTI = Weapons Tactics Instruction Course

## Conservation Measures

All conservation measures proposed in the previous BOs on MCAS-Yuma ongoing activities will continue to be implemented. Additionally, the following avoidance and minimization measures are proposed to further reduce training-related effects on biological resources:

**1) Exhaust Deflectors.** To reduce the potential for fires, exhaust deflectors on the MV-22 aircraft will be deployed while on the ground with engines running at undeveloped and vegetated sites.

**2) Reduced Time on Ground, Use of Developed Sites, and Vegetation Avoidance.** To reduce the potential for fires, operators will minimize the time on the ground with engines running on unprepared sites and follow all recommendations in the Naval Air Training and Operating Procedures Standardization (NATOPS) manual. Additionally, operators will maximize the use of developed sites and prepared surfaces during training scenarios, to the maximum extent possible.

For training within DZs, operators will touch down only on improved or disturbed, unvegetated surfaces where the potential for fire is lowest and landings have been approved, such as paved LZs, fire breaks, and/or training roads. Specific text regarding restrictions on landing sites within DZs will be incorporated into the Wing SOPs.

**3) Fire Incident Reporting, Review and Adaptive Training Management.** As part of an

MV-22 monitoring program, following the initial deployment of the MV-22 to the West Coast, MCI West in coordination with I MEF will prepare a Technical Memorandum describing and quantifying MV-22 training incidents that resulted in ignitions for all West Coast operations. The reporting will include an assessment of the conditions under which the fire started such as relative humidity, fuel moistures, ambient temperature, and vegetation type, as well as a description of the project area and other factors which may further the understanding of fire potential. The U.S. Marine Corps (USMC) will distribute the memorandum to the MCAS-Yuma Fire Department and Natural Resources staff to be used as part of an adaptive fire management strategy. As part of the adaptive management approach, and based on information from the initial deployment of the aircraft, MCAS-Yuma natural resources staff would monitor landing sites for high weed invasion rates and other disturbances and may propose landing site management if appropriate and consider modifications to operational protocols as necessary. This process will include coordination by MCAS-Yuma environmental management with the FWS and the MCAS-Yuma Fire Department. Specific components of the update would include a defined procedure for monitoring of fuel loads, particularly fine grasses and Sahara mustard, which vary from year to year, timely updating of this information into a Fire Danger Rating System, and adjustment of training activities to minimize the potential for fire during conditions of high fuel loads and fire danger (which would be expected only in years having exceptional growth of annual vegetation). Appropriate recommendations may be made to modify the timing or procedures associated with training during years in which there is a high standing crop of dried fuels. Initial development of monitoring and Fire Danger Rating System updating procedures and initial coordination will occur prior to the introduction of the MV-22 to the Bob Stump Training Range Complex training environment.

## SONORAN PRONGHORN
## STATUS OF THE SPECIES

The Sonoran subspecies of pronghorn (*Antilocapra americana sonoriensis*) was first described by Goldman (1945) and is the smallest of the four subspecies of pronghorn (Nowak and Paradiso 1983, Brown and Ockenfels 2007). The subspecies was listed throughout its range as endangered on March 11, 1967 (32 FR 4001) under the Endangered Species Preservation Act of October 15, 1966 without critical habitat. Three sub-populations of the Sonoran pronghorn are extant: 1) a U.S. sub-population in southwestern Arizona, 2) a sub-population in the Pinacate Region of northwestern Sonora, and 3) a sub-population on the Gulf of California west and north of Caborca, Sonora. The three sub-populations are predominantly geographically isolated due to barriers such as roads and fences, and in the case of the two Sonora sub-populations, by distance.

The 1982 Sonoran Pronghorn Recovery Plan (U.S. Fish and Wildlife Service 1982) was revised in 1998 (U.S. Fish and Wildlife Service 1998). The recovery criteria presented in the revised plan entailed the establishment of a population of 300 adult pronghorn in one self-sustaining population for a minimum of five years, as well as the establishment of at least one other self-sustaining population in the U.S. to reclassify the subspecies to threatened. Actions identified as necessary to achieve these goals include the following: 1) enhance present sub-populations of pronghorn by providing supplemental forage and/or water; 2) determine habitat needs and protect present range; 3) investigate and address potential barriers to expansion of presently used range and investigate, evaluate, and prioritize present and potential future reintroduction sites

within historical range; 4) establish and monitor a new, separate herd(s) to guard against catastrophes decimating the core population, and investigate captive breeding; 5) continue monitoring sub-populations and maintain a protocol for a repeatable and comparable survey technique; and 6) examine additional specimen evidence available to assist in verification of taxonomic status. In 2001 a supplement and amendment to the 1998 Final Revised Sonoran Pronghorn Recovery Plan was prepared (U.S. Fish and Wildlife Service 2001). We concluded that data do not yet exist to support establishing delisting criteria. Tasks necessary to accomplish reclassification to threatened status (as outlined in the 1998 plan) should provide the information necessary to determine if and when delisting will be possible and what the criteria should be.

**B. Life History and Habitat**

Sonoran pronghorn inhabit one of the hottest and driest portions of the Sonoran Desert. They forage on a large variety of perennial and annual plant species (Hughes and Smith 1990, Hervert *et al.* 1997b, U.S. Fish and Wildlife Service 1998). During drought years, Hughes and Smith (1990) reported cacti were the major dietary component (44 percent). Consumption of cacti, especially chain fruit cholla (*Cylindropuntia fulgida*, Pinkava 1999), provides a source of water during hot, dry conditions (Hervert *et al.* 1997b). Other important plant species in the diet of the pronghorn include pigweed (*Amaranthus palmeri*), ragweed (*Ambrosia* sp.), locoweed (*Astragalus* sp.), brome (*Bromus* sp.), and snakeweed (*Gutierrezia sarothrae*) (U.S. Fish and Wildlife Service 1998). Pronghorn will move in response to spatial limitations in forage availability (Hervert *et al.* 1997a). Water intake from forage is not adequate to meet minimum water requirements (Fox *et al.* 2000), hence pronghorn need and readily use both natural and artificial water sources (Morgart *et al.* 2005).

Sonoran pronghorn rut during July-September, and does have been observed with newborn fawns from February through May. Parturition corresponds with annual spring forage abundance. Fawning areas have been documented in the Mohawk Dunes and the bajadas of the Sierra Pinta, Mohawk, Bates, Growler, and Puerto Blanco mountains. Does usually have twins, and fawns suckle for about two months. Does gather with fawns, and fawns sometimes form nursery groups (U.S. Fish and Wildlife Service 1998). Sonoran pronghorn form small herds of up to 21 animals (Wright and deVos 1986).

Telemetry locations of 35 Sonoran pronghorn demonstrated that during 1995-2002, pronghorn used creosote/bursage and palo verde/mixed cactus vegetation associations less than expected or equal to availability. Pronghorn use of palo verde/chain fruit cholla associations and desert washes occurred more than expected. However, during the cool and wet winter on 1997-1998, pronghorn were found in creosote/bursage associations more than expected (Hervert *et al.* 2005). In contrast, during 1983-1991, pronghorn used creosote/bursage and palo verde mixed cacti associations more than expected (deVos and Miller 2005). Differences between these study results may be due in part to differences in precipitation and forage patterns between these periods. The earlier period was wetter with greater forage availability in flats and valleys where creosote/bursage associations predominate. In wet winters and early spring pronghorn are often found in flats and valleys, such as Pinta Sands, the Mohawk Dunes west of the Mohawk Mountains, and the west side of the Aguila Mountains. In late spring and summer, pronghorn then move from the flats and valleys upslope into bajadas and often south or southeast where

palo verde associations, chain fruit cholla, and washes are more common. Movements are most likely motivated by the need for thermal cover provided by leguminous trees and water available in succulent chain fruit cholla (Hervert *et al.* 1997b). Home range size of Sonoran pronghorn during 1995-2002 ranged from 16.6 to 1,109 $mi^2$, with an average of 197 $\pm$ 257 $mi^2$ (Hervert *et al.* 2005).

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

**C. Distribution and Abundance**

*United States*

Historically, the Sonoran pronghorn ranged in the U.S. from approximately the Santa Cruz River in the east, to the Gila Bend and Kofa Mountains to the north, and to Imperial Valley, California, to the west (Mearns 1907, Nelson 1925, Monson 1968, Wright and deVos 1986, Paradiso and Nowak 1971; Figure 1). Bright *et al.* (2001) defined the present U.S. range of the Sonoran pronghorn as bordered by Interstate 8 to the north, the International Border to the south, the Copper and Cabeza mountains to the west, and SR 85 to the east (see Figure 2). This area encompasses 2,508 $mi^2$ (Bright *et al.* 2001).

While Mearns (1907) suggested that pronghorn may have been common in some areas in the late 1800s, evidence suggests that the sub-population declined dramatically in the early 20$^{th}$ century. Sub-population estimates for Arizona, which only began in 1925, have never shown the pronghorn to be abundant (Table 2). Repeatable, systematic surveys were not conducted in Arizona until 1992. Since 1992, Sonoran pronghorn in the United States have been surveyed biennially (Bright *et al.* 1999, 2001) using aerial line transects (Johnson *et al.* 1991). Sub-population estimates from these transects have been derived using three different estimators (Table 3); currently the sightability model (Samuel and Pollock 1981) is considered the most reliable estimator (Bright *et al.* 1999, 2001). Table 3 presents observation data from transects and compares estimates derived from the different population models from 1992 through 2006.

The sightability model population estimates from 1992 to 2000 showed a 45 percent decrease in sub-population size (Table 3). The estimates indicate a steady decline in sub-population size, with the exception of the 1994 survey. The 1994 estimate may be somewhat inflated due to inconsistencies in survey timing (U.S. Fish and Wildlife Service 1998, Bright *et al.* 2001).

High fawn mortality in 1995 and 1996 and the death of half (8 of 16) of the adult, radio-collared pronghorn during the 13 months preceding the December 1996 survey corresponded to five consecutive six-month seasons of below normal precipitation (summer 1994 through summer 1996) throughout most of the Sonoran pronghorn range, which likely contributed, in part, to observed mortality (Bright *et al.* 2001, Hervert *et al.* 1997b).

Mortality of Sonoran pronghorn in 2002 was exceptionally high (Bright and Hervert 2005). At the start of the year, seven radio-collared Sonoran pronghorn were at large in the U.S. sub-population. By December 2002, all but one of these had died. For most, drought stress was considered to be the proximate cause. For those animals that may have succumbed to predation, it was suspected that drought stress was again a factor, by making the animal more vulnerable to predation, due to an emaciated physical condition and being forced into predator habitats by drought. The 2002 drought was one of the driest on record. As an example, annual rainfall at the Organ Pipe Cactus National Monument (OPCNM) visitor center was only 2.54 inches in 2002 (T. Tibbitts, Organ Pipe Cactus NM, pers. comm. 2002); *average* annual rainfall for the visitor center is 9.2 inches (Brown 1982). The November/December 2002 population survey revealed the U.S. sub-population had declined to the lowest level ever recorded. A total of 18 pronghorn were observed, in three groups (8, 9, and 1). The sightability model resulted in a population estimate of 21 animals, or a 79% decline from 2000. Also, very few fawns survived in 2002 to replace these dying adults.

Although drought was likely the proximate cause of the dramatic decline of the U.S. sub-population in 2002, anthropogenic factors almost certainly contributed to or exacerbated the effects of the drought. Historically, pronghorn likely moved to wetted areas and foraged along the Río Sonoyta, Sonora, and the Gila and probably Colorado rivers during drought. These areas are no longer accessible to the U.S. population due to fences, Interstate 8, Mexico Highway 2, and other barriers. The rate of decline in the U.S. sub-population from 2000-2002 (79 percent) was also much greater than that observed in either the sub-population southeast of Highway 8 (18 percent decline) or the El Pinacate sub-population (26 percent) during the same period (see discussion of Mexican sub-populations in the next section). Observations of forage availability suggest the El Pinacate sub-population experienced the same severe drought that occurred on the Arizona side (T. Tibbitts, J. Morgart, pers. comm. 2003). Yet that sub-population fared much better than its U.S. counterpart. The high level of human activities and disturbance on the U.S. side, particularly in regard to undocumented alien traffic, smugglers, and required law enforcement response, as compared to what occurs in the El Pinacate area, is a likely contributing factor in the differing rates of decline observed north and south of the border. See the section entitled "Drought" in the Environmental Baseline and "Cumulative Effects" for further discussion.

The December 2004, 2006, and 2008 aerial surveys resulted in an estimated 58, 58, and 68, respectively, wild pronghorn in the U.S. sub-population (Tables 2 and 3), a substantial increase brought on by the implementation of emergency recovery measures and improved conditions (as a result of increased rainfall) since 2002. The latter two estimates included a number of captive-born individuals that were released into the wild (see below). Also, though the exact ratio is unknown, during the 2008 survey, observers noted a skewed sex ratio with more males than females; this affects the rate at which the population may increase. Immediately after the 2008

survey, three does were captured and collared and one buck was captured but died to due capture myopathy. Though the U.S. Sonoran pronghorn population has increased significantly since 2002, the increase is not as great as the Sonoran Pronghorn Recovery Team (Team) had predicted given the adequate to favorable range conditions since 2002 as well as tremendous multi-agency recovery efforts, including providing waters and forage enhancement plots, implementing seasonal restrictions on public access to pronghorn habitat during the critical fawning season, and a captive breeding program. The Team asserts that this slow pronghorn population growth (caused by low fawn recruitment) is likely correlated with high CBV and USBP activity within the pronghorn range. Strong evidence of this correlation has been seen during the biennial aerial surveys, where since 2000, off-road vehicle tracks have been seen progressively increasing in extent and density, throughout the pronghorn's range 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, Khramtsov 1995, Mattson et al. 1996; as cited by Kerley *et al.* 2002). Failure of the wild U.S. pronghorn population to exceed 100 animals since the 2002 population decline is considered by many Team members to be evidence that acute adverse impacts from CBV and USBP activity, particularly off-road driving, continue to affect the population, inhibiting its ability to recover.

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 Cabeza Prieta National Wildlife Refuge (CPNWR) in 2004. The breeding program has been very successful and there are currently (as of August 2009) 74 pronghorn in the enclosure. Since establishing the program, nine pronghorn, primarily juveniles, yearlings, and two-year olds, have died in the pen due to various causes, including epizootic hemorrhagic disease. Additionally, two young bucks in the pen died in 2008 due to capture and release efforts. Sonoran pronghorn have been released from the pen every year since 2006; as of October 2009, a total of 21 individuals, primarily males, have been released. Thirteen of these are known to still be alive.

The objective is to produce at least 20 fawns each year to be released into the U.S. sub-population, and potentially to establish a second U.S. sub-population, possibly at Kofa NWR. Planning for the second herd is underway. Various alternatives are being considered, but a second herd could be established in King Valley of Kofa NWR within two years. A captive facility with a forage enhancement plot, and development of waters in King Valley would likely be needed. The population would probably be introduced as an experimental, nonessential population under section 10(j) of the Act. A draft Environmental Assessment and draft 10(j) rule are scheduled to be available for public review and comment by October 2009.

*Mexico*

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

Sub-populations of Sonoran pronghorn in Sonora had not been thoroughly surveyed until the December 2000 surveys (Bright *et al.* 2001), at which time 346 pronghorn were estimated to occur in Sonora. Although the 1993 estimate was approximate, survey results suggested a decline in the sub-populations of 16 percent from 1993 to 2000 (Table 4). Since 2000, the two Mexico sub-populations have been resurveyed biennially, with the exception of the winters of 2004/05 and 2005/06, when they were surveyed both years. In December 2002, a total (both El Pinacate and southeast of Highway 8) of 214 pronghorn in 32 groups were seen for a tentative population estimate of 280, indicating further decline. Only 19 pronghorn were observed in the Pinacate area for an estimate of 25, which is a decline of 26% from the 2000 estimate. Surveys conducted in December 2004 and February 2005 demonstrated that the population southeast of Highway 8 increased to 625 (439 observed), while the Pinacate population increased to 59 (30 observed) (684 total estimated, 469 total observed). In 2004, several capture-related mortalities occurred in Sonora associated with efforts to capture pronghorn to stock the breeding pen in Arizona. Since then, capture protocols were examined and improved. In January 2006, surveys indicated that pronghorn numbers remained relatively steady with an estimated total of 634 (486 observed) individuals (combined for both populations). Nine of these were captured, of which five were fitted with radio-collars and released and four were transferred to the semi-captive breeding facility in the U.S. In December 2007, surveys indicated pronghorn numbers declined with an estimated total of 404 (360 observed) individuals combined for both sub-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.

*Population Viability Analysis*

In 1996, a workshop was held in which a population viability analysis (PVA) was conducted for the U.S. sub-population of Sonoran pronghorn (Defenders of Wildlife 1998). A PVA is a structured, systematic, and comprehensive examination of the interacting factors that place a population or species at risk (Gilpin and Soulé 1986). Based on the best estimates of demographic parameters at the time, the likelihood of extinction of Sonoran pronghorn was calculated as one percent in the next 25 years, nine percent in the next 50 years, and 23 percent

in the next 100 years. More severe threats include population fluctuation, periodic decimation during drought (especially of fawns), small present population size, limited habitat preventing expansion to a more secure population size, and expected future inbreeding depression. At populations of less than 100, population viability declined 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). The likelihood of extinction increased markedly when fawn mortality exceeded 70 percent. Thus, a 30 percent fawn crop (30 fawns/100 does) each year is necessary to ensure the continuance of the U.S. sub-population. The authors concluded that "this population of the Sonoran pronghorn, the only one in the U.S., is at serious risk of extinction." The authors made these conclusions prior to the severe drought and decline in the species in 2002. On the other hand, Hosack *et al.* (2002) found that some management actions were possible that could improve the chances of population persistence significantly. Actions that would ameliorate the effects of drought or minimize mortality of pronghorn were of particular importance for improving population persistence.

**D. Threats**

*Barriers that Limit Distribution and Movement*
Highways, fences, railroads, developed areas, and irrigation canals can block access to essential forage or water resources. Brown and Ockenfels (2007) report that numerous railroad and highways bisect what was former contiguous pronghorn habitat, often dividing these rangelands into parcels too small to support, viable, long-term populations of pronghorn in Arizona. Furthermore, they state railroads and paved highways are especially restrictive, as in addition to acting as intimidating barriers in their own right, they are often fenced on both sides of the right-of-way. Highways 2 and 8 in Sonora, and SR 85 between Gila Bend and Lukeville, Arizona support a considerable amount of fast-moving vehicular traffic, are fenced in some areas, and are likely a substantial barrier to Sonoran pronghorn (one pen-raised radio-collared male crossed SR 85 and Mexican Highway 2 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. De-watering of reaches of the Río Sonoyta and lower Gila River have 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.

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

Of the aforementioned human activities, in the U.S. range of the pronghorn, CBV activity and required law enforcement response is the most significant current source of disturbance to Sonoran pronghorn and its habitat. As a result of increased presence of the USBP in the Douglas, Arizona area, and in San Diego (Operation Gatekeeper) and southeastern California, CBV traffic has shifted into remote desert areas, such as CPNWR, OPCNM, and BMGR (Klein 2000). In 2001, estimates of CBVs reached 1,000 per night in OPCNM alone (Organ Pipe Cactus National Monument 2001), and an estimated 150,000 people entered the monument illegally from Mexico (Milstead and Barns 2002). In fiscal years (FY) 2006 and 2007, OPCNM rangers apprehended 171 and 180 CBVs, respectively. Apprehensions of CBVs by the USBP Ajo Station increased from 21,300 in 1999 to 22,504 in 2006 (USBP Ajo Station's apprehensions also reflect those apprehension made by OPCNM rangers as CBVs were transferred from OPCNM rangers to USBP agents for processing). In FY 2008, a total of 15,462 apprehensions were made by the Ajo Station USBP.

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 David BeMiller, February 10, 2006). USBP agents have indicated, however, that apprehensions have recently decreased due to USBP presence at Camp Grip and recently completed tactical infrastructure. As USBP has been able to successfully gain control of more urban areas, CBV activity has shifted to more remote areas, such as CPNWR and OPCNM. 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 strong anecdotal evidence that pronghorn are avoiding areas of high CBV traffic and law enforcement activities (personal communication with Curtis McCasland, CPNWR, 2007). For example, prior to 2002 Sonoran pronghorn used the 90,000 acre Valley of the Ajo extensively during the fawning period (March 15-July 31); they primarily entered the Valley through an extremely critical and narrow mountain pass located near Bates Well. During the winter of 2001-2002, NPS stationed a ranger at Bates Well in a small (about 18-foot) temporary FEMA trailer, with no outdoor lighting or generators, to provide visitor security in the north part of OPCNM during the park's peak visitation period, which occurs prior to the Sonoran pronghorn fawning period. Beginning in 2002, USBP began to use the Bates Well site (i.e., Bates Well FOB) seasonally during the summer months. The NPS continued to use Bates Well for short periods during the late fall and winter in support of coordinated law enforcement efforts until ultimately discontinuing its use entirely in 2005. Because pronghorn traditionally used the Bates Well and Valley of the Ajo areas during the spring and summer months, it is unlikely that the NPS fall and winter presence at Bates Well between 2001 and 2005 had a significant effect on pronghorn use of the area. Since 2005, USBP has been the sole occupant at Bates Well. Over time USBP occupancy of this site has increased (the site can accommodate eight people) and today it is occupied nearly year round. Furthermore, USBP brought in generators that now run continuously and lights that operate throughout the night. Subsequent to the establishment of the FOB, no pronghorn have

been documented entering the Valley of the Ajo through the Bates Well 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. Since 2002, the population has increased and pronghorn continue to avoid the Bates Well migration corridor. Considering the sensitivity of pronghorn to human activity and the ongoing use of the Bates Well, it is likely that pronghorn are avoiding use of the area due to the high level of human activity currently associated with the site. In spring of 2009, it is thought that three does with fawns abandoned the Granite FEP due to the high amount of USBP activity at the site (a USBP drag road crosses adjacent to the FEP – it was created after the development of the FEP (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).

As stated above, 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.

A pronghorn can canter effortlessly at 25 mph, gallop without straining at 44 mph, and run flat out at speeds of 55-62 mph (Byers 1997). During an aerial reconnaissance, one herd of Sonoran pronghorn was observed 12 miles away from the initial observation location 1.5 hours later (Wright and deVos 1986). Hughes and Smith (1990) found that pronghorn immediately ran 1,310-1,650 feet from a vehicle, and that military low-level flights (<500 feet AGL) over three pronghorn caused them to move about 330 feet from their original location. Krausman *et al.* (2001, 2004) examined effects of military aircraft and ground-based activities on Sonoran pronghorn at the North and South 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) but 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.* 2005a). No conclusions could be drawn about effects of military activities on fawns due to poor fawn productivity during the Krausman *et al.* (2001 and 2004) study. Krausman *et al.* (2001 and 2004) did not address the pronghorn's response to low-level helicopter flights. During times of drought, disturbances that cause pronghorn to startle and run would energetically have a more significant effect. 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. In general, they found that Sonoran pronghorn used the lowest noise level area more than the higher noise level areas. However, as Krausman *et al.* (2005a) point out, they did not consider habitat in their analysis. Krausman *et al.* (2005a) examined Sonoran pronghorn habitat use on landscapes disturbed by military activities. Though they did not consider noise levels in their analysis, they found that pronghorn on NTAC and STAC ranges used areas that are continually disturbed by military activities (i.e., mock airfields, high-explosive hills, and other targets) more than expected by chance. They conclude that this is likely because these disturbed areas provide favorable forage.

*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 sub-population located southeast of Highway 8.

As discussed above, CBV activities and required USBP response have resulted in increased human presence in remote areas and widespread habitat degradation. For instance, all the valleys at Cabeza Prieta NWR are now criss-crossed with a network of illegal north-south roads and trails, even though those areas are designated as Wilderness. Segee and Neely (2006) report about 180 miles of illegal routes were created in wilderness areas of CPNWR from 2002 to 2006. Based on preliminary estimates, OPCNM reports there may exist a maximum of 1000 miles of unauthorized vehicle routes within a 12-mile radius of the proposed Ajo-1 towers. These routes

were likely created both by CBVs and USBP, and most are likely currently used by USBP. 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). In OPCNM, NPS notes that CBV vehicle activity has decreased since about 2004 (electronic mail, Tim Tibbitts, OPCNM, 2009). 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 necessitates 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.

*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 wooly 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 were consumed 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. In 2007, 2008, and 2009, 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 $^{0}$F in the American Southwest from 1970-2004, that trend is accelerating, and is predicted to continue through the 21$^{st}$ century and beyond (Intergovernmental Panel on Climate Change 2007). Most of the observed increases in globally averaged temperatures since the mid-20$^{th}$ 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.

*Small Population Size and Random Changes in Demographics*

At populations of less than 100, 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, and 68 in 2008, the U.S. sub-population is critically endangered and has likely experienced a substantial loss of genetic diversity resulting from the 2002 bottleneck; this should gradually improve as more pen-raised animals are released into the wild sub-population. At an estimated 25 in 2002 and 50 in 2007, the Pinacate sub-population is also well below desired numbers. At 354 (in 2007), the third sub-population (southeast of Highway 8) is closer to, but still below the desired size to maintain genetic diversity. Loss of the U.S. sub-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

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

## A. Action Area

See the 2003 BO for a description of the action area.

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

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

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

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

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

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

*Drought*
As discussed in the Status of the Species, climate change in the Southwest and the Sonoran Desert is predicted to result in warming trends and drier conditions, with accompanying changes in vegetation communities (Weiss and Overpeck 2005, Seager *et al.* 2007). Rowlands (2000) examined trends in precipitation for southwestern Arizona and OPCNM from 1895-1999. For southwestern Arizona, no trend in precipitation was found for the period, but low precipitation occurred around 1895 and during the 1950s. Periods of high precipitation occurred in 1915-1920 and in the 1980s. For OPCNM, there was a slightly increasing trend in monthly and annual precipitation over the period 1895-1999, a strong drought occurred in the 1950s, and a lesser drought occurred in the 1970s. No discernable trend in precipitation in southwestern Arizona or OPCNM was found in the 1990s, which is when the current decline in the U.S. pronghorn sub-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 sub-population from 2000 to 2002. From 2003 to 2008, rainfall and Sonoran pronghorn range conditions have varied, but have improved overall when compared to 2002. Range conditions in the spring of 2009 were very dry in part and the August 2009 long-term (48-months) drought status report (http://www.azwater.gov/dwr/drought/documents/August2009DroughtStatusUpdate.pdf) indicates that southwestern Arizona is experiencing conditions of abnormally dry to moderate drought.

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*

A number of critically important recovery projects have been recently initiated in an attempt to reverse the decline of the U.S. sub-population of the Sonoran pronghorn (Krausman *et al.* 2005b). These projects are designed to increase availability of green forage and water during dry periods and seasons 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. sub-population. 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. One plot is currently being constructed and two additional plots will be installed over the next five years. 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 August 2009 contains 74 animals. As described above, this facility will be used to augment the current U.S. sub-population, and potentially to establish a second herd at Kofa NWR. These crucial projects, which we hope will pull the U.S. population back from the brink of extinction, have been cooperative efforts among many agencies and organizations, including FWS, Arizona

Game and Fish Department, MCAS-Yuma, Luke Air Force Base, 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. sub-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 Border Patrol. 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*

1) U.S. Border Patrol Activities in the Tucson Sector, Arizona

We have been in informal consultation with the Tucson Sector Border Patrol regarding development of a biological assessment for several years (consultation number 02-21-99-I-0138). This consultation would encompass all field activities conducted by the Tucson Sector under their program to detect, deter, and apprehend cross-border violators. Activities within the Ajo Station of the Tucson Sector have the greatest potential to adversely affect pronghorn. Adverse effects may result from patrol and drag road activities, off-road operations, aircraft overflights, operation of FOBs, the use and maintenance of sensors, construction of vehicle barriers and fences, and installation, operation, and maintenance of cameras and communication towers. As USBP has been able to successfully gain control of more urban areas, CBV activity has shifted to more remote areas, such as CPNWR and OPCNM. Both activities have resulted in increased human presence in and widespread degradation of Sonoran pronghorn habitat. As discussed above (see the "*Human-caused Disturbance*" and "*Habitat Disturbance*" portions of the "Threats" section under "Status of the Species"), hundreds to thousands of illegal routes have been created and are likely currently used by CBVs and USBP on CPNWR and OPCNM. Also as mentioned previously, there is substantial evidence that pronghorn avoid areas of high CBV traffic and USBP activities on CPNWR and OPCNM. This activity in pronghorn habitat has

likely lead to significant disturbances to pronghorn resulting in decreased fitness and death (from reduced availability of important habitat, separation of does and fawns, increased energetic expenditure from fleeing, etc.). However, it is logical to assume the presence of agents in these areas generally reduces the amount of CBV activity which consequently reduces the potential for disturbance to pronghorn from CBVs.

2) Smuggler/Drug Interdiction

We are aware of U.S. Customs, Drug Enforcement Authority, and Arizona Army National Guard smuggler or drug interdiction activities in pronghorn habitat, including vehicle and helicopter activities. However, we have not received information regarding the extent or types of activities they conduct, and no consultation has occurred on these activities.

3) BLM Off-Road Vehicle Use Area

We are aware of an off-road vehicle (ORV) use area located north of Ajo on BLM land, near the CPNWR, and adjacent to suitable pronghorn habitat. The BLM has not authorized the use of this ORV area but plans to in the updated Resource Management Plan (RMP) they are developing for BLM lands in the vicinity. They will request formal section 7 consultation on the updated RMP. To date, BLM has not provided us with information about the extent and type of use of the ORV area or its possible effects to pronghorn.

4) DHS-CBP Hybrid Fence on BMGR and Vehicle Fence on CPNWR

Consultation was completed for the installation of a vehicle barrier (fence) along the U.S.-Mexico border from Avenue C to the western boundary of OPCNM, including the BMGR (see details below), however, 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 DHS, CBP never reinitiated consultation with us regarding this change to their proposed action. However, DHS did provide funding to the FWS for the implementation offsetting measures for Sonoran pronghorn. These offsetting measures will contribute to recovery actions for the Sonoran pronghorn.

5) DHS-CBP Vehicle Fence on CPNWR

CBP constructed and maintains a 1.6-mile segment of vehicle fence (known as CV-2a) and associated roads on the CPNWR. Though the project was likely to adversely affect pronghorn, as well as benefit pronghorn by reducing CBV vehicle activity within the pronghorn range, because all environmental laws were waived (as permitted by the Real ID Act of 2005) by Secretary of the DHS, it never underwent formal consultation. We provided CBP with recommendations to avoid, minimize, and offset effects to pronghorn, however, to date, we do not know if they were implemented.

*Federal Actions Addressed in Section 7 Consultations*

As part of our comprehensive discussion of all past and present actions affecting pronghorn within the action area, we describe below all biological opinions issued to date on actions that may affect the pronghorn.

Several opinions addressed projects with minor effects to the pronghorn (capture and collaring of pronghorn for research purposes, consultation numbers 02-21-83-F-0026 and 02-21-88-F-0006; installation of a water source in the Mohawk Valley for pronghorn, consultation number 02-21-88-F-0081; implementation of the CPNWR Comprehensive Conservation Plan, consultation number 22410-2006-F-0416; 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; and the following projects at OPCNM: widening of North Puerto Blanco Road, consultation number 02-21-01-F-0109; improvements to SR 85 roadway and drainages, consultation 02-21-01-F-0546; and construction of a vehicle barrier, consultation number 02-21-02-F-237). 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, discussed below. All of these formal consultations can be viewed on our website at http://www.fws.gov/arizonaes/Biological.htm.

Ten biological opinions evaluated major projects with greater effects to pronghorn:

1) U.S. Border Patrol Activities in the Yuma Sector, Wellton Station, Yuma, Arizona

This biological opinion (consultation number 02-21-96-F-0334), issued September 5, 2000, addressed all USBP activities along the United States/Mexico border in Yuma County from the Colorado River to about the area of Pinta Sands at the southern end of the Sierra Pinta Mountains. The Yuma Sector requested reinitiation of consultation, and we delivered a draft biological opinion in 2004; however, we have not received comments from the USBP to date. Currently, USBP activities within the Yuma Sector/Wellton Station include air and ground patrols; drag road preparation and assessment of road maintenance; remote sensor installation and maintenance; pedestrian and vehicle fence and associated road maintenance; apprehensions and rescues; and assistance to other sectors and agencies. Disturbance to pronghorn was anticipated as a result of on-the-ground USBP operations, and direct injury or mortality of pronghorn as a result of collision with USBP vehicles or by low-level helicopter flights abruptly approaching and startling pronghorn, which may result in injury or energetic stress, particularly during drought. Pronghorn may also be adversely affected by noise and visual impacts of helicopter overflights. To reduce adverse effects on pronghorn, the USBP agreed to implement a number of conservation measures, which to date have not been completed. We determined that the proposed action was not likely to jeopardize the continued existence of the pronghorn. We anticipated take in the form of harassment that is likely to injure up to one pronghorn in 10 years. The following reasonable and prudent measures were provided: 1) minimize injury of pronghorn; 2) monitor and study reactions of pronghorn on BMGR to USBP activities; and 3) provide a means to determine the level of incidental take that results from USBP activities. Several conservation recommendations were also provided. We are not aware of any incidental take attributable to Yuma Sector activities.

2) BLM's Lower Gila South Management Area

Three biological opinions address BLM's Lower Gila South Management Area. The Lower Gila South Resource Management Plan-Goldwater Amendment (consultation number 02-21-90-F-0042), proposed specific and general management guidance for non-military activities on the BMGR. The non-jeopardy biological opinion, issued April 25, 1990, was programmatic, requiring BLM to consult when site-specific projects are proposed. No incidental take was anticipated. The Lower Gila South Habitat Management Plan (HMP) (consultation number 02-21-89-F-0213) provided management guidance for both specific and general actions in southwestern Arizona. Four actions were addressed in the HMP, including an exchange of 640 acres near Ajo, rehabilitation work on two catchments, and assessment of livestock removal from pronghorn habitat. Exchange of land out of public ownership may facilitate development or other uses that would preclude use by pronghorn. The non-jeopardy opinion was issued on May 15, 1990. The biological opinion for the Lower Gila South Resource Management Plan and Amendment (consultation number 02-21-85-F-0069) addressed programmatic management of lands in southwestern Arizona, including livestock grazing, wilderness, cultural resources, fire, minerals and energy, recreation, wildlife management, wood cutting, Areas of Critical Environmental Concern, and other land uses. The non-jeopardy biological opinion was issued on March 27, 1998; no incidental take was anticipated. In regard to management on the BMGR, these three opinions have been replaced by the opinion on the BMGR's Integrated Natural Resources Management Plan (INRMP) (see below). The Air Force and MCAS-Yuma have assumed BLM's management responsibilities on the BMGR.

3) BLM grazing allotments in the vicinity of Ajo, Arizona

The original biological opinion (consultation number 02-21-94-F-0192), issued December 3, 1997, addressed effects to pronghorn resulting from issuance of grazing permits on five allotments, four of which were located near Ajo and Why (Cameron, Childs, Coyote Flat, and Why allotments); and the fifth near Sentinel (Sentinel allotment). All but portions of allotments east of Highway 85 were considered to be within the current distribution of the Sonoran pronghorn. Reinitiations resulted in revised biological opinions dated November 16, 2001, September 30, 2002, June 21, 2004, March 3, 2005, and March 8, 2007. Under the current proposed action, the Cameron Allotment is closed, the Sentinel Allotment has been in non-use for several years, the Coyote Flat and Why allotments were combined into one (Coyote Flat Allotment), and the Childs Allotment remains relatively unchanged in terms of management. Effects of livestock grazing activities included reduced forage availability for pronghorn, human disturbance due to livestock management, barriers to movement caused by pasture and allotment fences, and potential for disease transfer from cattle to pronghorn. The March 8, 2007 opinion concluded that the proposed action was not likely to jeopardize the continued existence of the pronghorn. No incidental take was anticipated, and none is known to have occurred.

4) Organ Pipe Cactus National Monument General Management Plan

The original biological opinion (consultation number 02-21-89-F-0078), issued June 26, 1997, addressed implementation of OPCNM's General Management Plan (GMP). This opinion was reinitiated five times, resulting in revised biological opinions dated November 16, 2001, April 7, 2003, March 10 and August 23, 2005, and March 8, 2007. GMP plan elements included: 1) continuing travel and commerce on SR 85 while enhancing resource protection, 2) seeking

designation of OPCNM as the Sonoran Desert National Park, 3) establishment of partnerships, 4) increased wilderness and an interagency wilderness and backcountry management plan, 5) changes in trails, facilities, and primitive camping, and 6) implementation of a Cultural Resources Management Plan. Included were a number of conservation measures to minimize impacts to pronghorn, including "Limiting future development to the area north of the North Puerto Blanco Drive and east of the Senita Basin Road/Baker Mine Trail/Dripping Springs Trail . . .". Effects of the action included human disturbance to pronghorn and habitat due to recreation and management activities. We determined that the proposed action was not likely to jeopardize the continued existence of the pronghorn. In the latest versions of the opinion, no incidental take of pronghorn was anticipated. No incidental take is known to have occurred. The original opinion was the subject of a lawsuit (Defenders of Wildlife, *et al.* v. Bruce Babbitt, *et al.*) and was remanded by the court due to our failure to adequately address the impact of proposed activities on pronghorn.

5) Marine Corps Air Station-Yuma in the Arizona Portion of the Yuma Training Range Complex

The original biological opinion (consultation number 02-21-95-F-0114), was issued on April 17, 1996. That opinion was reinitiated and revised opinions were issued November 16, 2001 and August 6, 2003. These opinions addressed all proposed and authorized actions on the BMGR by MCAS-Yuma, including ongoing and proposed changes to military flights over CPNWR and the BMGR, operation of various training facilities such as landing strips, a rifle range, targets, a parachute drop zone, a transmitter/telemetry system, ground support areas, and Weapons Tactics Instructor courses, conducted twice a year (March-April and October-November) that involve overflights, ground-based activities, and ordnance delivery at targets in BMGR-East. Ground-based activities, such as those of troops and vehicles at ground-support areas were determined to adversely affect pronghorn habitat use. In areas where helicopters fly particularly low and create noise and visual stimuli, disturbance of pronghorn was anticipated. Ordnance delivery at North and South TACs could disturb pronghorn, and ordnance, live fire, and shrapnel could potentially strike and kill or injure a pronghorn. MCAS-Yuma proposed measures to reduce the direct and indirect impacts of the proposed action, including measures to reduce or eliminate take of Sonoran pronghorn and to minimize destruction and degradation of habitat. We determined that the proposed action was not likely to jeopardize the continued existence of the pronghorn. In the 2003 version of the BO, no incidental take of pronghorn was anticipated and none is known to have occurred. This opinion was reinitiated on July 20, 2009, to address a change in aircraft type being used for training activities; to date, the new opinion has not been issued.

6) Luke Air Force Base Use of Ground-Surface and Airspace for Military Training on the BMGR

The original biological opinion (consultation number 02-21-96-F-0094), issued August 27, 1997, addressed military use of the airspace above and the ground space on BMGR-East and CPNWR by Luke Air Force Base. Military activities within the area of overlap with the CPNWR were limited to use of airspace and operation of four Air Combat Maneuvering Instrumentation sites. Military activities occurring within BMGR-East included: airspace use, four manned air-to-ground ranges, three tactical air-to-ground target areas, four auxiliary airfields, Stoval Airfield,

and explosive ordnance disposal/burn areas. Primary potential effects of the action included habitat loss due to ground-based activities, harassment and possible mortality of pronghorn at target areas, and disturbance of pronghorn due to military overflights. We determined that the proposed action was not likely to jeopardize the continued existence of the pronghorn. This opinion was reinitiated in 2001 and 2003, resulting in revised opinions dated November 16, 2001 and August 6, 2003. In the latest (2003) opinion, no incidental take was anticipated. We are not aware of any take of pronghorn confirmed attributable to Luke Air Force Base use of the ground-surface and airspace on the BMGR. A pronghorn found dead near a target may have been strafed, but it may also have died from other causes (see "Effects of the Proposed Action" in the 2003 opinion for a full discussion of this incident).

During the development of these opinions, Luke Air Force Base made substantial commitments to minimize the effects of their activities on the Sonoran pronghorn, and additionally committed to implementing a variety of recovery projects recommended by the Sonoran Pronghorn Recovery Team.

7) Western Army National Guard Aviation Training Site Expansion Project

The non-jeopardy biological opinion for WAATS (consultation number 02-21-92-F-0227) was 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. The purpose of WAATS is to provide a highly specialized environment to train Army National Guard (ARNG) personnel in directed individual aviator qualification training in attack helicopters. The WAATS expansion project included: 1) expansion of the existing Tactical Flight Training Area, which includes establishing four Level III touchdown sites, 2) development of the Master Construction Plan at the Silver Bell Army Heliport, and 3) establishment of a helicopter aerial gunnery range for use by the ARNG on East TAC of the BMGR. All activities that are part of the proposed action occur outside the current range of the pronghorn, with the exception of training at North TAC. Training at North TAC only occurs when East TAC is closed for annual maintenance and EOD clearances (4-6 weeks each year). Effects to pronghorn at North TAC are minimized by monitoring protocols established by Luke Air Force Base. Training at East TAC could preclude recovery of historical habitat if the many other barriers that prevent pronghorn use of East TAC were removed. The November 16, 2001 and August 6, 2003 opinions found that the proposed action was not likely to jeopardize the continued existence of the pronghorn. No incidental take was anticipated and none is known to have occurred as a result of the proposed action. ARNG included the following conservation measures as part of their proposed action: 1) they proposed to study the effects of low-level helicopter flights on a surrogate pronghorn population at Camp Navajo (to date this measure has not been implemented), and 2) they committed to funding up to five percent of emergency recovery actions on the BMGR.

8) BMGR Integrated Natural Resources Management Plan

The non-jeopardy opinion for this action was issued on August 26, 2005. The Military Lands Withdrawal Act (MLWA) of 1999 required that the Secretaries of the Air Force, Navy, and Interior jointly prepare an INRMP for the BMGR, the purpose of which was to provide for the

"proper management and protection of the natural and cultural resources of [the range], and for sustainable use by the public of such resources to the extent consistent with the military purposes [of the BMGR]." The proposed action was comprehensive land management, including public use restrictions, authorizations, and permitting on portions of the BMGR regarding camping, vehicle use, shooting, entry into mines, firewood collection and use, rockhounding, and other activities; natural resources monitoring, surveys, and research; habitat restoration; wildlife water developments; development of a wildfire management plan; law enforcement; limitations on the locations of future utility projects and the Yuma Area Service Highway; control of trespass livestock; and designation of special natural/interest areas, while allowing other designations to expire. The proposed action included many land use prescriptions that would improve the baseline for the pronghorn. No incidental take was anticipated, and none is known to have occurred from the proposed action.

9) CBP and USBP Permanent Vehicle Barrier from Avenue C to OPCNM, Arizona

This biological opinion (consultation number 22410-2006-F-0113), issued September 15, 2006, addressed the CBP - Office of the Border Patrol's installation of a permanent vehicle barrier (as well as access improvements, construction/improvement of border roads, and associated maintenance and patrol activities) along sections of the border from the western end of the OPCNM barrier to Avenue C just east of San Luis, Arizona. Effects to pronghorn included 1) disturbance of a narrow swath of habitat along the border, 2) presence of construction crews and vehicles that may disturb or preclude use of the area by pronghorn, 3) presence of maintenance and patrol vehicles and crews along the barrier access road, and 4) dramatic reduction or elimination of illegal drive-throughs and required law enforcement response, with much reduced route proliferation and habitat damage from off-highway vehicles. Included were a number of conservation measures to minimize and offset impacts to pronghorn, including the contribution of funds to establish pronghorn waters and forage enhancement plots. We determined that the proposed action was not likely to jeopardize the continued existence of the pronghorn. No incidental take of pronghorn was anticipated. As mentioned above, 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 DHS, CBP never reinitiated consultation with us regarding this change to their proposed action.

10) CBP and USBP 5.2-Mile Primary Fence near Lukeville, Arizona

This biological opinion (consultation number 22410-2008-F-0011), issued February 11, 2008, addressed the CBP and USBP action to construct and maintain 5.2 miles of primary fence along the U.S.-Mexico border near Lukeville, Arizona. Effects to pronghorn included 1) disturbance of a narrow swath of habitat along the border, 2) disturbance to pronghorn from construction and maintenance activities, 3) disturbance to pronghorn and their habitat from potential redirection of CBV traffic and ensuing USBP response to the west of the fence; and 4) reduction in CBV and USBP activities north of the fence, with reduced habitat impacts and disturbance to pronghorn. Included were a number of conservation measures to minimize and offset impacts to pronghorn, including the contribution of funds to close and restore unauthorized routes within pronghorn

habitat in OPCNM. We determined that the proposed action was not likely to jeopardize the continued existence of the pronghorn. No incidental take of pronghorn was anticipated.

**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 sub-population. The U.S. pronghorn sub-population is isolated from other sub-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 emergency recovery actions, the wild population increased to 68 in 2008. At 68, however, the wild sub-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). Additionally, since the establishment of a FOB at Bates Well, located in the middle of an extremely critical and narrow Sonoran pronghorn movement corridor (Bates Pass) on OPCNM, few pronghorn have been documented using the Valley of the Ajo, and

no pronghorn have been documented entering the Valley of the Ajo through the Bates pass area. 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. range of the species, including 10 emergency waters and four forage enhancement plots, with additional waters and forage plots planned. The projects tend 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 74 pronghorn. This facility will provide pronghorn to augment the existing sub-population and hopefully to establish a second U.S. sub-population, possibly at Kofa NWR. Additionally, vehicle barriers on the international border on CPNWR and OPCNM are facilitating recovery of pronghorn by drastically reducing the amount of CBV vehicle traffic in pronghorn habitat.

The current range of the 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. However, CBV foot traffic and off-road vehicle activity and required Federal law enforcement response have been and continue to be significant threats to the pronghorn and its habitat. Prior to November 2001, in seven of 12 biological opinions issued by FWS that analyzed impacts to the pronghorn, we anticipated that take would occur. In total, we anticipated take of five pronghorn in the form of direct mortality every 10-15 years, and an undetermined amount of take in the form of harassment. Given the small and declining population of pronghorn in the U.S. at the time the opinions were written, take at the levels anticipated in the biological opinions would constitute a substantial impact to the population.

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. The only current opinion that anticipates incidental take is 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. 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 – see 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 current range resulting from a myriad of human activities, exacerbated by periodic dry seasons or years, are responsible for the present precarious status of the Sonoran pronghorn in the action area. However, collaborative, multi-agency and multi-party efforts to develop forage enhancement plots and emergency waters, reduce human disturbance of pronghorn and their habitat, combined with the success of the semi-captive breeding facility, plus planned future

recovery actions, including establishment of a second U.S. sub-population, provide hope that recovery of the Sonoran pronghorn in the U.S. is achievable. Key to achieving recovery will be a drastic reduction in human disturbance to pronghorn and their habitat caused by CBV and corresponding enforcement activities.

## EFFECTS OF THE PROPOSED ACTION

### Military Overflights

The BOs on Ongoing Activities by the MCAS-Yuma in the Arizona portion of the YTRC on the BMGR, Yuma and Maricopa counties (02-21-95-F-0114, now 22410-1995-F-0114 and its reinitiations) evaluated the effects of routine helicopter and other operations on Sonoran pronghorn. Although the use of the MV-22 on MCAS-Yuma was not specifically evaluated in the BOs, the MV-22 is intended to replace an existing helicopter (i.e., the CH-46) that was addressed by those previous BOs. All conservation measures and other requirements within the BOs that are applicable to helicopter operations will also be applicable to operation of the MV-22.

As described in previous BOs, aircraft overflights may cause disturbance to Sonoran pronghorn, and helicopters, particularly low-level hovering helicopters, elicit greater responses than fixed-wing aircraft or aircraft flying at higher elevation (Workman *et al.* 1992, Weisenberger *et al.* 1996, Luz and Smith 1976). 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), which may be exacerbated in harsh environments such as those occupied by Sonoran pronghorn.

There will be no construction on BMGR-West in association with the proposed action; therefore no effects to Sonoran pronghorn are anticipated from project construction. All landings, take-offs, and low-level hovering will occur in established GSAs and LZs. Because the Lonesome Dove LZ, AUX-2, the Yodaville and Cactus West target complexes, and 25 of the 32 GSAs proposed for use as part of this project are outside, to the west, of the current pronghorn distribution, no effects to Sonoran pronghorn are anticipated from MV-22 activities associated with these areas. Seven GSAs proposed for use by the MV-22 (GSAs 40, 41, 43, 44, 48, 49, and 66) lie within or on the edge of western-most portion of the current Sonoran pronghorn range (as defined in our 2003 BO). Therefore, MV-22 activities associated with these GSAs may disturb pronghorn. However, because these GSAs are located in the western-most extent of the Sonoran pronghorn range and no pronghorn have been detected in these areas since prior to 2002, we anticipate that currently the likelihood of MV-22 activities in these GSAs disturbing pronghorn is relatively low. However, as the success of recovery efforts for the pronghorn gain momentum, pronghorn may again use these western portions of their range where they would be exposed to disturbance from MV-22 activities.

There will be an increase of an estimated 12,290 range operations per year due to the associated increase in MV-22 training operations (see Table 1) or a 14 percent increase in overall range operations at BMGR-West compared to existing conditions. However, the majority of this increase will occur outside of the current Sonoran pronghorn range. Specifically, MV-22

operations associated with "Air-to-Ground" (will occur at Yodaville and Cactus West), "AUX 2", and most "Confined Area Landing and Tactics" will be located well to the west of the current Sonoran pronghorn range. Consequently, we anticipate these operations will have no effect on pronghorn. "Confined Area Landing and Tactics" associated with GSAs 40, 41, 43, 44, 48, 49, and 66 will, however, occur within the current Sonoran pronghorn range. Because these are located in the western-most extent of the current the pronghorn range (i.e., to the west of longitude 113 degrees and 53 minutes) and pronghorn have not been documented using this area since prior to 2002, we believe that there is currently a low probability that pronghorn will be in the vicinity of these GSAs during MV-22 operations. Therefore, as stated above, we anticipate that the likelihood of MV-22 activities in these GSAs disturbing pronghorn is relatively low, but could increase if pronghorn use these areas more often due to successful recovery efforts. Should pronghorn be present near or in these GSAs during MV-22 operations, because the MV-22 is louder during landing, take-offs, and low-level hovering than the CH-46, disturbance to pronghorn during these activities would likely be greater than previously analyzed for the CH-46.

MV-22 Air-to-Air, Air Combat Maneuvers, and WTI operations will occur in the TACTS range partially within Sonoran pronghorn range; low-level MV-22 flights associated with these operations may disturb Sonoran pronghorn. To minimize effects of these operations on Sonoran pronghorn, the same seasonal, altitudinal, and locational limitations in place for CH-46 helicopters will be in place for MV-22 training, and the MV-22 training will be consistent with the requirements of the previous BOs. We anticipate the increase in MV-22 Air-to-Air and Air Combat Maneuvers operations (when compared to current CH-46 operations - see Table 1) may result in greater adverse effects to Sonoran pronghorn than previously analyzed. That said however, we anticipate these effects will be mostly offset because, when compared to the CH-46, the MV-22 operating in forward mode will typically fly much higher and is quieter. Additionally, the MV-22 will use the same four flight corridors established in the 2001 BO, which were developed to reduce disturbance to Sonoran pronghorn. Furthermore, because the 96 proposed MV-22 WTI operations will not land to the east of longitude 113 degrees and 53 minutes within BMGR-West (currently, CH-46 helicopter operations associated with WTI may land within Sonoran pronghorn range to the east of longitude 113 degrees and 53 minutes between the Mohawk Mountains and the Mohawk Dunes), we anticipate elimination of 4,882 CH-46 WTI operations will significantly reduce the potential for adverse effects to Sonoran pronghorn resulting from these operations. Note that, when equipped with a weapons system, the MV-22 may fire weapons into approved live fire ranges on BMGR-East. However, use of BMGR-East by the MV-22 will be consistent with the 2003 BO and will follow range operations protocols established and managed by the Luke Air Force Base to reduce potential effects to pronghorn.

The USMC has evaluated the potential for MV-22 operations to ignite wildfires and has determined that, though all types of training activities have the potential to start fires, based on a recent Department of Navy review, under normal operating conditions with engine exhaust deflectors operating, the MV-22 is unlikely to ignite wildfires. Based on this analysis and USMC's commitment to implement conservation measures (including the use of exhaust deflectors) to minimize the potential for fires associated with the MV-22, we anticipate that the

risk of fires and fire-associated adverse effects to pronghorn and their habitat occurring as a result of MV-22 use is low.

Based on the information provided and the analysis above, we have determined that the effects to Sonoran pronghorn due to MV-22 training by the MCAS-Yuma will not be greater than those evaluated for helicopter training within the previous BOs.

## 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 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 were acquired by the USAF. 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, on lands outside the BMGR, 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, and Yuma.

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. Though CBV activity has been high in recent years, it has declined recently, likely due to increased law enforcement presence, the border fence, and the status of the economy in the U.S. In particular, the number of drive-throughs in the action area has decreased significantly since construction of the border fence. This decrease has resulted in a consequent decrease in human disturbance to pronghorn and their habitat.

## CONCLUSIONS

After reviewing the current status of the Sonoran pronghorn, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, 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 6, 2003 biological opinion and reinitiation, and the following:

1. Measures included in the 2003 BO will continue to be implemented and will help to reduce and offset adverse effects to Sonoran pronghorn from the proposed project.

2. Increased low-level flights over the current Sonoran pronghorn range associated with the MV-22 could disturb pronghorn. However, adverse effects to Sonoran pronghorn from MV-22 low-level flights should mostly be offset because MV-22s in forward operating mode will fly higher and are quieter than the CH-46.

3. The elimination of 4,882 CH-46 WTI operations should reduce the potential for adverse effects to Sonoran pronghorn resulting from these operations.

4. MV-22 landings and take-offs are noisier when compared to the CH-46. However, because all landings and take-offs will occur in previously established GSAs and LZs to the west of longitude 113 degrees 53 minutes, which is near the western boundary of the pronghorn's range, the likelihood of these activities disturbing pronghorn is relatively low.

5. Conservation measures in the proposed action will help reduce the potential for fires as a result of MV-22 operations.

## AMOUNT OR EXTENT OF TAKE ANTICIPATED

We do not anticipate the proposed action will result in incidental take of Sonoran pronghorn. Our conclusion is based on the rationale given in our August 6, 2003 biological opinion and reinitiation on the proposed action; the Effects of the Proposed Action, above; and the following:

1. Measures included in the proposed action will reduce the likelihood that the West Coast Basing of the MV-22 will result in adverse effects to pronghorn.

## CONSERVATION RECOMMENDATIONS

We continue to recommend implementing the conservation measures in our 2003 BO (#02-21-95-F-0114R4, now 22410-1995-F-0114-R004) with the following modifications:

2. Replace with: Continue to fund or assist in the implementation of priority recovery projects as determined by the Sonoran Pronghorn Recovery Team.

4. Delete. With the support of MCAS-Yuma, a forage enhancement plot is under development at Devils Hills in lieu of the Mohawk Valley, per the recommendation of the Sonoran Pronghorn Recovery Team.

## LESSER LONG-NOSED BAT
## STATUS OF THE SPECIES

### A. Species Description

The lesser long-nosed bat is a medium-sized, leaf-nosed bat. It has a long muzzle and a long tongue, and is capable of hover flight. These features are adaptations for feeding on nectar from the flowers of columnar cacti (e.g., saguaro; cardon [*Pachycereus pringlei*]; and organ pipe cactus and from paniculate agaves (e.g., Palmer's agave [*Agave palmeri*]) (Hoffmeister 1986). The lesser long-nosed bat was listed (originally, as *Leptonycteris sanborni*; Sanborn's long-nosed bat) as endangered in 1988 (U.S. Fish and Wildlife Service 1988). No critical habitat has been designated for this species. A recovery plan was completed in 1997 (U.S. Fish and Wildlife Service 1997). Loss of roost and foraging habitat, as well as direct taking of individual bats during animal control programs, particularly in Mexico, have contributed to the current endangered status of the species. Recovery actions include roost monitoring, protection of roosts and foraging resources, and reducing existing and new threats. The recovery plan states that the species will be considered for delisting when three major maternity roosts and two post-maternity roosts in the U.S., and three maternity roosts in Mexico have remained stable or increased in size for at least five years, following the approval of the recovery plan. A five-year review has been completed and recommends downlisting to threatened (U.S. Fish and Wildlife Service 2007).

### B. Distribution and Life History

The lesser long-nosed bat is migratory and found throughout its historical range, from southern Arizona and extreme southwestern New Mexico, through western Mexico, and south to El Salvador. It has been recorded in southern Arizona from the Picacho Mountains (Pinal County) southwest to the Agua Dulce Mountains (Pima County) and Copper Mountains (Yuma County), southeast to the Peloncillo Mountains (Cochise County), and south to the international boundary.

Within the U.S., habitat types for the lesser long-nosed bat include Sonoran Desert scrub, semi-desert and plains grasslands, and oak and pine-oak woodlands. Farther south, the lesser long-nosed bat occurs at higher elevations. Maternity roosts, suitable day roosts, and concentrations of food plants are all critical resources for the lesser long-nosed bat. All of the factors that make roost sites useable have not yet been identified, but maternity roosts tend to be very warm and poorly ventilated (U.S. Fish and Wildlife Service 1997). Such roosts reduce the energetic requirements of adult females while they are raising their young (Arends *et al.* 1995).

Roosts in Arizona are occupied from late April to September (Cockrum and Petryszyn 1991) and on occasion, as late as November (Sidner 2000); the lesser long-nosed bat has only rarely been recorded outside of this time period in Arizona (U. S. Fish and Wildlife Service 1997, Hoffmeister 1986, Sidner and Houser 1990). In spring, adult females, most of which are pregnant, arrive in Arizona and gather into maternity colonies in southwestern Arizona. These roosts are typically at low elevations near concentrations of flowering columnar cacti. After the young are weaned these colonies mostly disband in July and August; some females and young move to higher elevations, primarily in the southeastern parts of Arizona near concentrations of

blooming paniculate agaves. Adult males typically occupy separate roosts forming bachelor colonies. Males are known mostly from the Chiricahua Mountains and recently the Galiuro Mountains (personal communication with Tim Snow, Arizona Game and Fish Department, 1999) but also occur with adult females and young of the year at maternity sites (U. S. Fish and Wildlife Service 1997). Throughout the night between foraging bouts, both sexes will rest in temporary night roosts (Hoffmeister 1986).

Lesser long-nosed bats appear to be opportunistic foragers and extremely efficient fliers. They are known to fly long distances from roost sites to foraging sites. Night flights from maternity colonies to foraging areas have been documented in Arizona at up to 25 miles and in Mexico at 25 miles and 36 miles (one way) (Ober *et al.* 2000; Dalton *et al.* 1994, Ober and Steidl 2004, Lowery *et al.* 2009). Lowery *et al.* 2009 and Steidl (personal communication, 2001) found that typical one-way foraging distance for bats in southeastern Arizona is roughly 6 to 18 miles. A substantial portion of the lesser long-nosed bats at the Pinacate Cave in northwestern Sonora (a maternity colony) fly 25-31 miles each night to foraging areas in OPCNM (U.S. Fish and Wildlife Service 1997). Horner *et al.* (1990) found that lesser long-nosed bats commuted 30-36 miles round trip between an island maternity roost and the mainland in Sonora; the authors suggested these bats regularly flew at least 47 miles each night. Lesser long-nosed bats have been observed feeding at hummingbird feeders many miles from the closest known potential roost site (Lowery *et al.*, 2009; personal communication with Yar Petryszyn, University of Arizona, 1997).

Lesser long-nosed bats, which often forage in flocks, consume nectar and pollen of paniculate agave flowers and the nectar, pollen, and fruit produced by a variety of columnar cacti. Nectar of these cacti and agaves is high energy food. Concentrations of some food resources appear to be patchily distributed on the landscape, and the nectar of each plant species used is only seasonally available. Cacti flowers and fruit are available during the spring and early summer; blooming agaves are available primarily from July through October. In Arizona, columnar cacti occur in lower elevational areas of the Sonoran Desert region, and paniculate agaves are found primarily in higher elevation desert scrub areas, semi-desert grasslands and shrublands, and into the oak and pine-oak woodlands (Gentry 1982). Lesser long-nosed bats are important pollinators for agave and cacti, and are important seed dispersers for some cacti.

**C. Status and Threats**

Recent information indicates that lesser long-nosed bat populations appear to be increasing or stable at most Arizona roost sites identified in the recovery plan (Arizona Game and Fish Department 2005, Tibbitts 2005, Wolf and Dalton 2005, U.S. Fish and Wildlife Service 2007; electronic mail from Tim Tibbitts 2009,). Lesser long-nosed bat populations additionally appear to be increasing or stable at other roost sites in Arizona and Mexico not included for monitoring in the recovery plan (Sidner 2005, Arizona Game and Fish Department 2009). Less is known about lesser long-nosed bat numbers and roosts in New Mexico. Though lesser long-nosed bat populations appear to be doing well, many threats to their stability and recovery still exist, including excess harvesting of agaves in Mexico; collection and destruction of cacti in the U.S.; conversion of habitat for agricultural and livestock uses, including the introduction of bufflegrass, a non-native, invasive grass species; wood-cutting; alternative energy development

(wind and solar power); CBV activities and required law enforcement activities; drought and climate change; fires; human disturbance at roost sites; and urban development.

Approximately 20 – 25 large lesser long-nosed bat roost sites, including maternity and late-summer roosts, have been documented in Arizona. Of these, 10 – 20 are monitored on an annual basis depending on available resources (U.S. Fish and Wildlife Service 2007). Monitoring in Arizona in 2004 documented approximately 78,600 lesser long-nosed bats in late-summer roosts and approximately 34,600 in maternity roosts. More recently, in 2008, the numbers were 63,000 at late-summer roosts and 49,700 at maternity roosts (Arizona Game and Fish Department 2009). Ten to 20 lesser long-nosed bat roost sites in Mexico are also monitored annually. Over 100,000 lesser long-nosed bats are found at just one natural cave at the Pinacate Biosphere Reserve, Sonora, Mexico (Cockrum and Petryszyn 1991). The numbers above indicate that although a relatively large number of lesser long-nosed bats exist, the relative number of known large roosts is quite small.

The primary threat to lesser long-nosed bat is roost disturbance or loss. The colonial roosting behavior of this species, where high percentages of the population can congregate at a limited number of roost sites, increases the risk of significant declines or extinction due to impacts at roost sites. Lesser long-nosed bats remain vulnerable because they are so highly aggregated (Nabhan and Fleming 1993). Some of the most significant threats known to lesser long-nosed bat roost sites are impacts resulting from use and occupancy of these roost sites by CBVs. Mines and caves, which provide roosts for lesser long-nosed bats, also provide shade, protection, and sometimes water, for border crossers. The types of impacts that result from illegal border activities include disturbance from human occupancy, lighting fires, direct mortality, accumulation of trash and other harmful materials, alteration of temperature and humidity, destruction of the roost itself, and the inability to carry out conservation and research activities. These effects can lead to harm, harassment, or, ultimately, roost abandonment (U.S. Fish and Wildlife Service 2005). For example, the illegal activity, presumably by CBVs, at the Bluebird maternity roost site, caused bats to abandon the site in 2002, 2003, and 2005. Other reasons for disturbance or loss of bat roosts include the use of caves and mines for recreation; the deliberate destruction, defacing or damage of caves or mines; roost deterioration (including both buildings or mines); short or long-term impacts from fire; and mine closures for safety purposes. The presence of alternate roost sites may be critical when this type of disturbance occurs.

Threats to lesser long-nosed bat forage habitat include excess harvesting of agaves in Mexico; collection and destruction of cacti in the U.S.; conversion of habitat for agricultural and livestock uses; the introduction of bufflegrass and other invasive species that can carry fire in Sonoran Desert scrub; wood-cutting; urban development; fires; and drought and climate change.

The 2005 fires referred to under Sonoran Pronghorn "Status of the Species" affected some lesser long-nosed bat foraging habitat, though the extent is unknown. For example, the Goldwater, Aux, and Sand Tank Fire Complexes on BMGR-East burned through and around isolated patches of saguaros. Rogers (1985) showed that saguaros are not fire-adapted and suffer a high mortality rate as a result of fire. Therefore, fire can significantly affect forage resources for lesser long-nosed bats in the Sonoran desert. Monitoring of saguaro mortality rates should be done to assess the impacts on potential lesser long-nosed bat foraging habitat. Fire suppression

activities associated with the 2005 fires could also have affected foraging habitat. For example, slurry drops may have left residue on saguaro flowers, which could have impacted lesser long-nosed bat feeding efficiency or resulted in minor contamination.

Drought (see the "Status of the Species" and "Environmental Baseline" for Sonoran pronghorn for further details regarding drought) may affect lesser long-nosed bat foraging habitat, though the effects of drought on bats are not well understood. The drought in 2004 resulted in near complete flower failure in saguaros throughout the range of lesser long-nosed bats. During that time however, in lieu of saguaro flowers, lesser long-nosed bats foraged heavily on desert agave (*Agave deserti*) flowers, an agave species used less consistently by lesser long-nosed bats (Tibbitts 2006). Similarly, there was a failure of the agave bloom in southeastern Arizona in 2006, probably related to the ongoing drought. As a result, lesser long-nosed bats left some roosts earlier than normal and increased use of hummingbird feeders by lesser long-nosed bats was observed in the Tucson area (personal communication with Scott Richardson, FWS, January 11, 2008). Climate change impacts to the lesser long-nosed bats in this portion of its range likely include loss of forage resources. Of particular concern is the prediction that saguaros, the primary lesser long-nosed bat forage resource in the Sonoran Desert, will decrease or even disappear within the current extent of the Sonoran Desert as climate change progresses (Weiss and Overpeck 2005, p. 2074). Monitoring bats and their forage during drought years is needed to better understand the effects of drought on this species.

The lesser long-nosed bat recovery plan (U.S. Fish and Wildlife Service 1997) identifies the need to protect roost habitats and foraging areas and food plants, such as columnar cacti and agaves. The lesser long-nosed bat recovery plan provides specific discussion and guidance for management and information needs regarding bat roosts and forage resources (U.S. Fish and Wildlife Service 1997). More information regarding the average size of foraging areas around roosts would be helpful to identify the minimum area around roosts that should be protected to maintain adequate forage resources.

We have produced numerous biological opinions on the lesser long-nosed bat since it was listed as endangered in 1988, some of which anticipated incidental take. Incidental take has been in the form or direct mortality and injury, harm, and harassment and has typically been only for a small number of individuals. Because incidental take of individual bats is difficult to detect, incidental take has often been quantified in terms of loss of forage resources, decreases in numbers of bats at roost sites, or increases in proposed action activities.

Examples of more recent biological opinions that anticipated incidental take for lesser long-nosed bats are summarized below. The 2008 biological opinion for implementation of the SBI*net* Tucson West Project, including the installation, operation, and maintenance of communication and sensor towers and other associated infrastructure, included incidental take in the form of 10 bats caused by collisions with towers and wind turbine blade-strike mortality for the life (presumed indefinite) of the proposed action. The 2007 biological opinion for the installation of one 600 kilowatt wind turbine and one 50KW mass megawatts wind machine on Fort Huachuca included incidental take in the form of 10 bats caused by blade-strikes for the life (presumed indefinite) of the proposed action. The 2005 biological opinion for implementation of the Coronado National Forest Land and Resource Management Plan (U.S. Forest Service)

included incidental take in the form of harm or harassment. The amount of take for individual bats was not quantified; instead take was to be considered exceeded if simultaneous August counts (at transitory roosts in Arizona, New Mexico, and Sonora) drop below 66,923 lesser long-nosed bats (the lowest number from 2001 – 2004 counts) for a period of two consecutive years as a result of the action. The 2004 biological opinion for the Bureau of Land Management Arizona Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management included incidental take in the form of harassment. The amount of incidental take was quantified in terms of loss of foraging resources, rather than loss of individual bats. The 2003 biological opinion for MCAS–Yuma Activities on the BMGR included incidental take in the form of direct mortality or injury (five bats every 10 years). Because take could not be monitored directly, it was to be considered exceeded if nocturnal low-level helicopter flights in certain areas on the BMGR increased significantly or if the numbers of bats in the Agua Dulce or Bluebird Mine roosts decreased significantly and MCAS-Yuma activities were an important cause of the decline. The 2002 biological opinion for Department of the Army Activities at and near Fort Huachuca (Fort), Arizona anticipated incidental take in the form of direct mortality or injury (six bats over the life of the project), harassment (20 bats per year), and harm (10 bats over the life of the project).

The lesser long-nosed bat recovery plan (U.S. Fish and Wildlife Service 1997), listing document (U.S. Fish and Wildlife Service 1988), and the 5-year review summary and evaluation for the lesser long-nosed bat (U.S. Fish and Wildlife Service 2007), all discuss the status of the species, and threats, and are incorporated by reference.

## ENVIRONMENTAL BASELINE

### A. Action Area

See our 2003 BO for a description of the action area.

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

A description of the region encompassing the action area has been previously provided (see "Environmental Baseline", part B. Terrain, Vegetation Communities, and Climate in the Action Area" for the Sonoran pronghorn).

The project is near the Sonoyta and Puerto Blanco mountains. Suitable day and night roosting potentially occur within the immediate project vicinity; however, these areas have not recently been surveyed for lesser long-nosed bat roosts.

### C. Status of the Lesser Long-Nosed Bat in the Action Area

Based on the known foraging distances for lesser long-nosed bats, it is likely that this species forages throughout portions of the OPCNM, CPNWR, TON, BMGR, and BLM lands, where flowers and fruit of saguaro, organ pipe, and agave are available.

Several large maternity roosts, including Bluebird Mine, Copper Mountain Mine, Pinacate Cave, and Slate Mountain, and one day-roost, Victoria Mine, occur in the action area. Bluebird Mine

along the eastern border of CPNWR in the Granite Mountains is within 40 miles of the three TACs, fixed wing flights occur over Bluebird Mine, and low-level fixed wing and helicopter flight corridors occur within 25 miles of the roost. This maternity roost generally supports an estimated 3,000 lesser long-nosed bats at the peak of annual occupancy (U.S. Fish and Wildlife Service 1997). The highest estimate of lesser long-nosed bats using Bluebird Mine from 2001-2009 bats was 4,500. They abandoned the mine however in 2002, 2003, and 2005 due to disturbance from illegal activities. In 2004, the bats returned to the mine after CPNWR staff placed a high steel fence around the mine to prevent disturbance. The bats returned to the mine in 2005, however abandoned the site once again after the fence was damaged, presumably by CBVs. The 2009 count was 2,427 in May.

Copper Mountain Mine, within OPCNM, is within 40 miles of the three TACs and low-level fixed wing and helicopter flight corridors. Higher level fixed wing flights occur directly over the mine. This maternity roost supports an average (calculated from 2000 to 2009) of about 28,654 bats at the peak of annual occupancy (the annual indicator of the base colony size is the average of two estimates, one in early June and one in late June) (electronic mail, Tim Tibbitts, OPCNM, July 9, 2009). The highest estimate of lesser long-nosed bats using Copper Mountain Mine from 2000-2009 bats was 38,932 in 2008, with a count of 33,531 in 2009. Though annual occupancy counts have continued, other monitoring and research at the Copper Mountain Mine has been reduced or eliminated because of researcher safety concerns related to border issues. The Victoria Mine day roost, also in OPCNM, is located about 2.6 miles from the nearest proposed tower site (TCA-AJO-204). Historical records of this roost indicate use by about 100 bats.

The largest maternity roost in the action area is Pinacate Cave in northern Sonora, Mexico. It occurs within 40 miles of the southern low-level fixed wing flight corridor across Cabeza Prieta NWR. This roost is estimated to support a peak of 130,000 bats each year (U.S. Fish and Wildlife Service 1994). In May 2006, approximately 200,000 lesser long-nosed bats were counted at the Pinacate Cave. However, in 2007, a significantly lower number of lesser long-nosed bats (83,000) were observed. Slate Mountain, another large roost (recently about 2,000-6,000 bats at peak numbers), occurs nearby on Tohono O'odham lands and is within 40 miles of East TAC.

Before they give birth, female bats probably occasionally move between the Bluebird and Copper Mountain roosts, and it has been recommended that these two roosts be censused simultaneously to avoid double-counting bats (U.S. Fish and Wildlife Service 1997). Observations at Copper Mountain and Pinacate Cave indicate that they are occupied from mid-April to early-to-mid-September (U.S. Fish and Wildlife Service 1997), although they reach their peak occupancy in late spring/early summer.

Though OPCNM and CPNWR monitor the Copper Mountain and Bluebird roosts annually to determine the presence, abundance, and disturbance of lesser long-nosed bats, including examining the roost year round for evidence of human entry, the rest of OPCNM and CPNWR has not been well surveyed to determine the number of additional day and night roosts that might exist in natural caves and/or mineshafts. This is due to safety issues and a lack of resources. A small maternity roost or roosts is known to occur in the Agua Dulce Mountains in the southeastern corner of the CPNWR. Surveys in 2008 documented that a small number of lesser

long-nosed bats continue to use these roosts (Corbett 2009). Smaller day roosts are known in other mine tunnels, and are also suspected in other mines and natural rock crevices and caves. Short-term night roosts are known in natural caves, under the eaves of buildings, and inside several abandoned buildings associated with past ranching activities. It is likely that there is within- and between-season interchange between these colonies, perhaps even within and between nights (U. S. Fish and Wildlife Service 1997).

Flowers and fruits of saguaro, organ pipe cactus, and cardon provide nearly all of the energy and nutrients obtained by pregnant and lactating females roosting in the Sonoran Desert in the spring and early summer (U.S. Fish and Wildlife Service 1997). Saguaro, which is common and abundant throughout much of the BMGR, CPNWR, and OPCNM; and organ pipe cactus, which is common at OPCNM and localized in the eastern portions of CPNWR and BMGR, and portions of the TON, flower in May and fruit mature in June and July (Benson and Darrow 1982). Lesser long-nosed bats feed on both the nectar and fruits of these cacti. When cacti fruit are scarce or unavailable in late July or early August, agave nectar may be the primary food resource for lesser long-nosed bats in OPCNM, CPNWR, and TON. Agaves typically bolt or flower and provide a nectar resource for foraging bats from about July into October. Desert agave occurs in mountainous areas within the action area. As mentioned above under "Status of the Species", the introduction of bufflegrass and other invasive species, fires, and drought and climate change may affect some lesser long-nosed bat foraging habitat within the action area, though the extent is unknown.

A number of activities occur in the action area that could affect bats. Because of the extent of Federal lands in the action area, with the exception of 1) CBV activities, 2) non-Federal activities that occur on the TON, and 3) all activities in Mexico, most activities that currently, or have recently, affected the lesser long-nosed bats or their habitat in the Action Area are Federal actions, many of which have undergone formal consultation. For example, our 1997 biological opinion on the OPCNM General Management Plan, found that the proposed action could result in incidental take of bats from recreation, specifically from unauthorized human disturbance to the Copper Mountain maternity roost. Our 2003 biological and conference opinion for the installation of the international boundary vehicle barrier on the OPCNM did not anticipate incidental take, but found that the project would result in the disturbance of 70 acres of potential lesser long-nosed bat foraging habitat, including the destruction of up to 750 to 1000 saguaro and 80 to 100 organ pipe cacti (about 400 to 600 of these were to be salvaged). Our 2006 biological opinion on the CBP - Office of the Border Patrol's installation of a permanent vehicle barrier (as well as access improvements, construction/improvement of border roads, and associated maintenance and patrol activities) along the border from the western end of the OPCNM barrier to Avenue C just east of San Luis, Arizona, did not anticipate incidental take. It did find, however, that the project would result in the direct disturbance of approximately 207 acres of potential lesser long-nosed bat foraging habitat, including the destruction of up to 50 saguaros and 3 organ pipe cacti. About 200 saguaros in the project corridor were to be avoided or salvaged. Our 2008 biological opinion on the CBP and USBP installation of 5.2 miles of primary (pedestrian) fence (as well as construction of access roads, and all associated maintenance and patrol activities) along the U.S.-Mexico border near Lukeville, did not anticipate incidental take. However, it did find that the project would result in the direct

disturbance of approximately 45 acres of potential lesser long-nosed bat foraging habitat, including the removal or salvage of up to 206 saguaros and 295 organ pipe cacti.

Some Federal actions that may affect the lesser long-nosed bat have not undergone consultation. For example, all the activities listed under "*Federal Actions For Which Consultation Has Not Been Completed*" of Section E. "Past and Ongoing Federal Actions in the Action Area" of the "Environmental Baseline" for Sonoran Pronghorn may also affect the lesser long-nosed bat and its habitat.

High levels of CBV activity (see the "*Human-caused Disturbance*" and "*Habitat Disturbance*" portions of the "Threats" section under "Status of the Species" for Sonoran pronghorn for further details about CBV activity) and the associated damage resulting to the landscape from their activities, as well the activities of law enforcement response, is a threat, not just to lesser long-nosed bats but to all wildlife of the region. As stated earlier, much CBV traffic occurs through the Growler Mountains, and Bluebird Mine on CPNWR in the Growlers was vandalized by suspected CBVs in June 2002, which resulted in at least four dead bats and abandonment of the roost. The bats returned to the mine in 2005; however, they abandoned the site once again after the fence was damaged by CBVs. Both OPCNM and CPNWR continue to evaluate the need for and type of additional protective measures that may be needed at Copper Mountain and Bluebird Mine, such as the possible construction of bat-friendly gates at roost entrances to prevent illegal human entry. However, lesser long-nosed bats are sensitive to bat gates and may not use mines or caves equipped with them. Therefore, use of bat gates to protect these roosts may not be a feasible alternative.

We believe the aggregate effects of general habitat degradation, spread of non-native invasive species, fires, roost disturbance, and drought and climate change, though significant, have not reached the point that lesser long-nosed bats are in imminent danger of extinction. Efforts are ongoing that contribute to the conservation and protection of populations and habitat within the action area.

## EFFECTS OF THE PROPOSED ACTION

### Military Overflights

The BOs on Ongoing Activities by the MCAS-Yuma in the Arizona portion of the YTRC on the BMGR, Yuma and Maricopa counties (02-21-95-F-0114, now 22410-1995-F-0114 and its reinitiations) evaluated the effects of routine helicopter operations on lesser long-nosed bats. Although the use of the MV-22 on MCAS-Yuma was not evaluated in the BOs, the MV-22 is intended to replace an existing helicopter (i.e., the CH-46) that was addressed by the BOs. All conservation measures and other requirements within the BOs that are applicable to helicopter operations will be applicable to operation of the MV-22.

As described in the previous BOs, low-level aircraft overflights have the potential to disturb lesser long-nosed bats. In particular, the noise and wind generated by low-level helicopter flights may cause auditory disturbance to bats and blow them into the ground or vegetation. Additionally, low-flying helicopters can also collide with lesser long-nosed bats.

There will be no construction on BMGR-West in association with the proposed action; therefore, no effects to lesser long-nosed habitat are anticipated from project construction. All landings, take-offs, and low-level hovering will occur in established GSAs and LZs to the west of longitude 113 degrees and 53 minutes (see Table and Figure III.5 of the BA), except under emergency conditions. The north-south line of longitude at 113 degrees and 53 minutes falls roughly along the eastern margins of the Baker Peaks and the Copper Mountains. Though one lesser long-nosed bat was recently documented in the Copper Mountains (note: the Copper Mountains are located on BMGR-West, whereas the Copper Mountain lesser long-nosed bat maternity roost is located on OPCNM, to the east of BMGR), the area to the west of the aforementioned longitude is outside of the 40-mile foraging radius of all known maternity roosts in or near the action area.

Because the MV-22 is louder and creates more rotorwash during landings, take-offs, and low-level hovering than the CH-46, disturbance to lesser long-nosed bats during these activities may be greater than previously analyzed for the CH-46. However, because MV-22 landings, take-offs, and low-level hovering will only occur to the west of longitude 113 degrees and 53 minutes, except under emergency conditions, we believe that there is a low probability that lesser long-nosed bats will be in the vicinity of these activities. Therefore, we anticipate that the likelihood of MV-22 activities in these GSAs disturbing lesser long-nosed bats is relatively low.

There will be an increase of an estimated 12,290 range operations per year due to the associated increase in MV-22 training operations (see Table 1) or a 14 percent increase in overall range operations at BMGR-West compared to existing conditions. However, the majority of this increase will occur outside of the 40-mile foraging radius of all known maternity roosts in or near the action area. Specifically, MV-22 operations associated with "Air-to-Ground" (will occur at Yodaville and Cactus West), "AUX 2", and all "Confined Area Landing and Tactics" will be located outside, to the west, of the 40-mile foraging radius of all known maternity roosts in or near the action area. MV-22 Air-to-Air, Air Combat Maneuvers, and WTI operations will occur in the TACTS range within the 40-mile foraging radius of known maternity roosts in the action area, and noise associated with these low-level flight operations could disturb lesser long-nosed bats, and the helicopters could collide with the bats. However, because, when compared to the CH-46, the MV-22 in forward operating mode will typically fly much higher, is quieter, and will create no rotorwash, we anticipate the potential for adverse effects (risks of both disturbance and collision) to lesser long-nosed bats resulting from these low-level flight operations will be reduced. Additionally, the same seasonal, altitudinal, and locational limitations in place for CH-46 helicopters will be in place for MV-22 training, and the MV-22 training will be consistent with the requirements of the August 6, 2003 BO.

Furthermore, because the 96 proposed MV-22 WTI operations will not land to the east of longitude 113 degrees and 53 minutes except under emergency conditions (currently, CH-46 helicopter operations associated with WTI may fly, land, and drop ordinance within the 40-mile foraging radius of known maternity roosts in the action area), we anticipate the elimination of 4,882 CH-46 WTI operations will significantly reduce the potential for adverse effects to lesser long-nosed bats resulting from these operations.

The USMC has evaluated the potential for MV-22 operations to ignite wildfires and has determined that, though all types of training activities have the potential to start fires, based on a recent Department of the Navy review, under normal operating conditions with engine exhaust deflectors operating, the MV-22 is unlikely to ignite wildfires. Based on this analysis and USMC's commitment to implement conservation measures (including the use of exhaust deflectors) to minimize the potential for fires associated with the MV-22, we anticipate that the risk of fires and fire-associated adverse effects to lesser long-nosed bats and their habitat occurring as a result of MV-22 use is low.

Based on the information provided and the analysis above, we have determined that the effects to lesser long-nosed bats and their habitat due to MV-22 training and elimination of CH-46 helicopter operations by the MCAS-Yuma will be less than those evaluated for helicopter training within the August 6, 2003 BOs.

## CUMULATIVE EFFECTS

Many lands within the action area are managed by Federal agencies; thus, most activities that could potentially affect bats are Federal activities that are subject to section 7 consultation. The effects of these Federal activities are not considered cumulative effects. However, a portion of the action area also occurs on the TON, on private lands in the U.S., and in Mexico. Residential and commercial development, farming, livestock grazing, planting of buffelgrass, surface mining and other activities occur on these lands and are expected to continue into the foreseeable future. These actions, the effects of which are considered cumulative, may result in loss or degradation of lesser long-nosed bat foraging habitat, and potential disturbance of roosts. CBV activities, described above under "Cumulative Effects" for pronghorn, can result in loss or degradation of potential lesser long-nosed bat foraging habitat (impacts to foraging habitat have not been quantified, however) and disturbance to and abandonment of roosts, as has been documented at the Bluebird Mine roost site. These CBV activities result in creation of trails and routes that can degrade lesser long-nosed bat habitats and disturb individual bats. Persons involved in these illegal activities often build cooking or warming fires, some of which escape and become wildfires. Though CBV activity has been high in recent years, it has declined recently, likely due to increased law enforcement presence, the construction of a border fence, and the status of the economy in the U.S. (see Cumulative Effects for the pronghorn). In spite of these activities, lesser long-nosed bat populations appear to be increasing or stable at many roost sites within and outside the action area.

## CONCLUSIONS

After reviewing the current status of the lesser long-nosed bat, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, we reaffirm our biological opinion that the proposed action is not likely to jeopardize the continued existence of the lesser long-nosed bat. No critical habitat has been designated for this species; therefore, none will be affected. Our conclusion is based on the rationale given in our previous biological opinions and reinitiations on the proposed actions, and the following:

1. Measures included in the 2003 BO will continue to be implemented and will help to reduce adverse effects to lesser long-nosed bats from the proposed project.

2. Increased low-level flights within the 40-mile foraging radius of known maternity roosts associated with the MV-22 could disturb or collide with lesser long-nosed bats. However, overall, adverse effects to lesser long-nosed bats from MV-22 low-level flights should be reduced because, when compared to the CH-46, MV-22s in forward operating mode will fly higher, are quieter, and create no rotorwash.

3. The elimination of 4,882 CH-46 WTI operations should reduce the potential for adverse effects to lesser long-nosed bats resulting from these operations.

4. MV-22 landings, take-offs, and low-level hovering are noisier and create more rotorwash when compared to the CH-46. However, because, except under emergency conditions, all landings, take-offs, and hovering will occur outside, and to the west, of the 40-mile foraging radius of known maternity roosts, the likelihood of these activities disturbing lesser long-nosed bats is low.

5. Conservation measures in the proposed action will help reduce the potential for fires as a result of MV-22 operations.

## INCIDENTAL TAKE STATEMENT

Our incidental take statement, including the **Amount or Extent of Take Anticipated, Effect of the Take, Reasonable and Prudent Measure**, and **Term and Condition**, remain the same as in our 2003 BO.

## CONSERVATION RECOMMENDATIONS

See the 2003 BO for our conservation recommendations.

## DISPOSITION OF DEAD, SICK, OR INJURED LISTED ANIMALS

See the 2003 BO.

## REINITIATION STATEMENT

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. Any questions or comments should be directed to Erin Fernandez (520) 670-6150 (x238) or Jim Rorabaugh (602) 242-0210 (x238).

Sincerely,

for Steven L. Spangle
Field Supervisor

cc: Assistant Field Supervisor, Fish and Wildlife Service, Tucson, AZ
Field Supervisor, Fish and Wildlife Service, Carlsbad, CA (Attn: Jonathan Snyder)
Refuge Manager, Cabeza Prieta National Wildlife Refuge, Ajo, AZ

Director, 56th Range Management Office, Luke Air Force Base, Gila Bend, AZ
Director, Range Management Department, Marine Corps Air Station, Yuma, AZ
Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ
Regional Supervisor, Arizona Game and Fish Department, Yuma, AZ

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## TABLES AND FIGURES

**Table 2.** A summary of population estimates from literature and field surveys for Sonoran pronghorn in the U.S.

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

[a] Confidence interval; there is only a 5 percent chance that the population total falls outside of this range.
[b] Population estimate for southwestern Arizona, excluding Organ Pipe Cactus National Monument.

**Table 3.** Comparison of U.S. Sonoran pronghorn population surveys, 1992-2008.

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

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

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

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

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

**Table 4.** Comparison of Mexico Sonoran pronghorn population surveys, 2000-2007.

| Date | Pronghorn observed | | | Population estimate | | |
|---|---|---|---|---|---|---|
| | West of Highway 8 | Southeast of Highway 8 | Total | West of Highway 8 | Southeast of Highway 8 | Total |
| Dec 2000 | | | | | | 346 |
| Dec 2002 | | | 214 | | | 280 |
| Dec 2004 Feb 2005 | 30 | 439 | 469 | 59 | 625 | 684 |
| Jan 2006 | | | 486 | | | 634 |
| Dec 2007 | 35 | 325 | 360 | 50 | 354 | 404 |

**Figure 1.** Historical range of Sonoran pronghorn in the Unites States and Mexico.

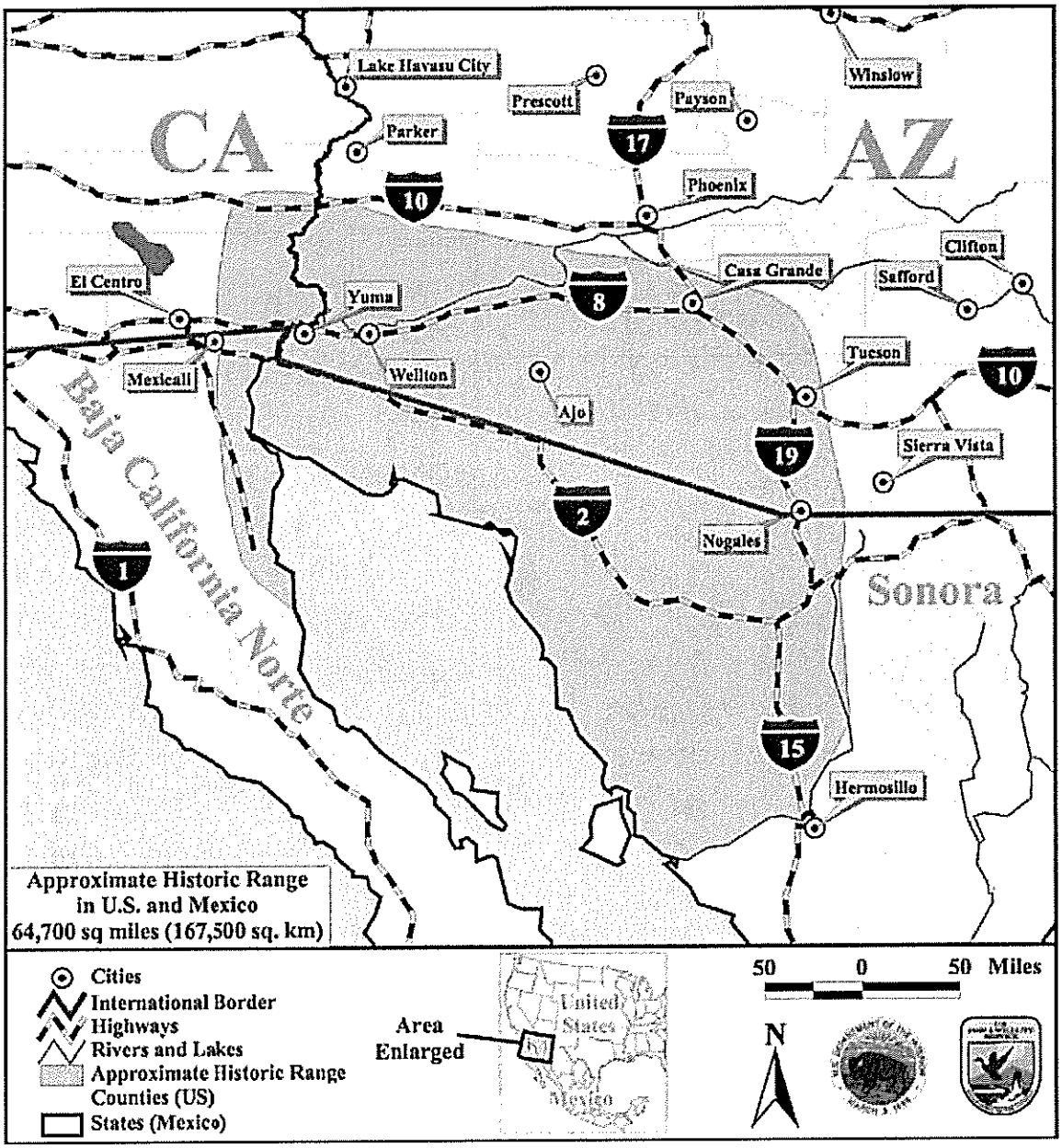

**Figure 2.** Current Sonoran pronghorn distribution in the United State: Records from 1994-2001.