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In Reply Refer to:
AESO/SE
22410-1996-F-0094-R003

May 4, 2010

Mr. James R. Uken
Director
56th Range Management Office
7224 N. 139th Dr.
Luke Air Force Base AZ 95309-1420

RE: Reinitiation of Formal Section7 Consultation on Military Training on the Barry M. Goldwater Range East, Maricopa, Pima, and Yuma Counties, Arizona

Dear Mr. Uken:

This letter is in response to your December 4, 2009, request for reinitiation of formal consultation for your Ongoing Operations and Proposed Enhancements of the Barry M. Goldwater Range East Project, Pima, Yuma, and Maricopa counties, AZ. Your request was received by us on December 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*.). At issue are the impacts to the endangered Sonoran pronghorn (*Antilocapra americana sonoriensis*) and the lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*).

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

CONSULTATION HISTORY

- See Biological Opinion #02-21-96-F-094-R2 (22410-1996-F-0094-R002, dated August 6, 2003) for consultation history prior to your December 4, 2009 request.

- August 26, 2005: We (U.S. Fish and Wildlife Service [USFWS]-Arizona Ecological Services Office [AESO]) issued the biological opinion for the Barry M. Goldwater Range (BMGR) Integrated Natural Resources Management Plan.

- March 4, 2009: We met with you, your environmental consultant Logan Simpson Design, Inc., and Cabeza Prieta National Wildlife Refuge (CPNWR) to discuss the proposed project including its possible effects on Sonoran pronghorn and lesser long-nosed bats and conservation measures for these species.

- July 15, 2009: We met with you and CPNWR to continue to discuss the proposed project.

- September 29, 2009: We met with you, Logan Simpson Design, Inc., and CPNWR to continue to discuss the proposed project.

- December 10, 2009: We received your request for reinitiation of formal consultation.

- March 29, 2010: Via conference call, we discussed the proposed project with you.

- March 30, 2010: We met with you to discuss the proposed project.

- March 31 – April 15: We corresponded via electronic mail and conference call to discuss the proposed project.

- April 16, 2010: We sent you the draft biological opinion.

- April 30, 2010: 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 December 2009, Biological Assessment for Ongoing Operations and Proposed Enhancements of the BMGR-East. The proposed action includes updates to ongoing military training operations and the following ten enhancement activities at the BMGR-East: 1) Sensor Training Area underlying the Air-to-Air Range Site; 2) Programmatic Target Reconfiguration; 3) Moving Vehicle Target System; 4) New Target for Air-to-Ground Missiles; 5) Lowering Flight Training Altitude over a Portion of the CPNWR; 6) Reconfigure Manned Range 3 for Helicopter Training; 7) On-the-Ground Training Exercises; 8) New Taxiway and Air Traffic Control Tower at the Gila Bend Air Force Auxiliary Airfield; 9) Manned Range 1 to Range Munitions Consolidation Point (RMCP) 1 Road Pavement; and 10) Sand and Gravel Excavation, Stockpiling, and Use on BMGR-East.

Background

The BMGR is the nation's third largest aerial gunnery training range with a restricted airspace overlying 2,766,670 acres, of which 1,733,921 acres (2,709 square miles) of land area are within BMGR. The BMGR is used for developing and maintaining the combat readiness of the tactical air forces of the U.S. Air Force (USAF), U.S. Marine Corps (USMC), U.S. Navy (USN), and U.S. Army National Guard (ARNG).

Restricted airspace for military flight operations overlies approximately 822,000 acres of the CPNWR, although the refuge land was not renewed as part of the BMGR per the Military Lands Withdrawal Act (MLWA) of 1999. Military use of the CPNWR is restricted to airspace and operation of four Air Combat Maneuvering Instrumentation (ACMI) sites. No air-to-ground training operations occur within CPNWR. The BMGR is divided into eastern and western segments in the MLWA of 1999. The eastern portion of the BMGR, known as BMGR-East, is assigned to the Secretary of the Air Force and is locally operated by Luke Air Force Base (AFB). Three blocks of Federal Aviation Administration designated restricted airspace, R-2301E, R-2304, and R-2305, overlie the majority of the BMGR-East. The western portion of the range, known as BMGR West, is assigned to the Secretary of the Navy and is locally operated by Marine Corps Air Station (MCAS) Yuma. The division between BMGR-East and BMGR-West is defined by the northwest-southeast boundary separating restricted airspaces R-2301E and R-2301W. The 56th Range Management Office (RMO), Luke AFB, Arizona is the designated Range Operating Authority for the BMGR-East Complex and associated airspace; BMGR West land and its associated airspace is managed primarily by MCAS Yuma. Due to their ownership of adjacent lands, the USFWS, National Park Service (NPS), Bureau of Land Management (BLM), and the Tohono O'odham Nation are consulting partners in managing lands within the BMGR. Although the USAF and USMC are the primary users of their respective portions of the BMGR, all aviation branches of the Armed Services use both portions of the range. The USMC formally consulted with the USFWS on their activities funded, authorized, or carried out by MCAS-Yuma in support of the Yuma Training Range Complex in Arizona, including those on BMGR-West and East and CPNWR (the biological opinion was issued in August 2003). This biological opinion focuses on the activities funded, authorized, or carried out by the USAF within BMGR, with the exception of those activities for which section 7 has been completed (i.e., USMC activities on BMGR-East).

The USAF is the primary user of and managing agency for BMGR-East. The 56th Fighter Wing, the host command for Luke AFB, provides local USAF command authority for BMGR-East.
Student aircrew training is the preeminent activity at BMGR-East, although training of combat ready-operational aircrews also occurs. As secondary missions, BMGR-East also supports certain, limited ground troop training functions and is used on an infrequent, special event basis for testing and some other defense-related purposes. The primacy of the aircrew-training mission at the BMGR-East is expected to continue into the foreseeable future. Users of BMGR-East are classified as being either regular or casual users. Regular users, which use BMGR-East on a frequent and regularly scheduled basis, are locally based or hosted and account for about 90 percent of the total use of the range. Regular users include:

• 56th Fighter Wing, Luke AFB, Glendale, Arizona (AZ),
• 355th Fighter Wing, Davis-Monthan AFB, Tucson, AZ,
• 563rd Rescue Group/79th Rescue Squadron, Davis-Monthan AFB, Tucson, AZ,
• Air National Guard SNOWBIRD (deployed) training program hosted at Davis-Monthan AFB, Tucson, AZ,
• 162nd Fighter Wing, Arizona Air National Guard, Air National Guard Base at Tucson International Airport, Tucson, AZ,
• Western Army National Guard Aviation Training Site, Silverbell Army Heliport, Marana, AZ, and
• 1/285th Attack Helicopter Battalion (Army National Guard), Silverbell Army Heliport, Marana, AZ.

Casual users, which use BMGR-East on an infrequent and irregularly scheduled basis, primarily include training deployments that originate from active duty and reserve USAF, USMC, and USN flying units from other areas of the country and from U.S. and allied units from overseas. Ranges on the BMGR-East are typically available from 0700-2330 hours, Monday through Friday, and 0800-1700 hours on two weekend days per month, except on Federal holidays.

To support training activities and operations, the land areas and restricted airspace of BMGR-East are partitioned into a number of smaller sub-ranges or operational areas to provide locations where multiple, simultaneous training activities or other operations may effectively and safely occur. There are eight aircrew training sub-ranges, these include: 1) Manned Ranges 1, 2, 3, and 4 (used to train pilots in precision air-to-ground delivery of practice, conventional ordnance, and special weapons); 2) North, South, and East TAC ranges (designed to simulate targets of opportunity for air-to-ground firing); and 3) the Air-to-Air Range within R-2301E (used for air combat training). In addition, there are two outlying auxiliary airfields that are periodically used for certain forward deployed training missions (Auxiliary Airfield 6 [AUX-6] and Stoval Auxiliary Airfield); one Explosive Ordnance Disposal (EOD) training range; one small arms range; and four support areas for maintaining sub-ranges and storing and processing spent ordnance and target debris (Range Munitions Consolidation Points, or RMCPs).

Proposed Ongoing Training and Associated Usages

Restricted Airspace Usage Rates

Current restricted airspace use is not expected to change; hence an examination of recent usage describes what is proposed for the foreseeable future. The number of sorties (one sortie equals a take-off and a landing by one aircraft) flown fluctuates from year to year, but use patterns continue to be similar. In fiscal year (FY) 1996, 61,895 sorties were flown in the BMGR-East restricted airspace. The vast majority of these (52,480 or 85 percent of the total sorties) were flown in R-2301E (Air-to-Air Range, North Tactical Range (NTAC), South Tactical Range (STAC), and manned ranges 1, 2, and 4). In FY 2002, 51,425 sorties were flown within BMGR-East restricted airspace as follows:

• F-16s: 67 percent
• A-10s: 23 percent
• Helicopters: <1 percent (most occurred over R-2305 [Manned Range 3] and R-2304 [East Tactical Range (ETAC)]
• Small fixed-wing aircraft: < than 0.4 percent
• The remaining nine percent includes various types of aircraft (mainly fixed wing) flown by a variety of users (e.g., USMC, Arizona Game and Fish Department [AGFD], U.S. Border Patrol [USBP], U.S. Customs Service, U.S. Drug Enforcement Agency, etc.)

The FY 2002 BMGR Range Utilization Report shows that there were approximately 23,325 sorties on the three TAC ranges. Of these sorties, the USAF conducted approximately 90 percent, the USMC approximately 6 percent, the ARNG less than 1 percent, and the remaining 3-4 percent includes a variety of users which include AGFD, USBP, and U.S. Customs, Drug Enforcement Agency. The data for 2008 were comparable with a report of 24,769 sorties on the three TAC ranges (and 10,071 sorties on the four manned ranges), all by the same proportion of users. Comparable to that analyzed in the 2003 biological opinion, about 12.5 percent of these sorties occurred at night in 2008. About two percent of sorties use high explosive (HE) ordnance; the vast majority of training missions use non-exploding training ordnance. Most (92 percent) of the HE missions occurred

during daylight hours. These rates are comparable to those analyzed in the 2003 biological opinion and are representative of what is proposed to occur in the future.

In regards to helicopter use, in fiscal year 1995, helicopter flights over all of R-2301E, much of which overlies pronghorn range, were limited to 232 sorties in 72 flights. In 2008, helicopter flights over all of R-2301E totaled about 150 sorties in 45 flights. For both years these estimate do not include helicopter use by the DHS or the USMC during WTI.

No major seasonal patterns of range use occur or are anticipated in the future. However, each tactical range is normally closed to live-fire activity for approximately six weeks annually for maintenance and clearance by EOD personnel. Increased use by casual users during winter months more or less compensates for days lost to maintenance and holidays. Thus, a slightly greater amount of daily activity occurs in winter but on a smaller percentage of days. The mix of aircraft use at BMGR-East gradually changes over time and an increased use of unmanned aerial vehicles (UAV) is likely in the future. Any changes in aircraft use at BMGR-East that may adversely affect listed species will be addressed through subsequent section 7 consultation.

Military Training Routes

In addition to the restricted airspace, military training routes (MTRs) have been established that provide military aircraft with high-speed, low-level flight corridors. Some MTRs provide ingress to and egress from the BMGR and two USAF MTRs (VR244 and VR260) cross the northeastern portion of CPNWR. MTRs are typically used on a daily basis. In the Yuma Training Range Complex supplemental Environmental Impact Statement (EIS; U.S. Marine Corps 1997), VR244 and VR260 were evaluated. VR244 is 18 miles long and 4 miles wide. VR260 is 16 miles long and 4 miles wide. Authorized altitudes within these routes are 500 feet above ground level (AGL). In FY 1995, a total of 376 sorties were made in VR244. All flights were low-level navigation or Low Altitude Navigation and Targeting Infrared for Night missions flown by USAF, USN, or USMC fighter or attack aircraft except for two sorties for low altitude navigation by C-130s and two sorties by Cessnas for route reconnaissance. At an average speed of 420 knots, an aircraft flight covers the 18 miles of VR244 over CPNWR in about 2.6 minutes. At this speed, the 376 sorties spent a combined total of approximately 16.3 hours (977 minutes) at low altitude over CPNWR in FY 1995. Utilization of VR244 in FY 2008 was comparable with approximately 432 sorties made, and no substantial changes in usage rates are predicted into the foreseeable future.

Additionally, a mix of east-west corridors with floors of 200 feet AGL for fixed-wing aircraft and 50 feet AGL for helicopters were established overlying the CPNWR to accommodate USMC training needs. The use of these corridors, however, was analyzed in the 2003 MCAS-Yuma biological opinion.

In 1995, a total of approximately 609 sorties were made in VR260. About 85 percent of the sorties made through VR260 were by F-16s and other high performance attack aircraft and about 15 percent were by A-10s. At an average speed of 480 knots, a flight of high performance attack aircraft covers the 16 miles of VR260 over CPNWR in about 2.0 minutes. At an average speed of 340 knots, a flight of A-10s covers the 16 miles of VR260 over CPNWR in about 2.8 minutes. Thus, the total amount of time spent over CPNWR in VR260 in FY 1995 was approximately 16.5 hours (992 minutes). Utilization of VR260 in FY 2008 was comparable with approximately 542 sorties made and no substantial changes in usage rates are predicted into the foreseeable future.

Air-to-Air Range

The Air-to-Air Range lies entirely within R-2301E and consists of two flight training ranges, Air to-Air High and Air-to-Air Low, each with assigned vertical and lateral airspace and surface boundaries. Air-to-Air High range has a designated floor altitude of 11,000 feet above mean sea level (MSL) and a ceiling altitude of 80,000 feet MSL. Air-to-Air Low range has an assigned altitude of surface to 10,000 feet MSL, except the flight floor is higher for portions overlying CPNWR. By agreement with the U.S. Department of the Interior, a minimum altitude of 1,500 feet AGL has been observed even though the airspace is authorized for use to the surface (the USAF is currently proposing lowering the minimum altitude over a portion of CPNWR – see proposed enhancement 5 below). However, as discussed above, within the MTRs the minimum the altitude is 500 feet AGL. A variety of altitude blocks occur during ACMI training depending on the nature of the activity and standard Air-to-Air High and Air-to-Air Low altitude restrictions.

A total of 187,944 acres of the Air-to-Air Live Fire Areas occur within pronghorn habitat. However, the use of live fire gunnery for Air-to-Air target practice against towed targets has been and will continue to be an extremely rare event, although the Air-to-Air Range remains authorized for such use. The only Air-to-Air gunnery in recent years has been by UH-60 helicopters of the U.S. Customs Service firing on a towed-banner target system. An alternate live aerial gunnery range is located south of the primary range over the CPNWR but can be scheduled for use only under special operational considerations. Expenditure of live cannon rounds within the alternate live aerial gunnery range has not occurred in several years. The virtual cessation of this practice (the use of live fire gunnery on the primary or alternate range) is attributed to an electronic scoring capability that does not require firing live ammunition.

A progression of non-firing training missions has and will continue to occur on all Air-to-Air Ranges. Each level of training contains a series of air combat maneuvers that sequentially increase in degree of difficulty and required skill level of pilots. These programs, listed in order of most fundamental to the most complex include: basic flight maneuvers including turning, climbing, and descending; intercepts, where two aircraft on a common flight vector maneuver for identification of friendly/enemy aircraft; air combat maneuvers; air combat tactics which combine air combat maneuvers with simulated combat; and dissimilar types of aircraft in simulated combat.

ACMI is used for simulated Air-to-Air combat training between friendly and simulated enemy fighter aircraft to improve aircrew combat maneuvering, tactics, and techniques. ACMI is a computerized telemetry/instrumentation system that monitors the relative positions and flight data of all aircraft engaged in a training mission. ACMI tracking sites, which are located on selected mountains around the BMGR, provide telemetry on aircraft in simulated combat and transmit flight data to the ACMI range master tracking instrumentation substation located on Childs Mountain north of Ajo. Combat activity is displayed via video simulation for in-flight advisory comment and recorded for post-mission performance evaluation.

Aircraft Crashes, Rescues, and Clean Up

Inadvertent or emergency jettisons of any external stores outside of target areas are rare and crashes of aircraft have averaged less than one per year on the BMGR-East. However, crashes are followed up with emergency rescue operations and then crash clean up. Rescue and clean up typically require ground and/or air operations, often in remote areas. The USAF maintains up-to-date crash response plans and response teams. These plans have been coordinated with the BLM, USFWS, and other agencies for

responses to both on- and off-range mishaps. The basic plan components include: (1) notifying the Luke AFB command post of the crash and location, if known; (2) activating the response plan and dispatch of airborne search and rescue; (3) locating site/aircrew and completing rescue; (4) establishing site security to protect public safety and preserving site/aircraft remains for post-accident investigation; (5) notifying land managers/owners; (6) securing munitions, residual fuel, or other hazardous materials to the extent necessary and practicable; (7) consulting with land managers/owners/regulatory agencies regarding surface access, removal of aircraft remains, and cleanup requirements and procedures; and (8) remediating and restoring site per regulatory requirements and agreements with land managers/owners and regulators. Crash response plan procedures are updated as needed after each event.

Manned Ranges 1-4

Manned Ranges 1, 2, 3, and 4 are used for delivery of simulated conventional and special weapons. Ranges 1, 2, and 4 lie within Restricted Airspace block R-2301E; Manned Range 3 lies within R-2305. Manned ranges are under direct operational control of a Range Control Officer (RCO). Personnel are stationed in the main tower and ground shack near the target for the purpose of providing range safety and scoring the accuracy of a weapons delivery using practice munitions that are not armed with high explosives warheads but may contain a small spotting charge that produces flash and smoke to reveal where the round has struck. Some are scored on a hit or miss basis; others are scored electronically showing degrees of accuracy. A combination of five target types, tactical strafe, strafe, bomb/rocket circle, special weapons delivery, and applied tactics orientation, comprise the manned target complex. Each target is approached at different airspeeds, angles, and altitudes by the attack aircraft. RCOs are also responsible for safely controlling aircraft and ground activities on the range.

All manned ranges have a night operations capability for conventional ground attack maneuvers. The use of airborne flares, smudge pots, and lighted run-in lines facilitate night operations. Target hits are scored either by triangular reference to the flash emanating from the ignition of practice ordnance on contact or by the Acoustiscore System (noise-activated system) for scoring accuracy of strafing).

Manned ranges are periodically closed for maintenance and munitions clearance activities by EOD personnel. Each manned range is closed annually for a period of approximately three weeks (usually in the summer months) for range maintenance and EOD clearance as well as for periods of about three days after every 150 days of use for scheduled EOD clearance. Clearance distances are the same as the tactical ranges, except the 150 day clearance is limited to the inside of the cleared target circles.

Tactical Ranges

Three tactical ranges, NTAC, STAC, and ETAC are present on BMGR-East. These ranges are unmanned, diverse target complexes for air-to-ground weapons training that simulate combat staging areas. NTAC and STAC lie under the Air-to-Air High Range and are in close proximity to Manned Ranges 1, 2, and 4. Training missions on adjacent ranges and targets require flights within NTAC and STAC to be confined to specific airspace (surface to 24,000 feet MSL) and to be responsive to other range training schedules. ETAC is located in the northeastern corner of the BMGR-East and underlies R-2304 airspace with range airspace extending from the surface to 24,000 feet MSL.

NTAC and STAC present a composite of simulated combat target features that include: airfields with aircraft in revetments, on taxiways and runways, as well as control towers, hangars, and administrative buildings; field artillery batteries and missile launchers; truck convoys; railroad yards with trains;

friendly/enemy tank groups and regiments; Maverick missile training targets (plywood and real tanks); simulated SCUD Launchers and ZSU 23-4 anti-aircraft artillery; HE hills (one target on each tactical range authorized for live (exploding) bombs and rockets); and SAM missile sites with protective soil revetments and associated radar equipment. Many targets are constructed of plywood and other common construction materials. Exceptions are simulated trains, convoys, buildings, and combat vehicles that are made up of salvaged tanks, trucks, buses, jeeps, Sea land cargo containers, and combat vehicles. The configuration and type of targets used can change when new combat scenarios require different target configurations. New targets are also continually added to replace old ones. Salvaged vehicles positioned on the tactical ranges are pre-conditioned by removal of heavy components (engines and transmissions), draining of all lubricants and coolants, and removal of glass windows and rubber tires before being used as targets.

Simulated combat and target features located on ETAC include: an airfield complex with runway, hangars, revetments, and storage buildings; SAM missile sites with protective soil revetments and associated radar equipment; an intercontinental ballistic missile site consisting of a covered silo and associated buildings; a railroad yard with warehouse and simulated train; a single span bridge crossing a dry wash; enemy radar missile sites with revetments; tanks and trucks randomly spaced along dirt roads; randomly spaced artillery pieces serving as heavy artillery for a forward battle staging area; forward battle area with friendly and enemy tanks deployed, mobile SAM unit artillery, and ZSU23/4 anti-aircraft artillery; Maverick missile training targets; one HE ordnance hill target; and enemy command centers containing antennae and automatic weapons. Other non-target, support combat features on ETAC include NATO Hill, an observation hill with helicopter landing pad, and water wells.

About 1,200 individual targets are located on the three tactical ranges. Authorized ordnance for delivery at selected NTAC, STAC, and ETAC targets include gun/cannon ammunition, white phosphorus spotting rockets, and training practice bombs. Training practice munitions are not armed with high explosives or incendiary warheads but may contain a small spotting charge that produces flash and smoke to reveal where the round has struck. HE bombs and rockets and live Maverick and Hellfire missiles are only authorized for use on the three HE hill targets and the two live Maverick targets (one on NTAC and one on ETAC). A small amount of live ordnance is used at night on BMGR-East tactical ranges. In 2002, fewer than five percent of missions involved night use of live ordnance and approximately 90 percent of such night missions were flown into ETAC due to Sonoran pronghorn clearance requirements. At times when ETAC was not available, NTAC was the preferred range, and STAC was least preferred. In FY 2002, tactical ranges were available for a total of 10,217 hours combined day and night use. The FY 2002 tactical range use rates are shown in Table 1 below. The 2008 use were similar to the 2002 rates and what is proposed in the foreseeable future. In 2008, about two percent (737) of all missions involved live ordnance, and of these, about seven percent (45) occurred at night. Currently, the scheduling of night missions is subject to the availability of tactical range times with no preference for ETAC.

Table 1. Tactical range utilization rates for FY 2002.

	NTAC	STAC	ETAC	Overall
Day	69.3%	67.8%	59.8%	61.5%
Night	47.5%	45.8%	42.6%	47.9%
Total	63.3%	61.4%	54.7%	58.1%

A total of 404 sorties involving live bombs were flown on NTAC and STAC in 2008 (a total 764 sorties involving live bombs were flown on NTAC and STAC in 2002 by USAF planes). Each aircraft drops an average of four bombs on a single pass. In 1996, 74 Maverick missile firings occurred on NTAC and

ETAC (the 2003 BO includes STAC; however, this was an error). In 2008, 59 live Maverick missile sorties were flown on NTAC and ETAC.

At least two sites for Ground Forward Air Controllers are located on all ranges and are used in controlling aircraft for missions such as Close Air Support. The ranges are also used with Electronic Warfare equipment and Smokey SAM rockets to simulate enemy air defense for conducting training. A variety of anti-aircraft armament, SAM, and missile jamming systems can be deployed for units to employ electronic countermeasures, chaff (small fibers that reflect radar signals and temporarily hide aircraft from radar detection), and radar warning receiver equipment tactics.

Both the Air-to-Air and Air-to-Ground ranges allow the use of chaff and self-protection infrared decoy flares, expended in accordance with USAF regulations. Typically, aircraft on Air-to-Air missions deploy 15 chaff and 10 flares per sortie, which is a greater quantity of chaff and flares than used on Air-to-Ground missions. Night-time illumination flares are also used during night Air-to-Ground operations on all tactical ranges and occasionally on the manned ranges. Three to eight illumination flares are normally deployed per mission. Missions using illumination flares account for approximately 20-30 percent of all night missions and are generally used by A-10 aircraft, though other aircraft use them.

Airborne and ground-based target identification lasers are commonly used on the tactical ranges and manned ranges. These lasers are used to identify a target for aircrews or to provide an aim point for a laser guided bomb.

Sonoran Pronghorn Monitoring

To reduce potential impacts to Sonoran pronghorn due to military exercises, the USAF funds a team of biologists to conduct Sonoran pronghorn monitoring in association with and prior to activities at the USAF tactical ranges and manned ranges inhabited by Sonoran pronghorn (NTAC, STAC, and Manned Range 1). Protocols for standardized biological monitoring are described in Luke Air Force Base Operating Instruction 1-1, Sonoran Pronghorn Monitoring and are in compliance with the 2001 and 2003 biological opinions. This protocol was updated in December 2008 and is superseded by OI 13-01, Sonoran Pronghorn Monitoring. Monitoring of NTAC and STAC ranges is triggered by following five events:

1. Live Monitoring: performed on days when live ordnance deliveries are scheduled on that tactical range.
2. Maverick Monitoring: performed on days when live Maverick missile deliveries are scheduled on NTAC range.
3. Required Monitoring: performed on each tactical range on the first fly day of the week (typically Mondays), plus the second fly day of the week if Sonoran pronghorn were detected within the last seven days on that tactical range.
4. Follow-up Monitoring: performed the next fly day after Sonoran pronghorn are detected on a tactical range.
5. EOD Monitoring: performed on days that EOD crews intend to detonate ordnance on a tactical range as part of annual range maintenance activities.

Monitoring is conducted from vantage points and includes visual observations with the aid of binoculars and spotting scopes, as well as telemetry surveillance to locate collared Sonoran pronghorn. The use of vantage points and telemetry provides landscape-scale coverage of most of the target areas. Monitoring is typically performed at dawn when sighting conditions are optimum and prior to the first mission of the

day. When Sonoran pronghorn are detected, their positions are estimated using biangulation or proximity to known landmarks. Other biological data collected includes: 1) Sonoran pronghorn activity when sighted, 2) number and composition of herd, 3) last known direction of travel, and 4) the quality of sighting conditions. The coordinates are called in by radio to the Range Operations Coordination Center where the data are entered into a geographical information system (GIS) application. This application generates a target closure list based on the coordinates and the type of ordnance. Target closures remain in effect for the remainder of the day. The Sonoran pronghorn monitors work together and with other range personnel to ensure all personnel are aware of Sonoran pronghorn locations in an effort to minimize disturbance.

Currently, if a Sonoran pronghorn is located within a 5 km radius of HE ordnance targets on NTAC and STAC, or the live Maverick missile target within NTAC, no HE ordnance deliveries are authorized on the affected tactical range and the mission is diverted or cancelled. In addition, no ordnance deliveries of any kind (e.g., inert ordnance) are authorized within a 3 km radius of any pronghorn location on the TAC ranges for the remainder of the day. On Manned Range 1, if a Sonoran pronghorn is located within a 3 km radius of a target, strafe activities at that target will be closed for the day and if a Sonoran pronghorn is located within 1 km of a target, no ordnance of any type will be released.

Gila Bend Air Force Auxiliary Field (AFAF)

Gila Bend AFAF is located in the northeastern corner of BMGR-East. Gila Bend AFAF includes a fixed-wing aircraft runway and a heliport. The runway is used for emergency precautionary recoveries of military aircraft that malfunction or are damaged during operations on the BMGR. The runway is also used daily by aircraft performing overhead approaches and patterns. The six-pad heliport is used routinely to support ARNG training operations. No aircraft are permanently based at Gila Bend AFAF.

Abandoned Auxiliary Airfields

Six abandoned World War II era auxiliary airfields, AUX-6, 7, 8, 9, 10, and 11, are present on BMGR-East. Each of these airfields consists of a triangular configuration of runways on a 500 to 700-acre tract. AUX-8 and AUX-10 are no longer used for any military activities. AUX-7 is part of the Manned Range 1 complex. AUX-9 is part of the Manned Range 2 complex and is used as a munitions consolidation point. AUX-11 was used in the past by the USMC during Weapons Tactics Instructors (WTI). Currently, it is the Manned Range 4 munitions consolidation point and is intermittently used for small UAV operations. AUX-6 is frequently used by many groups, though primarily as a forward operating base for helicopters. These activities include a refueling and staging area for rotary-winged aircraft units, limited C-130 aircraft operations, a parachute drop zone for personnel and equipment, and other uses that may occur as the military mission evolves.

Stoval Airfield

Stoval Airfield is an abandoned World War II auxiliary airfield located in the extreme northwestern corner of the BMGR-East. This airfield is not currently used by the USAF, but the USAF authorizes use by the USMC for helicopter refueling and rearming and limited C-130 aircraft operations during spring and fall WTI training exercises which were analyzed in the 2003 MCAS Yuma biological opinion. This use frequently includes the presence of approximately 100 ground personnel and equipment encamped within about a one-half mile radius from the airfield. Previously, the ground personnel were more concentrated within the airfield; however, now and into the future, the personnel are and will be more dispersed.

Explosive Ordnance Disposal

Each tactical range is closed for a period of approximately six weeks each year for range maintenance and EOD clearance. Currently scheduled maintenance periods are October to mid December for STAC, January to mid February for NTAC, and mid April to mid June for ETAC. The distances to which EOD personnel clear expended weapons have decreased significantly over the past eight years. Additionally, both the frequency and duration of clearance activities has been decreased. A standard clearance criterion for all USAF primary training ranges is described in Air Force Instruction 13-212, Range Operations and Maintenance. During annual maintenance prior to August 2001, an area 1,000 feet in radius from the edge of each target and 100 feet on each side of access ways was cleared. Every five years, clearance extended to one nautical mile (6,076 feet) from the outer edge of each target or until fewer than five complete ordnance items per acre were found, whichever was less. Since August 2001, new criteria reduced the target radius clearance areas, corresponding to increased accuracy of ordnance delivery. Most significantly, the five-year radius was reduced from one nautical mile to the lesser of one half nautical mile (3,280 feet) or a density of five items per acre. Table 2 shows the reductions in EOD clearance areas of the past 10 years. These new criteria substantially reduce the land area covered by EOD operations.

Table 2. EOD clearance distance reductions since 2001.

	Annual target clearance	**Annual access way clearance**	**Biennial target clearance**	**5 year target clearance**	**10 year target clearance**
Prior to 2001	1,000 ft	100 ft	Not applicable	6,076 ft	Not applicable
2001 to 2007	1,000 ft	100 ft	Not applicable	3,280 ft	Not applicable
2007 to present and as proposed	No longer applicable	50 ft	500 ft for live targets 300 ft for inert targets	No longer applicable	1,000 ft

Currently, in accordance with Air Force Instruction 13-212, annual EOD clearance will include the clearing of access ways to the target and 50 feet on either side of primary target access roads. Biennial EOD clearance for targets not used for live munitions will extend to either 1) a radius of 300 feet from each target or 2) the shorter radius where the debris density factor is less than five items per acre, and for live munitions targets either 1) a radius of 500 feet from each target or 2) the shorter radius where the debris density factor is less than five items per acre. Every 10 years, the EOD clearance area will extend to either 1) a radius of 1,000 feet from each target or 2) the shorter radius where the density of debris items is less than five per acre in each direction. For example, if less than five debris items are being found per acre at a radius of 700 feet from the target, the clearance radius for the decennial clearance would be shortened to 700 feet.

As a result of the reduction in range clearance distances, the biennial EOD clearance areas of the tactical and manned ranges in aggregate (including those within and outside of the current Sonoran pronghorn range) encompass about 10,900 acres, compared to the about 25,500 acres that were previously cleared annually. Today's decennial clearance area equates to approximately 23,000 acres combined for the three tactical ranges. This is about a 75 percent reduction compared to the about 92,000 acres that were cleared every 5 years prior to 2001 and about a 45 percent reduction compared to the about 42,000 acres that were cleared every 5 years after 2001 until July 2007.

In addition, as a result of the significant reduction in range clearance distances, the duration of effort has also been reduced by over half. The previous EOD clearances areas took approximately eight weeks to clear and today the areas are cleared in approximately three weeks, with the remaining four weeks used for other maintenance activities.

The EOD clearance process at BMGR-East is typically conducted using trucks spaced at approximately 100-foot intervals in a line-abreast formation. The trucks are driven in parallel transects across the areas surrounding each target so that ordnance delivered to that target may be located. EOD personnel destroy dangerous unexploded ordnance on the ranges being cleared. The remaining scrap metal, along with recyclable scrap metal from target vehicles, is taken to one of four existing RMCP where it is processed for recycling. These consolidation points are 3-5 acre cleared sites surrounded by a ten-foot-high chain link fence. One site serves Manned Range 1 and NTAC and STAC. Another located on AUX-9 serves Manned Range 2. A third located on AUX-11, serves Manned Range 4. A fourth serves Manned Range 3 and ETAC. Luke AFB EOD controls all access into these areas. Some explosive demolition work is occasionally performed at these sites.

Other Military Ground Uses

Military ground use in the BMGR-East outside of the above facilities is limited to roads and emergency situations. Sites used by the Ground Forward Air Controllers are accessible by roads or hiking. Use of the sites and use of Ground Forward Air Controllers is limited in scope and accounts for less than one percent of all missions on the BMGR-East.

Proposed Training Enhancements

Sensor Training Area Underlying the Air-to-Air Range (Proposed Enhancement 1)

The USAF proposes to develop and operate a Sensor Training Area (STA) within the San Cristobal Valley and underlying the Air-to-Air Range. An airspace boundary separate from those that currently exist for the tactical and manned ranges is needed for the purpose of scheduling the STA sub-range and airspace independent of the other areas. The STA will consist primarily of an array of high-technology scoring systems, one or more threat emitter sites, and infrastructure that simulates an urban environment. Two laser scoring systems and associated equipment will require approximately one acre per site for a total of two acres allocated for Large Scale Target Sensor System (LSTSS) sites. At least one unmanned threat emitter (UMTE) will be installed; with fencing, each UMTE site will cover approximately 1.5 acres. The urban complex will include the construction of simulated homes, buildings, industrial areas, roads, a sports field, and other types of urban features. The laser scoring system, UMTE, and urban complex will all be located within a one-square-mile (640-acre) site. The location and density of development within the 640-acre site will vary with some areas being intensely developed and others being left open and unaltered from the existing site conditions. Full development of the facility will likely occur in several phases. Ultimately, up to 400 acres of the 640-acre site could be developed over time.

The action may also include the use of 8-foot by 20-foot containers that could be stacked within 0.25 acre or less outside of the 640-acre STA. These stacked containers would serve as a vantage point outside of the proposed urban complex site to be used by ground-based forward air controllers who would direct simulated aircraft attacks on the STA.

Aircraft Operations at the STA

Once the STA is built, some existing aircraft operations will likely be conducted at the STA rather than at other locations on the range and future missions could include use of the STA. Typically, the STA will be scheduled in 40-minute blocks within the normal hours of operation from 0700 to 2300, with generally four aircraft using the airspace associated with the STA in a given block of time. This equates to a daily maximum of 96 sorties, although it is not likely that the STA will be fully scheduled every day and periodic large-force exercises result in higher sortie rates on some days.

Fixed-wing aircraft will fly about 85 percent of the sorties. Although the flight profile for fixed-wing aircraft differs by aircraft type, about 60 to 70 percent of the fixed-wing operations will typically be conducted at a medium-level altitude (6,000 feet AGL to approximately 30,800 to 31,500 feet AGL). A small percentage of the fixed-wing operations will occur above 31,500 feet AGL and the balance will occur at less than 6,000 feet AGL. Additionally, concurrent low-level and medium-altitude sorties will be flown during training operations. All aforementioned activities are consistent with current BMGR-East airspace use.

Helicopter use will be highest during the USMC's semi-annual WTI course, the semi-annual Mojave Viper (formerly Desert Talon) exercise, and during combat search and rescue (CSAR) training. During Mojave Viper and WTI exercises (which last up to six weeks), helicopters may land at the STA on an average of twice per week to support on-the-ground troop training. The overall number of helicopter sorties will not increase; instead STA will provide a new target option for existing sorties. In other words, as use increases on STA, use will decrease on STAC, NTAC, or ETAC. Such training will typically be limited to foot traffic associated with ground based forward air controller or search and rescue training. However, most helicopter training at the STA will not include landings and will normally be conducted at low levels (50 feet AGL or less).

UAVs are occasionally flown on the BMGR, with a gradual increase in operations expected in the future. UAVs vary from larger, Cessna-sized aircraft that takeoff and land from airports, to medium sized aircraft launched from vehicles/trucks, to man-portable small aircraft similar in size to recreational RC-type remote controlled aircraft. The larger UAVs typically operate at 5,000-feet AGL and above; medium UAVs can operate from 500 - 5,000-feet AGL; and small UAVs are controlled by a person on the ground within visual range of the craft, out to 3 miles and up to 1,500-feet AGL. The small UAVs typically have the greatest sound impact at ground level because of the lower altitude for operations. In comparison to F-16 flight activities, the noise generated from UAV operations is minor.

For aircraft operations conducted after dark, 2.75-inch rockets with infrared illumination warheads and/or illuminating flares (LUU-1, -2, and -19 type flares) will be used for target illumination during training with night vision devices. The quantity of rockets and flares will fluctuate depending on the amount of STA night use. On nights that the STA is used at full capacity, an estimated 24 rockets and 24 flares could be used during the course of the night training. At the proposed STA and throughout BMGR-East, during times of elevated fire risk, the minimum altitude at which flares will be dispensed will be adjusted to ensure the device fully burns out before reaching the ground.

Sensor Training Area Features

1) Unmanned Threat Emitter (UMTE)

An UMTE is an electronic instrument that transmits radar signals to simulate the radars used to operate either Surface-to-Air Missile (SAM) or Anti-Aircraft Artillery (AAA) air defense systems. One UTME will be installed within the boundaries of the STA. Threat emitters produce radio frequency (RF) energy that is potentially harmful to people or wildlife. To help minimize access to the UMTE by people and large mammals, including Sonoran pronghorn, a chain link perimeter fence will be built around the UTME at a radius of 308 feet. Additionally, bird-repellent devices, such as spikes, will be installed on appropriate features within the RF field to discourage birds from perching in areas where they may be exposed to radiation.

2) Large Scale Target Sensor System Sites (LSTSS)

The LSTSS is designed to support realistic attack training and to provide feedback (accurate targeting assessment) for laser targeting systems. The system has two parts: 1) the main tower, which collects data from the sensors or "nodes," and 2) the actual laser sensors (nodes), which are laser receiver plates that are placed on buildings or other targets. The targeting lasers on the aircraft, which will be employed both day and night as aircrews attempt to hit selected targets in the STA and activate the LSTSS sensor nodes on targets, are not eye-safe systems. The area affected by laser use will be included in laser hazard areas. Routine maintenance on the LSTSS sites will be conducted weekly at the same time as other maintenance on STA equipment.

3) Remotely Controlled Smokey SAM Launcher System

Smokey SAMs are small (less than 2 feet long), solid fuel rockets made out of cardboard tubing and plastic foam and are used to enhance the visual realism of the air-ground training environment. Most Smokey SAM motors include perchlorate, a stable and reliable propellant oxidizer that is valued for its safe storage, handling, and performance, but may also be a contaminant if it enters water sources. Smokey SAMs can generate a visible smoke column to approximately 1,000 feet AGL when launched in conjunction with threat emitter transmissions to give aircrews visual as well as electronic cues that they have been engaged by a surface-to-air missile and that evasive action is in order. While the cardboard tubing will biodegrade over time, debris from launched Smokey SAMs will typically be collected and removed from the range by the range operations and maintenance contractor during scheduled maintenance in the area. The launcher unit will be restocked with Smokey SAMs during the weekly routine maintenance for the STA.

4) Utilities

Incandescent lights will primarily be used within the STA at night to simulate the lighting within an urban environment, though some features will include infrared lights. Some lights will be attached to standard-height poles comparable to those used to light streets in cities. These poles will be topped with spikes to prevent birds from perching on the poles.

5) EOD Clearance/Equipment Maintenance

Prior to the development of the STA, the ground surface of the site selected and a buffer extending 1,000 feet beyond the one-square-mile STA site will be cleared of any unexploded ordnance or other ordnance

or target waste materials. Periodic EOD clearance will be necessary to support operational training at the STA. This clearance will be performed at the same distances and time intervals as the tactical ranges (every 2 years to 300 ft radius and every 10 years to 1,000 ft radius). The STA clearance area will be small in comparison to the area cleared within the tactical ranges; therefore STA clearance will likely be completed with fewer trucks and lighter vehicles. EOD clearance will be completed within about a one-week period or less for the 10-year clearance requirement and in a few days for biennial EOD clearance. The season in which EOD clearance will occur is subject to the overall schedule for all EOD operations. However, training schedules and environmentally sensitive periods such as the fawning season for the Sonoran pronghorn will be avoided. The UMTE, LSTSS sites, and other equipment will be checked approximately once or twice a week to ensure that all features are undamaged and are working optimally. Most routine maintenance visits will be completed in less than one hour. An annual major maintenance period of approximately one week will be scheduled; a limited or biennial EOD clearance will occur in conjunction with this annual maintenance.

6) Access and Roads

Access to the STA will be via the existing dirt road that extends approximately 17 miles from Stoval Airfield near Interstate 8 (I-8) to the proposed site within the San Cristobal Valley. Road widening and minor improvements will be required to facilitate construction of the STA, equipment maintenance, and EOD clearance operations. In some areas, particularly where the access road crosses a wash or sandy soils, additional improvements may be required, including installing culverts to facilitate proper drainage or topping the road with gravel to provide a firmer roadway surface. USAF will schedule road improvements outside of the fawning season to extent possible and will enforce Operating Instruction (OI) 13-01, *Sonoran Pronghorn Monitoring* (Appendix 1). Among other restrictions, OI-13-01 includes the following: 1) vehicle speed limits are 45 mph on paved roads leading to manned ranges (note, OI-13-01 will be modified to reflect the 35 mph speed limit on the 7-mile road segment to be paved as part of proposed enhancement 9 – see below), 35 mph on maintained dirt roads, and 25 mph on all other roads; 2) if a vehicle is 1-2 km from a Sonoran pronghorn, the speed limit is 15 mph; 3) if a vehicle is less than 1 km from a Sonoran pronghorn, every effort is made to use an alternate route; if none are available and movement is essential, then the speed limit is 15 mph; 4) if Sonoran pronghorn are observed running due to ground disturbance, vehicles near Sonoran pronghorn locations stop until animals have stopped running; and 5) approved non-military personnel on foot may approach to within ½ km of a known Sonoran pronghorn location only if postponing their work could result in a work stoppage.

Roads or simulated roads will be developed within the STA site to provide the proper appearance of an urban area to aircrews. Additionally, some unpaved internal roads within the STA site may be developed (up to three miles) to provide better access to equipment. The specific location of these roads has yet to be determined, but they could be built anywhere with the STA.

Lowering Flight Training Altitude over a Portion of the CPNWR 15 NM south from the BMGR-East Boundary (Proposed Enhancement 5)

A 1994 Memorandum of Understanding (MOU) will be modified to provide for lowering the flight training altitude floor over a portion of the CPNWR from 1,500 feet AGL to 500 feet AGL to enable more realistic attack approaches to targets in STAC and low-altitude intercepts in the Air-to-Air range. The lowered training floor will be within R-2301E and will extend from the west side of the Growler Mountains west to the R-2301E and R-2301W airspace boundary, and south of the STAC boundary to a distance of 15 nautical miles. The R-2301E airspace from 500 feet AGL up to 1,500 feet AGL over the CPNWR will be available to be scheduled for either day or night missions in association with R-2301E

airspace above 1,500 feet AGL. Both the USAF MTRs and the USMC low-level corridors will not be affected by this proposed enhancement. Use of this low level airspace block will be restricted to missions that require lowered flight paths for realistic training. Because of the high airspeeds and abrupt maneuvers required of air combat training, nonparticipating aircraft (such as surveillance aircraft flown by the USBP) will be restricted from the proposed low-level airspace block when it is scheduled for training use.

The entire CPNWR is overlain by the R-2301E and R-2301W restricted airspaces from the surface to 80,000 feet MSL. However, the general operating floor for military aircraft overflying the CPNWR was voluntarily set at 1,500 feet AGL and above in a 1951 agreement between the USAF and the Department of the Interior. The general operating floor provided in the 1951 agreement, and as renewed in several superseding MOUs, has remained in effect to the present. However, in the 1975 edition of the MOU between the USAF, USN, and USFWS, the operating floor provision was amended to state that "…military aircraft flying over the Game Range shall maintain a minimum altitude of at least 1,500 feet above ground level, except along mutually approved low-level corridors." The low-level flight provision was included in the MOU to support training missions requiring ingress to BMGR-East at low altitudes.

Approximately 19,000 sorties currently use the R-2301E airspace overlying the CPNWR annually. Of these, about 4,200 air-to-air sorties fly to the 1,500-foot altitude floor and about another 2,000 sorties approaching targets in STAC also fly to that altitude. It is anticipated that these sorties (totaling 4,200 to 6,200) will annually use the airspace from 500 feet to 1,500 feet AGL over the CPNWR. Most sorties will continue to be flown at altitudes at or above 1,500 feet AGL.

Reconfigure Manned Range 3 for Helicopter Training (Proposed Enhancement 6)

The southern portion of Manned Range 3, including the left conventional target south of the tower, will be converted into a helicopter gunnery range with fixed, moving, and pop-up targets to provide more appropriate training for the ARNG and other rotary-wing units that train at BMGR-East. The 56th RMO will initially purchase and place about 15 to 25 pop-up systems set in an area encompassing approximately 400 acres. Installation of the targets will require some ground disturbance in specific areas. Power is available on site so no new electrical lines will need to be established.

Targets will be strafed with small munitions (such as 0.50 caliber) to avoid shredding the targets. EOD clearance will be conducted prior to establishing the targets. Once targets are established, EOD clearance will typically consist of clearing the roads as part of routine maintenance. Weapons will be deployed to the south, southwest, and southeast and the Sauceda Mountains will serve as a backdrop to retain errant strikes or munitions that ricochet. The target complex will be used for daytime and night-time training missions. Night-time operations will occur on approximately 40 nights per year, which is comparable to the existing helicopter night-time use at Manned Range 3. Helicopters will typically be flown at altitudes of 300 to 1,000 feet AGL. There is an existing landing pad at Manned Range 3 that could be used; however take offs and landings are not anticipated in the course of the training associated with the proposed reconfiguration of the range. This area has been previously used by both fixed-winged and rotary-winged aircraft for air-to-ground target training.

Manned Range 1 to RMCP 1 Road Pavement (Proposed Enhancement 9)

About seven miles of the existing road will be paved from the main tower within Manned Range 1 to the existing water well and adjacent RMCP 1 located near the boundary of the NTAC and STAC ranges to the west of Manned Range 1. The current roadbed and drainage way is approximately 30 feet wide;

however, only the center 16 feet will be paved. The total area to be paved will cover approximately 13.5 acres. To prepare for the paving process, the current road will be graded to obtain a smooth and level surface with a slight crown to facilitate drainage. The area disturbed by the grading process will not extend substantially beyond the 16-foot-wide lane proposed to be paved. Approximately 35 to 40 loads of asphalt will be trucked to the paving site. The construction crew will consist of approximately seven workers, not including the asphalt truck drivers. Existing, previously disturbed staging areas located adjacent to the Manned Range 1 main tower will be used for temporary storage of equipment and materials during construction. Grading and paving of the seven mile road segment will occur outside of the Sonoran pronghorn fawning season. Maintenance of the road will likely not be necessary for at least five years. After this time, the USAF will likely seal the road with a tar and asphalt slurry every two to three years, or as necessary, to prevent deterioration of the road surface. Current maintenance occurs four times per year; therefore maintenance frequency after paving will be significantly reduced. Existing traffic volumes, traffic speeds, and types of vehicle using this road are not expected to change after road paving. The current speed limit of 35 miles per hour (mph) established by the USAF for this road will not be changed, and additional speed limit signs will be posted along the road. In addition to the speed limit, the signs will indicate that the speed restriction is for Sonoran pronghorn protection compliance. Furthermore, OI-13-01 will continue to be enforced (as stated previously, OI-13-01 will be modified to reflect the 35 mph speed limit for this paved road segment).

Proposed Reduced Sonoran Pronghorn Target Closure Distances for STAC, NTAC, and Manned Range 1

Sonoran pronghorn use of STAC and NTAC has significantly increased over the last few years (this is further described in the "Environmental Baseline" section for Sonoran pronghorn below).
The increased presence of Sonoran pronghorn on both the STAC and NTAC has caused numerous targets to be closed for extended periods of time. In 2008, at least one training ordnance target was closed 228 days of 265 days that the targets were monitored; additionally the live ordnance targets were closed on 100 days causing 30 missions to be cancelled and another 40 missions to be diverted. The number of training ordnance targets that have been closed due to Sonoran pronghorn proximity to the targets has increased steadily from 2005 to 2008; 14 days in 2005, 50 days in 2006, 97 days in 2007 and 228 days in 2008. Live ordnance target closures have also increased from just one day in 2006, to 16 days in 2007 and 100 days in 2008. Absent any procedural changes, as Sonoran pronghorn observations continue to increase, cancelled or diverted military training sorties within NTAC and STAC would also increase.

To decrease the number of target closure days while still minimizing risks for Sonoran pronghorn, USAF proposes reduced target closure distances for both the tactical ranges and Manned Range 1 based on the type of ordnance delivery (Table 3). The reductions are in line with the reduction in size of EOD clearance areas, which were reduced due to the increasing accuracy and precision of ordnance deliveries. USAF derived the new target closure distances using Weapons Danger Zone—an application developed by the Department of Defense (DoD) to determine the safety footprint of aircraft-delivered weapons. USAF also factored into consideration that the probability of a Sonoran pronghorn being struck by an errant weapon decreases asymptotically with distance from the target. The Weapons Danger Zone analysis, which investigated the radius of the area where specific munitions ultimately fall using a 99 percent confidence level, showed that inert munitions will fall 99 percent of the time within a 500 meter radius of the specified target; strafe will strike 99 percent of the time within a 1,000 meter radius of the specified target; and live explosive and shrapnel will fall 99 percent of the time within a 1,500 meter radius of the specified target.

Because Sonoran pronghorn occasionally occur in the vicinity of Manned Range 1, the daily startup procedure for this range includes having the RCO perform a binocular scan of the area, particularly down range (west) of the strafe targets. If Sonoran pronghorn are detected on the Range, the RCO will implement protective measures as necessary and appropriate, which consist of directing use of targets that are more distant from the Sonoran pronghorn location. The new target closure distance for strafe of non-HE targets on Manned Range 1 is 0.5 km up range and laterally from the target and 1.0 km downrange of the target. The new target closure radius for bombing of non-HE targets on Manned Range 1 is 0.5 km. These measures were developed based on the information that the RCO has positive control of the aircraft engaging targets and also has good visual observation of the Sonoran pronghorn, except for the areas down range of the strafe panels. Manned Ranges 2, 3, and 4 are generally outside current Sonoran pronghorn range; however, in 2008 and 2009, released pen-raised bucks were documented using both Manned Range 2 and 4 (see the "Environmental Baseline" for Sonoran pronghorn below). If Sonoran pronghorn are observed by the monitors north of the Crater Range within 3 km of Manned Range 2, 3, and 4, the same target closure procedures as described above for Manned Range 1 will now be implemented.

Table 3. Previous (as analyzed in the 2003 biological opinion) and proposed target closure radii based on ordnance delivery or military activity.

Activity	NTAC and STAC Target Closures		Manned Range 1 Target Closures		Comments
	Previous radius in km	Proposed radius in km	Previous radius in km	Proposed radius in km	
HE ordnance	5.0	1.5	Not applicable, no HE at Manned Ranges	Not applicable, no HE at Manned Ranges	Includes HE hills (NTAC and STAC) and Maverick target on NTAC
Strafe of non-HE targets	3.0	1.0	3.0	0.5 up range and laterally from the target 1.0 downrange of the target	
Bombing of non-HE targets	3.0	0.5	1.0	0.5	Non-exploding training ordnance
EOD detonations	3.0	1.5		1.5	Controlled Detonation

The USAF has a 12-year history of strict compliance with the previous biological opinions, resulting in full performance of all monitoring activities. The protection of the Sonoran pronghorn on the BMGR-East is paramount and several steps have been taken to evaluate and minimize potential impacts of USAF activities on this subspecies. Sonoran pronghorn monitors work together and with range personnel to ensure all personnel are aware of Sonoran pronghorn locations in an effort to minimize disturbance. There are two to three incidents per year that require follow up by the monitors. In addition, if any Sonoran pronghorn mortalities are reported on BMGR-East, the Sonoran pronghorn Recovery Team lead is

notified, and a site visit is arranged within 24 hours of the report. To date, there have been no documented Sonoran pronghorn mortalities as a result of USAF operations.

Moving Vehicle Target System at Target 104/106 (Proposed Enhancement 3)

A moving vehicle target system will be introduced to BMGR-East. Various target platforms may be employed, but it will essentially consist of a remotely operated, global positioning system (GPS) guided, unoccupied vehicle (such as a 4x4 pickup or sport utility vehicle) with an approximately 250-foot-long cable pulling a target. For safety, the tow vehicle will be remotely monitored by trained personnel who will have the ability to stop the vehicle if necessary. The tow vehicle will be fueled with gasoline that is brought to the site by fuel truck. The tow vehicle will pull the target on an oval-like track that allows the vehicle to turn around at the end of a straight-away and return to the starting point on a different straight-away portion of the track. The moving vehicle target system will be located south-southwest of the Crater Mountains within NTAC. The total length of the proposed track will be approximately 7.3 miles and about 50 feet wide. The track will be developed partially on an existing road and surface grading will be required to create the remainder of the track sections. Construction of the moving vehicle target track will be done in during the NTAC maintenance closure period which is outside of the fawning season. Road maintenance will be required on a recurring basis approximately once a month to remove munitions impact scars. About 85 percent of the time, the vehicle towing the target will be driven at speeds up to 45 mph. About 15 percent of the time, the vehicle will travel at speeds between 45 mph and 60 mph. It is estimated that the moving vehicle target system will be used in 30-minute blocks approximately 4 times per day, 5 days per week, and 46 weeks per year. Annually, it is estimated that the system may be driven up to 20,000 miles per year, although the average is likely to be about 11,500 miles a year.

Aircrews will attack the vehicle target from a perpendicular angle as it travels on the straightaway portions of the track. Most of the attacks will be strafing with inert practice ammunition, but other types of training ordnance may also be used such as rockets, small air-to-ground missiles, laser-guided or other bomb dummy units (BDUs), and inert full-scale bombs (gravity, laser, or GPS guided). Bullets used in strafing do not require EOD clearance. However, if rockets, missiles, BDUs, or inert full-scale bombs are used, the moving vehicle target system road corridor will be treated as linear targets and periodically cleared of ordnance in accordance with the established EOD clearance requirements and schedule for NTAC. This will include clearing expended ordnance within 50 feet of the track used for the moving target on an annual basis and to a radius of 300 feet of the track every other year.

The moving vehicle target system will have forward- and aft-looking cameras and up to four additional cameras will be established near the track on approximately 20-foot towers providing visibility up to 1,000-feet base to monitor traffic or other activity on the track. These will be used prior to any training events to help ensure the track is cleared of people, vehicles, and large wildlife. If Sonoran pronghorn were sighted on the NTAC within the preceding seven days during weekly scheduled monitoring, Sonoran pronghorn monitors would be stationed at look-out points to ensure no Sonoran pronghorn are in the vicinity of the moving vehicle target track prior to any operation that could potentially impact the animals. If Sonoran pronghorn are present, the same weapons restrictions would apply to the moving vehicle target track as any other non-HE target and the mission would be rescheduled or cancelled.

New Target for Air-to-Ground Missiles (Proposed Enhancement 4)

BMGR-East has long supported training with air-to-ground missiles for the aircrews of fixed-wing and rotary-wing aircraft. Both inert and live air-to-ground missiles are authorized for use at BMGR-East, but only against designated targets. There is currently one live missile target and one inert missile target in NTAC and one live missile target and one inert missile target in ETAC. Two types of air-to-ground missiles, the AGM (air-to-ground missile)-114 Hellfire and the AGM-65 Maverick, are typically used at BMGR-East. The Hellfire missile is a helicopter launched, precision-guided missile designed to defeat tanks and other individual targets while minimizing the exposure of the launch vehicle to enemy fire. Both live and inert Hellfire missiles are used at BMGR-East. The AGM-65 Maverick is a tactical, air-to-ground guided missile designed for close air support, interdiction, and defense suppression missions. The A-10 and F-16 aircraft are designed to carry as many as six Mavericks. Mavericks can be launched from altitudes from tree-top level to above 10,000 feet and can hit targets ranging from a distance of a few thousand feet to 13 nautical miles at medium altitude (USAF 2007). The Maverick missiles used at BMGR-East are live missiles.

A second live missile target will be developed in a more centrally positioned location in ETAC to allow attacks with Maverick missiles from a wider variety of headings and optimal altitudes. Normal attack altitudes will be in the range of 1,000 to 1,500 feet AGL, but could be as low as 100 feet AGL. While the target could be used at night, live sorties at night will be rare (estimated at no more than 16 per year). The target location will be within prior EOD clearance areas. The existing air-to-ground missile target will be retained for Hellfire or other munitions training, but will be retired from live Maverick use.

Gila Bend Air Force Auxiliary Field: New Taxiway and Air Traffic Control Tower at the (Proposed Enhancement 8)

Two improvements proposed for the Gila Bend AFAF to support airfield operations, including the construction of a taxiway parallel to the airfield runway to increase the safety and capacity of the airfield and a new air traffic control tower.

Taxiway

Runway 17/35 at Gila Bend AFAF has a north-south orientation. The proposed parallel taxiway will be constructed to the west of the runway, a minimum of 1,000 feet from the runway centerline. The taxiway will be 75 feet wide and include a 50-foot shoulder on each side of the main taxiway. The existing runway, which is 8,500-feet long with 1,000-foot overruns on each end (10,500 feet in total length), will be tied to the proposed taxiway by expanding the ends of the runway arming areas. The dimensions of the arming areas will be 1,075 feet by 200 feet. Actual ground disturbance will be approximately 42 acres consisting of the dimensions of the taxiway (8,500 feet by 125 feet), plus the extension of the runway arming area to tie the taxiway to the runway. To meet compliance requirements, the existing helicopter landing pads may need to be relocated; if required, they will be moved to a previously disturbed and environmentally cleared area. Construction activities will include clearing approximately 42 acres, establishing drainage on the site, constructing all pavements, installing lighting structures and systems, and painting taxiway markings.

Air Traffic Control Tower

The new air traffic control tower will be constructed at a previously disturbed site about 3,100 feet north of the Runway 35 threshold (the beginning of the portion of the runway that is usable for landing) and 1,600 feet west of the Runway 17/35 centerline. This location is approximately 1,100 feet west of the existing tower. The new tower will replace the existing tower.

On-The-Ground Training Exercises (Proposed Enhancement 7)

CSAR teams, and potentially other small special tactics teams, will use BMGR-East for ground-based training activities. Training for CSAR or similar small team missions will involve clandestine insertions and extractions from helicopters or vehicles driven on existing range roads, and performance of cross-country land navigation and other on-the-ground exercises, such as shooting at targets while traveling on foot. Targets for the on-the-ground training exercises may be made of wood, metal, stucco, mud, sea-land containers, concrete, or other materials; however, no native vegetation or other natural features will serve as targets. Targets will generally be established within the tactical ranges along existing roads. Teams may remain within BMGR-East for several days and camp at night.

These CSAR training missions will typically involve two to six teams that consist of four to six, and occasionally up to ten, troops in each team. The teams will conduct long-range, cross-country reconnaissance patrols on foot with the intent of remaining undetected. The reconnaissance patrols will be inserted into BMGR-East by parachute drop or helicopter, or by utility or all-terrain vehicles using existing roads. Vehicles will be pulled off the road and parked within 50 feet of the road. No development of drop zones will be necessary to support parachute or helicopter insertions or extractions. Insertions and extractions generally will be limited to personnel, but could include small vehicles such as an all terrain vehicle that would be driven only on existing roads.

These cross-country patrols could occur anywhere within BMGR-East, but the principal areas of insertion and extraction will be in Area B with teams moving into the military target areas of ETAC. Area B is the Sauceda Mountains area of BMGR-East (located southwest of ETAC and east of State Route [SR] 85) that is open to general public access with a BMGR permit. Most of the maneuvers will occur in mountainous areas, such as the Sauceda Mountains west of ETAC. The duration of these training missions will typically be one to several days. There will be about 30 events per year lasting up to one day and four events per year that will include an overnight component.

Certain events, including the WTI course, could include up to 100 troops. These events will be infrequent (typically no more than two or three events per year) and will generally occur within the tactical ranges in areas of previous military ground disturbance. These larger-scale events (i.e., WTI course) generally involve land maneuvers over distances less than 3 miles (from the point of troop insertion to their objective).

In scheduling the small tactical team training and WTI exercises, the USAF will consider data from the ongoing monitoring programs that track the general distribution of the Sonoran pronghorn herd and attempt to schedule the small tactical team training exercises in a manner that minimizes impacts to Sonoran pronghorn to the extent possible. Currently, the Sonoran pronghorn monitoring and military activity restrictions protocol as established in OI-13-01 does not apply to WTI maneuvers. However, the OI will be revised to preclude WTI course maneuvers (involving greater than 50 troops) within a 1 km radius of Sonoran pronghorn. In addition, all ground personnel (e.g., CSAR teams or WTI course personnel) will be provided with video or other training regarding their responsibilities to conduct training

in a manner that complies with environmental laws and regulations which includes information on avoiding impacts to pronghorn. Ground personnel will be provided with pre-coordinated locations, access, and allowable operations during maneuvers (such as walking, camping, length of time on the Range, etc.) to avoid or minimize environmental impacts.

Units conducting tactical training on the ground will be self-contained and will carry out all trash or other items that they brought into the range (including parachutes).

Sand and Gravel Excavation, Stockpiling, and Use on BMGR-East (Proposed enhancement 10)

Sand and gravel will be excavated from 10 sites within BMGR-East to be used for on-range road maintenance, target reconstruction, and target maintenance. This will include transporting the material to four new stockpile sites on BMGR-East and to one existing site on the Gila Bend AFAF where the materials could be accessed as needed. The proposed material source sites are all located in highly ephemeral washes located adjacent to existing roads; these include Sauceda Wash, Quilotosa Wash, Daniels Arroyo, Tenmile Wash, and Midway Wash. Material from the source sites will be removed and the open excavations will not be filled. The source sites are in areas open enough to provide reasonable access for a loader and where trees along the banks of the washes can be avoided. Five of the excavation sites are in areas that burned in 2005 wildfires and two sites are near the burned areas. The materials will be excavated in a manner to ensure a gentle slope from the top to the bottom of the excavation site so that animals are not trapped in a pit. Using the sand and gravel sources is not expected to import noxious weeds because the sources and use destinations are all local to BMGR-East.

The annual volumes will equal approximately 13,000 cubic yards, which is equivalent to about 16,000 tons; this reflects a three-foot excavation depth over the delineated area at each source site. A combined area of 2.68 acres will be disturbed in sites ranging from 0.12 to 0.88 acres in size. The areas most affected include Tenmile Wash (0.88 acre), Quilotosa Wash (0.84 acre), Daniels Arroyo (0.4 acre), Sauceda Wash (0.3 acre), and Midway Wash (0.26 acre). Because the demand for source material is primarily associated with target maintenance on the ranges, excavation will primarily be focused within the three six-week periods when each of the tactical ranges is closed to operations for EOD clearance and maintenance activities. Excavation and movement of sand will not be limited exclusively to these periods, however, they will not occur year-round.

The materials excavated from the source sites will be removed using existing equipment such as a front-end loader mounted on a rubber-tired tractor. The material will be loaded into a dump truck and transported to a stockpile site for later use. All source sites and stockpile sites are accessible by existing roads and only the loader will travel off the road to and from the wash. Stockpile sites will be outside of washes so that runoff from storms will result in minimal movement of the stockpiled sand and gravel.

Programmatic Target Reconfiguration (Proposed enhancement 2)

New procedures will be established to guide environmental reviews and approvals for target reconfigurations needed to update BMGR-East tactical ranges. Target reconfigurations will be needed over approximately the next 10 years to bring the tactical ranges up-to-date with current and emerging aircrew training requirements. NTAC, STAC, and ETAC ranges currently have 23, 20, and 34 target complexes, respectively. These complexes provide simulations of tactically important features such as airfields, air defense sites, vehicle convoys, railroads, battle lines between opposing forces, and supply areas. Each complex includes simulations of multiple individual targets. In aggregate, the target complexes in the tactical ranges provide several hundred aim points for air-to-ground attack training. The

number of target complexes and/or individual targets that will ultimately be reconfigured within each tactical range is currently unknown and target reconfigurations will likely occur in increments over 10 or more years.

Changes to the overall configurations of the tactical ranges will likely be modest, with most major target complexes (such as the simulated airfields) generally remaining in their current orientations. Most of the foreseeable reconfigurations will occur within the target and ordnance impact areas on each tactical range that have received the longest-term and most intensive historical use and that continue to be used for these purposes. The types of materials and construction methods used to reconfigure target simulations will change little from the materials and construction methods used to maintain the existing targets. In most cases, there will be little or no change in the types of ordnance delivered on the reconfigured target, and the distribution of ordnance delivery impacts will be the same or similar to the distribution of ordnance delivered on the previous target.

The proposed environmental review and approval parameters are anticipated to increase the consistency, efficiency, and effectiveness with which environmental review and approval processes are performed for proposed future target reconfigurations. Target reconfigurations occurred on a relatively infrequent schedule over the past several decades and were generally addressed as isolated, individual actions. The need to update individual targets or selected groups of targets is expected to occur as frequently as every one or two years.

A set of standard procedures will be developed for determining the appropriate level of environmental review and approval necessary before a proposed target reconfiguration could be implemented. A process will be established for revalidating any prior impact assessment to assure that all potential effects to ESA-listed species from a specific action such as target reconfiguration were fully considered, and if any additional effects are identified, consultation with USFWS will be reinitiated. The internal verification that all appropriate effects of target reconfiguration have been addressed will include the following components:

1. The compliance documents (e.g., biological opinions) relevant to the targets in question would be identified.

2. An updated list of ESA-listed species for the county would be consulted to determine if any newly listed species would need to be considered.

3. If ESA-listed species were considered in the assessment, the conditions of any biological opinion would be verified.

4. For ESA-listed species, a determination would be made if the target reconfiguration would result in effects to the species that were not considered in the biological opinion.

5. The results of this reassessment would be documented by memorandum in the project administrative record, and if the reassessment includes ESA-listed species, a copy of the compliance memorandum would be provided to USFWS for informational purposes.

6. If these conditions are not met, and/or potential effects to ESA-listed species may occur in a manner not previously considered in a biological opinion, consultation procedures with USFWS would be followed in compliance with existing regulations.

All content of this action reflects streamlining existing environmental regulations and does not affect the implementation of the ESA. Any future actions that necessitate USFWS consultation would occur following existing regulations.

Conservation Measures

The USAF has been funding and/or actively working on Sonoran pronghorn recovery projects since before 1996. Specifically the USAF has obligated over $5 million to support recovery actions and research studies for Sonoran pronghorn and fund the team of biologists who monitor for the presence of Sonoran pronghorn on the BMGR-East. Furthermore, about half of the time of one full-time employee of the Luke AFB Environmental Science Management section is dedicated to working on Sonoran pronghorn issues. Sonoran pronghorn recovery actions supported (i.e., contributing funds and/or personnel hours) annually by the USAF include radio collaring; aerial telemetry flights; studies of Sonoran pronghorn diet, habitat use and genetics; tactical range monitoring before flights; forage enhancement; and the captive breeding project. Luke AFB continues to actively support priority recovery actions established by the Sonoran Pronghorn Recovery Team, including directly funding the breeding pen, forage plots, artificial water sources, biennial surveys of the U.S. and Mexico Sonoran pronghorn populations, and a portion of the Environmental Assessment for establishing a second herd in a new geographic location. The USAF proposes to implement or continue implementation of the following conservation measures:

1. The annual range maintenance schedule will continue to be implemented to reduce potential effects to Sonoran pronghorn as follows: East TAC – 15 April to 15 June; NTAC- 1 January to 28 February; STAC – 1 October to 15 December. These dates are subject to scheduling changes which may move the starting and ending dates by two weeks.

2. All BMGR-East ground personnel are briefed on the Sonoran pronghorn. The briefings cover the status of the species, the importance in reducing impacts to the species, and any mitigation measures the users must comply with while on the range, specifically OI 13-01.

3. All vehicles are restricted to designated roads except as required by EOD, maintenance, emergency response, and environmental sciences personnel including authorized contractors while conducting required mission support activities.

4. When actions require new surface disturbance in current Sonoran pronghorn habitat, every effort will be made to minimize the extent of surface disturbance and to restore the area to the previous grade when such work is practicable. Most actions will be conducted on the existing road system but there will be a few cases where that cannot be done, such as during annual EOD clearances. The USAF will make every effort to minimize the impacts of operations to vegetation and friable soils, and for operations to be consistent with the conservation measures and terms and conditions of this biological opinion.

5. Low speed limits on roadways will continue to be enforced to ensure that no Sonoran pronghorn are injured due to vehicles. The 56th RMO OI 13-01 specifies that vehicle speed limits for all ground personnel will be reduced when approaching known Sonoran pronghorn locations. OI 13-01 speed limits on BMGR-East within SPH habitat are 45 mph on paved roads, 35 mph on major graded roads, and 25 mph on all other roads. The speed limit on the 7-mile road segment

proposed for paving will remain at 35 mph and additional speed limit signs will be posted to encourage compliance.

6. The USAF will continue to revise OI 13-01, *Sonoran Pronghorn Monitoring*, from monitoring data collected by the Sonoran pronghorn monitors and input provided by the Sonoran Pronghorn Recovery Team. Luke AFB will use the biennial internal reviews of 56th RMO OI 13-01 to assess and adjust the guidelines to support military training operations and further the recovery of the Sonoran Pronghorn.

7. The USAF funded and installed two forage enhancement plots on BMGR-East. One forage enhancement plot is operational and the other has been completed but is not yet in use. Continued funding will be required to maintain and operate those forage enhancement plots in the future for as long as they are needed. The USAF proposes working with the Sonoran Pronghorn Recovery Team to estimate operational costs for all forage enhancement plots and determine how to best cost-share that undertaking among the interested agencies. The USAF will contribute to the operation of these forage enhancement plots if the Sonoran Pronghorn Recovery Team determines this to be a priority use of USAF Sonoran pronghorn recovery action funding (see conservation measure 14).

8. The USAF supported new feed and water stations placed on BMGR-East's STAC (see the "Environmental Baseline" for Sonoran pronghorn for a description of this action). The USAF, along with others, spent numerous hours monitoring these three sites for use patterns, moving them to new locations when use was low, as well as moving them further away from the targets when use was high, and restocking water and alfalfa feed. The USAF will continue to support the development and implementation of food and water stations as determined necessary by the Sonoran Pronghorn Recovery Team.

9. In accordance with its responsibilities under the MLWA of 1999 and the Sikes Act, Luke AFB will continue to work with its agency partners - the USMC, the USFWS, BLM, and AGFD - to implement the Integrated Natural Resources Management Plan (INRMP) for the BMGR. The INRMP, which incorporates ecosystem management principles, is designed to establish a long-term resource stewardship program for the BMGR that provides for protection, conservation, and rehabilitation of natural resources, including Sonoran pronghorn and their habitat. The INRMP also provides for sustained public use of the range consistent with its military purposes and will undergo a review every five years. The INRMP fully supports the requirements of the Sonoran Pronghorn Recovery Plan and the actions of the Sonoran Pronghorn Recovery Team. The Record of Decision for the INRMP EIS was signed in March 2007.

10. The USAF produces and will continue to produce an annual report, which is provided to the USFWS-AESO, that summarizes the results of all monitoring efforts (including the Sonoran pronghorn monitors annual report), the Range Use annual report, all range incidents, and a brief summary of all contract and construction work in Sonoran pronghorn habitat. The report includes the date and location of any Sonoran pronghorn observed by USAF personnel and contractors, including observations of injured or dead Sonoran pronghorn. This report describes in detail how each of the conservation measures was implemented. Reports that may be produced in association with implementation of the conservation measures or this opinion will be appended to the annual monitoring report. The annual report will be submitted in the spring of each year. Incidents of dead or injured Sonoran pronghorn will be reported within 24 hours to the Recovery Lead at CPNWR and to this office.

11. The San Cristobal Valley is closed to public use with access limited to authorized federal and state personnel and individuals holding a special use permit issued by 56th RMO. Special use permits for San Cristobal Valley are generally not issued for the time period beginning 15 March through 15 July to protect Sonoran pronghorn during the fawning period. Special use permits will only be issued during this period on an extremely limited basis and only if the proposed activity is not in conflict with pronghorn. These dates may be adjusted as recommended by the Recovery Lead at CPNWR.

12. The USAF removed several kilometers of barbed wire fencing from Sonoran pronghorn habitat. Fencing is a known deterrent to Sonoran pronghorn foraging and movement and poses a potential tangle hazard. The USAF will continue to remove unnecessary fencing as it is identified.

13. The USAF will continue to coordinate and share data with the CPNWR and the Arizona Ecological Services Office on all Sonoran pronghorn studies and monitoring efforts.

14. The USAF will continue to support priority recovery actions for Sonoran pronghorn as established by the Sonoran Pronghorn Recovery Team. This support has been in the form of providing 1) funding to AGFD and CPNWR to plan and implement recovery actions and 2) USAF staff time to assist in the planning and implementation of recovery actions identified by the Sonoran Pronghorn Recovery Team. Among other actions, last year USAF contributed funding to develop the Environmental Assessment (EA) for establishing a second pronghorn population in Arizona and more recently, they have committed to providing funding to develop the EA for a Sonoran Pronghorn Habitat Management Plan which is needed to coordinate pronghorn recovery actions range wide in Arizona (i.e., forage enhancements, water redevelopments, habitat manipulation, etc.). Luke AFB staff has contributed funding and dedicated numerous hours to the successful development and operation of the semi-captive breeding pen. USAF support of Sonoran pronghorn recovery actions will be continued at levels comparable to that provided since the issuance of the 2003 biological opinion (annual funding since 2003 has been approximately $210,000).

15. The USAF will continue to maintain the Sonoran pronghorn GIS database of all historical sightings in USAF files and support an annual program of documenting Sonoran pronghorn sightings by employees and other agencies throughout range. These files will be made available to the CPNWR, AGFD, and USFWS Tucson office upon request.

16. The USAF will continue efforts to implement the use of electronic scoring systems to reduce the number of air-to-ground weapons deliveries in pronghorn habitat. Development of the proposed STA was specifically designed to meet this goal, allowing pilots to practice delivery of precision-guided munitions on no-drop, electronically scored, targets.

Conservation measures 6, 7, 15, and 16 in the 2003 biological opinion were removed for reasons explained below:

Conservation Measure 6. USAF funding for on-going study with AGFD to determine the effect of military night operations on Sonoran pronghorn: In approximately 1998 the Air Force funded AGFD to perform this study using radio collar signal changes to indicate the movement of animals, but this method was determined to be non-feasible. Since then no new methods of performing this study have emerged, and the multi-year noise study concluded that pronghorn

were acclimated to the noise resulting from military training operations. Hence there has been no compelling reason to fund further study, and instead, USAF funds were used for higher priority recovery actions such as the semi-captive breeding pen. The USAF does not propose any further study of this topic unless the Recovery Team identifies it as a high priority.

Conservation Measure 7. USAF study to determine the effects of military activities during the fawning season: In approximately 1998 the USAF funded the multi-year noise effects study. The field crew's observations over three seasons included some fawns, and this information was included in the noise effects study. The USAF does not propose any further study of this topic unless the Recovery Team identifies it as a high priority.

Conservation Measure 15. USAF roadside watering: No roadside watering was accomplished since the 2003 Biological Opinion was issued. Due to limited personnel and availability of equipment, further watering is not currently proposed unless the Recovery Team identifies it as a high priority.

Conservation Measure 16. Study of the effects of undocumented migrants on Sonoran pronghorn, vegetation transects, and soil analysis: The USAF has not funded a study of effects of undocumented aliens and law enforcement response, nor is one proposed given that this topic is being addressed as part of the Ajo 1 Tower biological opinion. Vegetation mapping of NTAC and STAC was completed in February 2007, and mapping of the San Cristobal Valley is in progress. An analysis of soil and vegetation characteristics at the NTAC HE Hill target was completed in November of 1999 and another in June of 2005.

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 20th century. Sub-population estimates for Arizona, which only began in 1925, have never shown the pronghorn to be abundant (Table 4). 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 5); currently the sightability model (Samuel and Pollock 1981) is considered the most reliable estimator (Bright *et al.* 1999, 2001). Table 5 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 5). 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 (Tim Tibbitts, Organ Pipe Cactus National Monument, personal communication 2002); *average* annual rainfall for the visitor center is 9.2 inches (Brown 1982). The November/December 2002 population survey revealed the U.S. sub-population had declined to the lowest level ever recorded. A total of 18 pronghorn were observed, in three groups (8, 9, and 1). The

sightability model resulted in a population estimate of 21 animals, or a 79% decline from 2000. Also, very few fawns survived in 2002 to replace these dying adults.

Although drought was likely the proximate cause of the dramatic decline of the U.S. 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 4 and 5), 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. Informal surveys in 2010 indicate the U.S. population (again, including captive-born individuals released into the wild) has increased to about 80 or 90 animals, not including any young-of-the year fawns (personal communication with Jim Atkinson, Cabeza Prieta National Wildlife Refuge, April 5, 2010). 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 cross-border violator (CBV) and USBP activity within the pronghorn range. Strong evidence of this correlation has been seen during the biennial aerial surveys, where since 2000, off-road vehicle tracks have been seen progressively increasing in extent and density, throughout the pronghorn's 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.

Distribution within BMGR-East

Based on the locations of collared Sonoran pronghorn within the US sub-population from 1983-1993, Sonoran pronghorn occurred most frequently in the following areas: Pinta Sands, Growler Valley, Mohawk Valley, San Cristobal Valley, and between the Growler and Little Ajo mountains (Daniel's Arroyo area). All Sonoran pronghorn localities from 1994-2001 were south of I-8, east of the Copper and Cabeza Prieta mountains, and west of SR 85 (Figure 4; Bright *et al.* 2001). Although Sonoran pronghorn continue using these same general areas, they are using them to different extents. For example, telemetry data from collared Sonoran pronghorn show a declining trend in habitat use near the U.S.-Mexico international border. Between 2006 and 2008, collared Sonoran pronghorn used areas on average approximately ten miles farther north of habitat used between 1994 and 1996 (Figure 4), which could possibly be attributed to illegal border activities and required law enforcement response near the border that may be driving pronghorn north.

Furthermore, Sonoran pronghorn monitors (biologists funded by the USAF to conduct visual surveys for Sonoran pronghorn of the TAC ranges) have reported dramatic increases in Sonoran pronghorn sightings in BMGR-East over the last few years. On STAC, Sonoran pronghorn sightings increased 60 percent between 2005 and 2006, 107 percent between 2006 and 2007, and 175 percent between 2007 and 2008 (see Figure 1 of the BA). Sonoran pronghorn sightings have also increased on the NTAC from one sighting in 2006 to two in 2007 and 38 in 2008.
Based on the most recent 2009 monthly Sonoran pronghorn monitors reports, these annual numbers are anticipated to continue to increase. It is unclear why Sonoran pronghorn have recently been found more often and in greater concentrations on the STAC; some suggestions may include the proximity to the forage enhancement plots and captive breeding pen, the addition of an artificial water source and alfalfa feed station in 2009, and the increase in illegal border activities and associated law enforcement activity to the south of STAC.

In 2008, four collared pen-raised bucks moved northeast of the recent U.S. Sonoran pronghorn distribution area, travelling through BMGR-East's Manned Ranges 2 and 4 and exiting BMGR-East to the north (Figure 4). Three of these drowned in an irrigation canal and one traveled on a roundabout route south to Sonora. In February 2009, a lone, recently released pen-raised buck wandered onto Manned Range 2 near the active strafing area. He stayed in the vicinity of target on Manned Range 2 for about one week. An attempt to capture and relocate him with other animals was made by AGFD; however, it was not successful as the buck died likely due to capture myopathy.

Sonoran pronghorn are occasionally present throughout the San Cristobal Valley and within the Air-to-Air Range, though radio-telemetry data indicates that this area has not frequently been used by them since 2006.

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 April 5, 2010) 69 pronghorn (44 adults and 25 fawns) in the enclosure. Since establishing the program, 13 pronghorn, primarily juveniles, yearlings, and two-year olds, have died in the pen due to various causes, including epizootic hemorrhagic disease (8), bobcat predation (2), entanglement in the fence (1), and capture operations (2). Sonoran pronghorn have been released from the pen every year since 2006. As of February 2010, a total of 44 individuals, primarily males, have been released, 25 of which are known to still be alive. Currently, more male fawns are

surviving in the pen than females; this is thought to be associated with less than optimal nutrition (it has been documented than when females are stressed, they tend to give birth to more males) (personal communication with John Hervert, Arizona Game and Fish Department, April 13, 2010). As the nutrition of pronghorn in the pen has improved, the female to male ratio has increased, however it is still favors males slightly. As females contribute much more significantly to population growth and recovery than males, producing and releasing females is more desirable. Due to sex ratios that favor males and because more females than males need to be kept in the pen to serve as breeding stock, it is anticipated that at least for some time more males than females will continue to be released. If the female to male sex ratio of fawns in the pen increases, more females will likely be released in the future.

The objective is to produce at least 20 fawns each year to be released into the U.S. population, and potentially to establish a second U.S. 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 were made available for public review and comment in February 2010.

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 6). 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. In December 2009, surveys indicated pronghorn numbers increased somewhat with an estimated total of 482 (311 observed) individuals combined for both sub-populations (including 381 pronghorn [258 observed] in the area southeast of Mexico Highway 8 and 101 [53 observed] to the west of the highway).

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. The trend in apprehensions and drive-throughs in the Ajo Station's overall Area of Operation has declined in recent years, particularly after the construction of the vehicle fence.

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

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 CPNWR are now criss-crossed with a network of illegal north-south roads and trails, even though those areas are designated as Wilderness. A recent mapping effort conducted by CPNWR shows almost 8,000 miles of illegal routes. 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 burned as a result of these fires.

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

Drought and Climate Change

As discussed, drought may be a major factor in the survival of adults and fawns (Bright and Hervert 2005), and the major decline in 2002 was driven by drought. Mean annual temperatures rose 1.8-3.6 ^{0}F in the American Southwest from 1970-2004, that trend is accelerating, and is predicted to continue through the 21st century and beyond (Intergovernmental Panel on Climate Change 2007). Most of the observed increases in globally averaged temperatures since the mid-20th century are very likely due to the observed increases in anthropogenic greenhouse gas concentrations (Intergovernmental Panel on Climate Change 2007). In the Sonoran Desert, anthropogenic climate change is causing warming trends in winter and spring, decreased frequency of freezing temperatures, lengthening of the freeze-free season, and increased minimum temperatures in winter, which will likely cause changes in vegetation communities (Weiss and Overpeck 2005). These increases in temperature are predicted to be accompanied by a more arid climate in the Southwest (Seager *et al.* 2007, Intergovernmental Panel on Climate Change 2007). As a result, the Sonoran pronghorn is expected to be confronted with more frequent drought, which increases the importance of recovery actions, such as forage enhancement plots and water developments, which can offset the effects of drought.

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 101 in 2009, the Pinacate sub-population is also well below desired numbers. At 381 (in 2009), 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 biological opinion 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 2009, 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 and the August 2009 long-term (48-months) drought status report (http://www.azwater.gov/dwr/drought/documents/August2009DroughtStatusUpdate.pdf) indicated that southwestern Arizona was experiencing conditions of abnormally dry to moderate drought. Current (winter 2009-2010) range conditions have significantly improved due to winter rain events; however, the January 2010 long-term (48-months) drought status report (http://www.azwater.gov/azdwr/StatewidePlanning/drought/documents/janlong.pdf) continues to indicate that southwestern Arizona is experiencing conditions of abnormally dry to moderate drought. A significant long-term improvement was anticipated by the April update if the January-March period continued to experience a wet El Niño pattern.

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.

More recently, in March 2009, three temporary, experimental feed and water stations were placed on STAC on the BMGR-East. The objective of this cooperative effort by CPNWR, AGFD, and the Luke AFB was to 1) attempt to lure pronghorn off of targets on NTAC and STAC where their persistent presence was significantly affecting military training missions, and 2) enhance pronghorn survival and recruitment during a period of prolonged drought. The stations were originally placed at locations agreed to by Luke AFB. Pronghorn began to frequently use one of the stations starting in April 2009; however, pronghorn did not show an affinity for other two stations. Subsequently, the heavily used station was moved incrementally (about 1.3 miles each time) south and east in late June and again in November to lure pronghorn off the active targets on the TACs. By August 2009, over 30 pronghorn, including fawns, were using the station on a daily basis. The food and water station experiment was successful at achieving both of its objectives. As range conditions worsened due to persistent drought, use of one station increased and it is thought that the station contributed significantly to fawn recruitment in 2009. After range conditions improved as a result of winter rainfall events in early 2010, pronghorn use of the station was considerably reduced. After February 2, no pronghorn were detected using the station.

A semi-captive breeding facility at CPNWR was first stocked with pronghorn in 2004 and as of April 5, 2010 contains 69 animals (44 adults and 25 fawns). 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 (AGFD), 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>U.S. Border Patrol Activities in the Tucson Sector, Arizona</u>

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) <u>Smuggler/Drug Interdiction</u>

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 six times, resulting in revised biological opinions dated November 16, 2001, April 7, 2003, March 10 and August 23, 2005, March 8, 2007, and December 10, 2009. 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 south 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. The sixth reinitiation addressed a one-time deviation from the aforementioned conservation measure to allow DHS to construct towers TCA-AJO-170, 302, and 003 and associated access roads outside the area referenced in the conservation measure. OPCNM issued a Special Use Permit for the construction of these towers on OPCNM lands; however as the lead action agency, DHS consulted on the entire action and incidental take associated with the action was attributed to DHS rather than OPCNM.

5) U.S. 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, August 6, 2003, and October 21, 2009. 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 and 2009 versions of the biological opinion, no incidental take of pronghorn was anticipated and none is known to have occurred.

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. Because the animal had been heavily scavenged by the time it was found, the cause of death was impossible to determine. It is possible that it was killed by strafing near NTAC or it may have died during combat with another animal.

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, USN, 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.

11) SBI*net* Ajo-1 Tower Project, Ajo Area of Responsibility, USBP Tucson Sector, Arizona

This biological opinion (consultation number 22410-F-2009-0089), issued December 10, 2009, addressed the DHS's implementation of the SBI*net* Ajo-1 Tower Project in the Ajo Station's Area of Responsibility of USBP-Tucson Sector, Arizona. The project included the following components: construction, operation, and maintenance of communication and sensor towers; construction, use, and maintenance of new associated access roads; repair, improvement, use, and maintenance of associated approach roads; USBP operations, including relocating and operating a forward operating base (FOB); and implementation of conservation measures for endangered species. Adverse effects to pronghorn included 1) disturbance of Sonoran pronghorn from noise and lights associated with tower, road, and FOB construction, operation, and maintenance; 2) loss of foraging habitat from tower and road construction; 3) increased risk of collision with project construction and maintenance vehicles; 4) continued degradation of habitat from USBP operations; and 5) disturbance of pronghorn from USBP operations, potential shifts in CBV traffic to important pronghorn areas, better access for the public provided by new or improved roads, and the presence of towers in Sonoran pronghorn habitat. Long-term beneficial effects to Sonoran pronghorn were anticipated if the project results in greater effective control of the border leading to eventual decreased CBV and USBP activity in the project area. Included were a number of best management practices and offsetting measures to avoid, minimize, and offset effects to Sonoran pronghorn resulting from the project, including the contribution of funds to implement Sonoran pronghorn recovery actions. We determined that the proposed action was not likely to jeopardize the continued existence of the pronghorn. We anticipated take of three Sonoran pronghorn due to harassment within the first year of towers becoming operational and two every 5 years thereafter; and one due to direct mortality over the life of the project. The following reasonable and prudent measures were provided: 1) monitor incidental take resulting from the proposed action and report to the FWS the findings of that monitoring; and 2) minimize harassment of Sonoran pronghorn resulting from the proposed action. To date, we are not aware of any incidental take attributable to the project.

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 69 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 current opinions that anticipate incidental take are 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, and the Ajo 1 Tower opinion, in which we anticipated take of three Sonoran pronghorn due to harassment within the first year of towers becoming operational and two every 5 years thereafter; and one due to direct mortality over the life of the project. 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

Our understanding of the effects of the proposed action has not changed dramatically since the August 6, 2003 biological opinion; however, the free ranging U.S. Sonoran pronghorn population has increased from about 21 to about 80 to 90 (as of April 2010). Furthermore, habitat use patterns of the Sonoran pronghorn have also changed, with increased use of BMGR-East. The increased number of animals in the U.S. population and the increased use of BMGR-East by Sonoran pronghorn elevate the potential for interaction between pronghorn and military activities. Thus, the likelihood of adverse effects occurring to individuals or the population is increased (although any adverse effects that occur would have a proportionally reduced impact to the species due to the larger population size). Recovery actions have not only helped to increase the Sonoran pronghorn population, but they have also helped create a less stressful environment, in that forage and water is now available even during drought, and thus the wild pronghorn population is better equipped physiologically to withstand stress, such as human disturbance.

Furthermore, animals produced in the semi-captive breeding facility are now augmenting the wild population.

Effects of ongoing and proposed activities on the Sonoran pronghorn can still be segregated into effects of ground-based activities and effects of overflights. Ground-based activities can destroy or degrade forage and cover, and result in behavioral or physiological changes that may be detrimental (Geist 1971, Freddy *et al.* 1986, Workman *et al.* 1992). In response to military overflights, pronghorn may exhibit a startle response or may flush from cover (Krausman *et al.* 2001, Hughes and Smith 1990, Workman *et al.* 1992, Luz and Smith 1976). Pronghorn may alter use of areas to avoid aircraft noise or disturbance (Bleich *et al.* 1990, Krausman *et al.* 1986), or may exhibit other physiological or behavioral responses that could be detrimental (Bowles 1995, Norrix *et al.* 1995, Stockwell and Bateman 1987, Berger *et al.* 1983). In addition, overflights may involve delivery of chaff, flares, rockets, practice or live ordnance, and practice rounds that may affect pronghorn directly or may degrade their habitat. Aircraft crashes and crash rescue or cleanup activities for expended ordnance or crash sites may also impact the pronghorn and its habitat.

Proposed enhancement numbers 1, 3, 5, 7, 9, and 10 may result in adverse effects to Sonoran pronghorn and are addressed below in the context of the effects analysis from the 2003 biological opinion. Proposed enhancements 2, 4, 6, and 8 are not addressed below for the following reasons. Proposed enhancement numbers 4, 6, and 8 are outside the current Sonoran pronghorn range and are therefore not expected to affect Sonoran pronghorn. As such, they are not analyzed below. Proposed enhancement 2 streamlines LAFB's existing environmental review procedures for target reconfigurations. Implementation of the streamlined procedure will not result in adverse effects to Sonoran pronghorn. As part of the procedure, if LAFB determines any target reconfigurations would result in effects to listed species not considered in this biological opinion, they would reinitiate section 7 consultation.

Overview – Effects of Ground-Based Activities

Behavioral responses of wild ungulates to human activities range from none to panic flight and abandoning areas of disturbance (Jorgenson 1988), while physiological responses may include a variety of effects that can influence survival and reproduction, 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. Disturbance from human activities may also lead to increased risk of predator attack, susceptibility to heat stress and malnutrition, and abandonment of fawns.

Similar to those of other ungulates, observations and studies of Sonoran pronghorn response to ground-based activities have shown a range of reactions. Wright and deVos (1986) noted that Sonoran pronghorn exhibit "a heightened response to human traffic" as compared to other subspecies of pronghorn. Hughes and Smith (1990) found that a Sonoran pronghorn immediately ran 1,310-1,650 feet from a vehicle. Anecdotal evidence suggests that Sonoran pronghorn avoid and may abandon areas of high human activity and that this behavior has led to fawn mortality, as is thought to be the case with pronghorn abandonment of the Granite Mountain FEP (see Status of the Species, *Human-caused Disturbance* above).

deVos (1989) investigated the relationship of telemetered pronghorn localities to the proximity of "concentrated military activities" on the BMGR. Pronghorn tended to be found relatively close to military activities, particularly in areas within 660 feet of military zones, and were found less than expected in areas 5,250 to 21,000 feet from military zones. This occurred despite the fact that many pronghorn were

initially captured on CPNWR and OPCNM, at points distant from military activity, and would not be expected to occur near military zones.

Hervert *et al.* (2000) investigated use of military target areas by pronghorn, and found that pronghorn showed a preference for some of these target areas. The first 0.6 mile around targets was most preferred by pronghorn, and the authors concluded that pronghorn may be attracted to the airfield and HE Hill on the NTAC. The authors surmised that pronghorn may be attracted to these areas because of available water, forage, and greater visibility. They documented pronghorn drinking from water collected in a bomb crater in this area. The authors found that pronghorn may be attracted to areas with plywood targets, but appeared to avoid metal convoy target areas. Plywood targets were typically located on bajadas, and association with these targets may have been incidental to pronghorn preference for this habitat type.

Krausman *et al.* (2001) investigated effects of military overflights and ground-based activities on the pronghorn at NTAC and STAC. This is the only comprehensive study of the effects of military activities on the Sonoran pronghorn. The NTAC and STAC support some of the most intense military use on the BMGR, and, within the current range of the pronghorn, are where most live fire practice and live ordnance delivery occur. The ranges are used heavily by pronghorn; 21 (about 20 percent of the U.S. population) used the two TACs during the study by Krausman *et al.* (2001). Krausman *et al.* (2001) observed 2,128 ground-based events, 443 overflight events, and 594 occurrences of other air stimuli (flares, bombs, smoke) on the BMGR. In response to all stimuli, on days without stimuli, pronghorn foraged more and bedded less than on days with stimuli; the opposite was true for fawns. Krausman *et al.* (2001) only considered a change in behavior to trotting or running in response to stimuli as biologically significant. Eighty-seven (4.1 percent) of the 2,128 events with ground-based stimuli resulted in pronghorn changing their behavior to trotting or running. A total of 866 (41 percent) resulted in some change in behavior.

Krausman *et al*. (2004) found that pronghorn rarely responded to military aircraft, but often moved greater than 10 m when ground stimuli were present. Krausman *et al.* (2001) also monitored noise levels at the BMGR. In regard to all forms of military activities, the authors concluded that: 1) behavioral patterns of pronghorn were similar with and without presence of military stimuli, 2) behavioral patterns of pronghorn exposed to military activity were similar to that of pronghorn not exposed to regular military activity, and 3) auditory characteristics are similar for ungulates that have and have not been exposed to sound pressure levels characteristic of military activity. Military activity was associated with changes in the behavior of pronghorn, but these changes did not likely influence animals in a detrimental manner. 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). The authors found that because of low fawn productivity and recruitment, they could not draw specific conclusions about fawn behavior in the presence of military activity. Fawns were involved in two of the six instances pronghorn moved more than 33 feet. Fawns appeared to respond to military stimuli as do their mothers, which may be more sensitive to anthropogenic stimuli than other pronghorn.

Any activity that is detrimental to fawns is important to the conservation of the pronghorn because low fawn recruitment appears to limit population size. Hervert *et al.* (2000) investigated fawn survival on the BMGR versus OPCNM and CPNWR, and found no difference in daily mortality rates of fawns between the BMGR and the other two areas. The authors concluded that their data do not support a hypothesis that fawn survival is affected by military training activities. However, military overflights and other ground activities (e.g., CBVs, USBP, and recreation) occur in all three areas to varying degrees; thus it is not

possible to evaluate the effects of human activities, including military activities, on fawn survival, or to tease out the effects of ground-based or other types of military activities from other factors that may affect fawn survival.

With the increase in the U.S. Sonoran pronghorn population from about 21 in 2002 to about 80 or 90 in 2010 and increased use of the STAC and NTAC, the likelihood that individual pronghorn will be affected by military activities has increased similarly. Because pronghorn are more abundant and because their use of BMGR-East has increased, it is now much more likely that a pronghorn will be adversely affected by ground-based military activities, particularly during times when they are stressed by lack of forage and water. During these stressful times, running from vehicles or exclusion from foraging and watering areas could contribute to decreased physical condition and increased mortality of animals. Furthermore, fleeing behavior can cause fawns to be abandoned or separated from their mothers, which can leave them vulnerable to predator attack or cause physiological stress that results in death. Forage enhancement plots and water developments provide pronghorn with a buffer against drought and allow them to better survive stressful periods, such as occurred in 2002. At the same time, if animals are in better condition due to forage enhancement and available water, they will be less affected by human interactions and disturbance.

Overview – Military Overflights

Overflights by themselves do not cause habitat degradation, but ungulates may respond with increased heart rates and may flee from aircraft in a response similar to ground-based stimuli (Weisenberger *et al.* 1996; Krausman *et al.* 1986, 1998, 2001; Workman *et al.* 1992; Hughes and Smith 1990). Krausman *et al.* (2001) is the only comprehensive evaluation of effects of military activities on the SOPH. The authors documented 149 direct overflights and 263 other overflights (in which the aircraft passed $\geq$ 328 feet to the side of the animal). Pronghorn changed their behavior 39 and 35 percent of the time during direct and other overflights, respectively. Krausman *et al.* (2001) only considered a change in behavior to trotting or running in response to stimuli as biologically significant. Pronghorn broke into a trot or ran 3.7 percent of the time when exposed to direct overflights, and 1.6 percent of the time during overflights greater than 328 feet to one side of an animal. Pronghorn also ran during a crash of an F-16. Pronghorn trotted or ran in response to flares, bombs, and smoke 1.0 percent of the time. Of the nine instances where pronghorn changed their behavior to trotting or running, only two of these resulted in animals moving more than 33 feet, including a crash of an F-16, and one instance of an overflight at greater than 1,000 feet AGL. In response to all ground and air stimuli, on days without stimuli, pronghorn foraged more and bedded less than on days with stimuli. The opposite was true of fawns. Krausman *et al.* (2001) concluded that military activity was associated with changes in the behavior of pronghorn, but these changes did not likely influence animals in a detrimental manner.

The authors acknowledged that their conclusions were inconclusive in regard to fawns, because of small sample sizes. Other questions remain unanswered as well. The authors observed few “low-level” (less than 1,000 feet AGL) flights; including six direct military overflights, 15 indirect military overflights (where the flight occurred more than 328 feet to the side of a pronghorn), and 14 other low-level direct and indirect overflights; thus the effects of this type of flight were not examined in any depth. Also, the authors did not distinguish between fixed-wing and helicopter flights. However, we suspect the authors observed few helicopter flights, and most overflights were probably fixed-wing aircraft at high elevation: most overflights in R2301E are by fixed-wing aircraft greater than 1,500 AGL. Unfortunately, we cannot discern from Krausman *et al.* (2001) how pronghorn responded to low-level helicopter flights.

Studies of the effects of low-level helicopter flights on other ungulates suggest pronghorn may react more to this type of stimulus than other types of overflights. 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). Bighorn sheep have been documented to abandon their range in response to human disturbance, including human activity and helicopter activities (Jorgenson 1988). Pronghorn would be expected to move greater distances and respond for a longer period of time to helicopters than to fixed-wing aircraft. In a study of disturbance effects to pronghorn in Utah, sonic booms and subsonic aircraft flyovers caused elevated heart rates (Workman *et al.* 1992). Pronghorn exhibited the greatest response to a hovering Huey helicopter flown at 500 feet AGL (Workman *et al.* 1992). Luz and Smith (1976) found that pronghorn ran from a low-flying helicopter. Habituation by pronghorn to sonic booms and low-level overflights by F-16 aircraft and Huey helicopters was observed by Workman *et al.* (1992). However, pronghorn did not habituate to low-level hovering by a Huey helicopter. Low-level flyovers by a Cessna 182 elicited apparent habituation in one pronghorn but not another. Landon *et al*. (2003) found that in areas with noise produced by military aircraft, Sonoran pronghorn used the lowest noise level area more than the higher noise level areas.

Disturbance and flight of ungulates caused by a variety of sources are known to result in numerous physiological effects that can be adverse, including elevated metabolism, lowered body weight, reduced fetus survival, and withdrawal from suitable habitat (Geist 1971, Harlow *et al.* 1987). Mule deer disturbed by snowmobiles and humans on foot expended from 0.2 to 5.0 percent of their daily metabolizable energy in each encounter (Freddy *et al.* 1986). Frequent disturbance imposes a burden on the energy and nutrient supply of animals (Geist 1978), which may be exacerbated in harsh environments such as the BMGR. Repeated stimuli commonly leads to habituation and reduced response (Harris 1943); however, animals should habituate reluctantly to stimuli that pose a threat (MacArthur *et al.* 1979). Despite these findings, overflights of bighorn sheep elicit only minor physiological response and a minor increase in stress (Krausman *et al.* 1998).

The U.S. Sonoran pronghorn population increased from about 21 in 2002 to about 80 or 90 in 2010 and pronghorn use of STAC and NTAC has increased. As a result, the encounter rate between aircraft and pronghorn will have increased similarly. Although encounters between pronghorn and aircraft have likely increased relative to when the population was smaller, because the population is larger, each animal is not as important in comparison to 2002, making adverse effects to an individual less important (again, relative to 2002) to the survival and recovery of the U.S. population. Aircraft activities that elicit pronghorn response (such as fleeing behavior) or that lead to reduced use of preferred habitat could contribute to decreased physical condition of individual animals or abandonment of fawns, both of which could result in increased mortality, particularly during times of drought. As mentioned above, forage enhancement plots and water developments provide pronghorn with a buffer against drought and allow them to better survive stressful periods, such as occurred in 2002. At the same time, if animals are in better condition due to forage enhancement and available water, they will be less affected by disturbance.

Effects of Ordnance Delivery

Direct death or injury to pronghorn could occur as a result of ordnance deliveries, other objects falling from aircraft, spent shells, live rounds, or pronghorn stepping on ordnance. Potential impacts of normal ordnance deliveries are limited to manned and tactical ranges except for air-to-air live ammunition, which is a very rare activity. On manned ranges and most areas of tactical ranges, ordnance is limited to cannon fire and practice bombs and rockets. HE delivery is limited to HE Hills, one of which occurs on each of the tactical ranges. Live Maverick missiles are used on one target near the southern border of NTAC and one target in ETAC. Numerous targets throughout the ranges also receive various degrees of strafing.

ETAC and Manned Range 3 are outside the known current range of Sonoran pronghorn based on telemetry data from 2000 to 2008. Manned Ranges 2 and 4 are generally outside the current range of Sonoran pronghorn based on telemetry data from 2000 to 2008; however, released pen-raised bucks were documented using these ranges in 2008 and 2009. These ranges are west of Highway 85 – no substantial barriers exist to movement of pronghorn into these areas - and as the pronghorn population continues to grow, we expect Manned Ranges 2 and 4 to receive more pronghorn use. Pronghorn also occasionally occur on Manned Range 1. Therefore, pronghorn appear to be most at risk of death or injury as a result of ordnance from live fire air-to-air training and from air-to-ground training on STAC, NTAC, and Manned Range 1, and the Air-to-Air Live Fire Areas. Additionally, pronghorn, particularly pen-raised animals, may also be at risk of death or injury on Manned Ranges 2 and 4.

The likelihood of practice bombs or inert ordnance affecting pronghorn is remote. Such ordnance or pieces thereof would have to fall on or otherwise strike an animal to kill or injure it. Of greater concern are live bombs and strafing or cannon fire. To reduce the risk of injuring or killing a pronghorn from ordnance delivery activities, Luke AFB has developed operating instructions (OI-13-01) for the pronghorn on NTAC and STAC. These instructions are implemented during any HE delivery of ordnance and also as triggered by other events as described in the "Description of the Proposed Action". The instructions require at least two monitors per tactical range during the daylight hours. The ranges are monitored visually and by telemetry daily (for animals with transmitters) for two hours before delivery begins. In the 2003 biological opinion, if a pronghorn was sighted, no strafing or training ordnance deliveries were made within 3 km (1.2 miles) and no live ordnance was delivered within 5 km (3.1 miles) of the pronghorn. Now, if a pronghorn is sighted, no strafing will be made within 1.0 km, no training ordnance will be delivered within 0.5 km, and no live ordnance will be delivered within 1.5 km of the pronghorn.

To further reduce the risk of injuring or killing pronghorn, Luke AFB also implements target closure protocols at Manned Range 1. According to protocol, the RCO scans the downrange area and around the conventional circles (target area) before commencing daily operations at Manned Range 1. In 2003, the Manned Range 1 target closure distance for strafe activities was 3.0 km and for inert bombing activities, it was 1.0 km. The new target closure distance for strafe activities will be 0.5 km up range and laterally from the target and 1.0 km downrange of the target. For inert bombing activities, the new target closure radius will be 0.5 km. This protocol will also be implemented at Manned Ranges 2 and 4 if Sonoran pronghorn are documented north of the Crater Range and within three kilometers of the Ranges.

No mortality or injury of pronghorn as a result of ordnance delivery or unexploded ordnance has been documented. As described in the 2003 opinion, remains of a pronghorn were found near a strafing target at the North TAC in 1999. Because the animal had been heavily scavenged by the time it was found, the cause of death was impossible to determine. It is possible that it was killed by strafing near NTAC or it may have died during combat with another animal. During 374 hours of observing pronghorn on the North and South TACs, Krausman *et al.* (2001) noted 594 instances of flares, bombs, smoke, and strafing. Although we do not know what percentage of these instances were bombs or strafing, no injury or mortality of pronghorn were recorded. Pronghorn in and near target areas are at risk of death or injury; however, that risk appears low based on this information.

As described above, monitoring and target closure protocols reduce the risk of death or injury to Sonoran pronghorn due to ordnance delivery. However, there is a chance that pronghorn may not be detected during monitoring sessions. If this were to occur, pronghorn would be at risk of being killed or injured due to explosive ordnance delivery. Furthermore, the protocol is based on the nature of the training

activity and previous sighting information and therefore monitoring is not always conducted on every day that strafing and inert weapons deliveries occur. As such, in the absence of monitoring, there is an increased risk that pronghorn may wander onto targets or other areas where bullets or inert bombs land and could be killed or injured. These risks have likely increased since 2003 for the following reasons: 1) the U.S. Sonoran pronghorn population has grown considerably; 2) the behavior of the Sonoran pronghorn has changed over the past two years such that they are now concentrating on the STAC and NTAC; and 3) because the behavior of pen-raised animals, particularly within the first year of their release, is generally more erratic and less predictable than that of the wild animals (e.g. pen-raised pronghorn occurring on Manned Ranges 2 and 4). Furthermore, the risks are likely higher for males, particularly pen raised males, than it is for females. Male ungulates tend make greater movements than females; these movements are thought to be associated with finding receptive mates (personal communication with John Hervert, Arizona Game and Fish Department, April 13, 2010). It has been observed that, particularly under conditions with favorable forage, adult male Sonoran pronghorn tend to move farther than females (personal communication with John Hervert, Arizona Game and Fish Department, April 13, 2010). Currently, there is a skewed sex ratio favoring males in the wild population in Arizona and in the semi-captive facility. Because, at least currently, more males than females are surviving in and being released from the pen, we anticipate the sex ratio of free ranging pronghorn will continue to favor males for some time. Due to the higher number of males in free ranging population and the tendency of males to make greater movements, we anticipate males will be at greater risk of being killed or injured by any ordnance delivery activities than females.

Luke AFB is proposing reducing the target closure distances, which on the surface is suggestive of higher risk of death or injury to Sonoran pronghorn due to ordnance delivery. However, based on the weapons zone analysis results (i.e., that inert munitions will fall 99 percent of the time within a 500 meter radius of the specified target; strafe will strike 99 percent of the time within a 1,000 meter radius of the specified target; and live explosive and shrapnel will fall 99 percent of the time within a 1,500 meter radius of the specified target), we anticipate the increase in risk will be small, and may represent a reduction in risk over the situation when the original target closure distances were first implemented (1996) – which was at a time when weapons delivery was less accurate, so the hazard zone around targets was much larger. Because the closure distances will be reduced, pronghorn could occur closer to ordnance delivery activities which may cause some increased level of disturbance to pronghorn. As a result, pronghorn could exhibit adverse behavioral changes, such as fleeing from the area. This behavior was observed in pronghorn in the captive facility in association with an explosion at HE Hill (personal communication with James Atkinson, Cabeza Prieta National Wildlife Refuge, April 12, 2010).
Based on a study that showed no effects to the hearing ability of mule deer living near high ordnance delivery activities at ETAC (personal communication with John Hervert, Arizona Game and Fish Department, April 13, 2010), we do not anticipate the hearing of Sonoran pronghorn will be greatly affected. This said, reduced target closure distance associated with the delivery of HE ordnance could result in adverse physiological effects that we do not understand.

Air-to-Air gunnery range operations within the Air-to-Air Range could potentially injure or kill a pronghorn. However, because the use of live fire gunnery for Air-to-Air target practices is now an extremely rare event, the likelihood of ammunition striking a Sonoran pronghorn is very low.

<u>Flare and Chaff Delivery; Illumination devices; Laser Targeting;</u>

The effects of chaff and flares were evaluated by the U.S. Air Force Air Combat Command (1997). The report concluded that chaff is unlikely to have any adverse effects to terrestrial wildlife, although adverse

effects were possible in aquatic systems. If chaff fell in water, the effects of pronghorn using that water were unknown.

The primary effect of flares is the increased incidence of fire. On the BMGR, fuel loads are generally very low, making the likelihood of a flare-caused fire very low. However, in some years, such as 2005, with abundant ephemeral vegetation, flares could ignite fires. If ignited, fires would not likely carry far due to discontinuity of fuels. However, as evidenced in 2005 when over 63,000 acres burned on BMGR-East and 7,500 acres burned on CPNWR as a result of fires ignited by military training and CBVs, there is a real potential for large fires on BMGR-East and adjacent areas. The amount of habitat loss due to potential fire cannot be predicted; however, fire could at least temporarily impact a significant amount of pronghorn habitat, as in 2005, when about 29,260 acres of pronghorn habitat burned. Fire likely has mixed effects on pronghorn. Fire can temporarily reduce forage and cover resources; however, it can also can increase visibility and stimulate growth of annual plants and forbs that provide forage for pronghorn and. If areas burn repeatedly, permanent changes in the flora are likely, such as the establishment of non-native species and displacement of native species, which could detrimentally affect pronghorn. To minimize the potential for fires, during times of elevated fire risk, Luke AFB adjusts the minimum altitude at which flares are dispensed to ensure the device fully burns out before reaching the ground.

Up to 24 rockets and 24 flares could be used nightly at the proposed STA. However, this does not represent an increase in flare use, but rather simply a change in the location of flare use. As such, we do not anticipate there will be an increased risk of accidental fire on BMGR-East as a result of flare use at the proposed STA. Furthermore, vegetation is very sparse in the San Cristobal Valley (within which the STA will be located); therefore, if flares ignite a fire within the STA, it is unlikely that the fire would carry far.

The use of night-time illumination devices at the STA site could also startle Sonoran pronghorn, especially if bedded in the area, and cause them to be more susceptible to predation. The risk of pronghorn being disturbed by night-time illumination device use at the STA is likely low because, based on telemetry data, few Sonoran pronghorn have been documented using this area from 2006 to the present. This risk will increase if Sonoran pronghorn use of the area increases, as was the case prior 2003.

The three TACs located in BMGR-East, are designated for use by combat lasers mounted on aircraft. Only NTAC and STAC are within the current pronghorn range. The lasers may cause eye injury or blindness if an observer looks directly into the laser light. The two TACS cover a large area, but the laser-focused hazard area is greater than the general hazard area in the TACS. If pronghorn were present in this area, potentially an animal in the hazard area could hear an approaching aircraft, look up at the aircraft and be hit by a laser that could injure or blind the animal. However, the area affected by a laser beam is very narrow and as a result it is very unlikely that a pronghorn would be directly in the path of a laser or be injured or blinded. No pronghorn are known to have been affected by laser targeting.

Sonoran pronghorn may be further exposed to the detrimental effects of lasers within the proposed STA target site in the Air-to-Air Range. However, this targeting laser is only activated in “combat” mode for approximately the last eight seconds of flight time for a precision-guided bomb; therefore, the potential for Sonoran pronghorn exposure would be minimal. Furthermore, as stated previously, few pronghorn have been documented in the last few years using the proposed STA area and the habitat loss that will result from the development of the STA is likely to further decrease the likelihood of pronghorn using the area or being affected by laser targeting.

Effects of Ground-based Activities

Ground based military activities, which occur regularly throughout BMGR-East within the Sonoran pronghorn range, could disturb, injure, or kill Sonoran pronghorn. These activities generally include 1) equipment maintenance conducted by vehicle, 2) road improvements and maintenance, 3) construction and maintenance of targets, including the proposed STA or moving vehicle target system, 4) EOD clearance activities, and 5) training missions involving ground troops.

In the 2003 biological opinion, we anticipated that the potential for injury or death to pronghorn from collisions with ground vehicles involved in military activities was unlikely because the majority of roads on the BMGR are unimproved and vehicle speeds are low. However, we anticipate this potential has increased for the following reasons: 1) the U.S. Sonoran pronghorn population has grown considerably and we anticipate continued growth; 2) the behavior of the Sonoran pronghorn has changed over the past two years such that they are now more frequently using BMGR-East; and 3) pen-raised animals are generally accustomed to the presence of humans and vehicles (i.e., those associated with monitoring, feeding, and other activities at the pen) and as such, they are more likely to be closer to human activities, including vehicular traffic. Furthermore, as discussed above, due to the higher number of males in the free ranging population and the tendency of males to have greater movements, we anticipate males will be at greater risk of being killed or injured by collisions with vehicles. To reduce the risk of vehicular collisions with Sonoran pronghorn, Luke AFB implements OI-13-01, which among other restrictions, includes the following: 1) vehicle speed limits are 45 mph on paved roads leading to manned ranges, 35 mph on maintained dirt roads, and 25 mph on all other roads; 2) if a vehicle is 1-2 km from a Sonoran pronghorn, the speed limit is 15 mph; 3) if a vehicle is less than 1 km from a Sonoran pronghorn, every effort is made to use an alternate route; if none are available and movement is essential, then the speed limit is 15 mph; and 4) if Sonoran pronghorn are observed running due to ground disturbance, vehicles near Sonoran pronghorn locations stop until animals have stopped running.

Collisions appear to be most possible on the road out to Manned Range 1, which is staffed on weekdays throughout the year except for times when the range is closed. The 35 mph speed limit and the openness of the terrain reduce the likelihood of collision, but do not eliminate it. Paving 7 miles of an existing graded road from the main tower within Manned Range 1 to the water well and adjacent RMCP 1 located near the boundary of the NTAC and STAC ranges could result in higher vehicle speeds due to improved driving conditions (for all users, including USBP) and possibly an increased likelihood of collisions with Sonoran pronghorn. To reduce this risk, the speed limit on the newly paved access road will remain at 35 mph (as opposed to being increased to 45 mph as is allowed on other paved roads leading to manned ranges) and additional speed limit signs will be posted to encourage compliance.

Ground-based activities may also result in disturbance to Sonoran pronghorn. As discussed in the overview, vehicles may elicit a flight response in pronghorn, with possible associated physiological effects that can be adverse, including elevated metabolism, lowered body weight, reduced fetus survival, and withdrawal from suitable habitat (Geist 1971). However, Krausman *et al*. (2001) found that military activity, including vehicle use, was associated with changes in the behavior of pronghorn, but these changes did not likely influence animals in a detrimental manner. Presence of troops or maintenance workers at areas of ground activities is transitory within current range of the pronghorn; however, when people are present on the ground, they are likely to exclude use by pronghorn of localized areas. This is likely to have the greatest effects on pronghorn during the critical portion of the fawning season, from March 15 to July 15, or during times of drought when pronghorn are in poor physical condition. If winter and spring rains have been spatially concentrated in portion of Childs or Growler valleys subject to military activities, pronghorn could be excluded from important foraging and watering areas. In years

with good winter/spring rainfall and abundant forage when pronghorn are in good physical condition, presence of troops and other personnel probably have minimal effects to pronghorn. The growing number of pronghorn in the U.S. population (relative to 2003) increases the likelihood of interactions between pronghorn and military activities. Forage enhancement projects and water developments will continue to improve the ability of Sonoran pronghorn to survive drought periods and buffer the effects of human disturbance on the U.S. population during these otherwise stressful periods.

A number of the proposed enhancements may result in increased short and long-term disturbance to Sonoran pronghorn. Paving the aforementioned 7-mile road segment could temporarily disturb pronghorn, though based on telemetry data from the past few years, pronghorn seldom occur in the area. Nevertheless, to reduce disturbance to pronghorn, OI-13-01, including the four aforementioned restrictions, will be enforced. Additionally, to minimize the adverse effects of any potential disturbance, road paving will be conducted outside of the Sonoran pronghorn fawning season. Because the road will not need to be maintained as frequently after it is paved (current maintenance occurs four times per year, whereas the paved road will not require maintenance for at least five years and then will require maintenance about every two to three years), long-term disturbance of pronghorn due to maintenance should be reduced.

Construction, maintenance, and operation of the proposed STA target site, improvement and maintenance of an existing 17 mile dirt access road (from Stoval field to the STA site), and periodic EOD clearance activities associated with the STA may cause additional short and long-term disturbance to pronghorn. Construction of the STA and road improvements will take about three months to complete, during which pronghorn in the area may be temporarily displaced or excluded from the area. To reduce adverse effects to Sonoran pronghorn, access road improvements will occur outside the fawning season to the degree possible.

Following STA construction, increased human presence at the STA (associated with routine maintenance of the site and EOD clearance) will likely cause increased long-term, intermittent disturbance to Sonoran pronghorn in the area. EOD clearance of the STA will be conducted over a one-week period or less for the 10-year clearance requirement and in a few days for biennial EOD clearance. The season in which EOD clearance will occur is subject to the overall schedule for all EOD operations; however, to minimize impacts to Sonoran pronghorn, the fawning season will be avoided. Routine maintenance activities at the STA will occur once to twice weekly. Following construction, the presence of target facilities could alter (decrease) pronghorn use of the unmanned target area. However, we do not anticipate presence of the target facilities will completely exclude use of the area, as pronghorn are known to frequently use target sites on STAC and NTAC (where ground disturbance activities associated with targets are similar to those that will occur at the new STA site). Within the new STA target site, the unmanned threat emitter could expose Sonoran pronghorn to harmful radio frequency energy. To reduce this threat, the area will be fenced to preclude the entry of large animals. Night-time lighting at the STA facility (mock street lights) may also cause long-term disturbance to pronghorn using this area. The Smokey SAMS associated with the STA could result in some visual disturbance to pronghorn, as they can generate a visible smoke column to approximately 1,000 feet AGL when launched.

Currently, the 17 mile dirt road is not maintained; however, after implementation of the STA, it will be maintained approximately annually. Additionally, road use will increase after the STA site is in use due to routine STA maintenance activities and periodic EOD clearance. To minimize disturbance to Sonoran pronghorn associated with maintenance and use of the improved road, OI-13-01 will be enforced.

Construction, maintenance, EOD clearance, and operation of the proposed moving vehicle target system in NTAC may cause additional short and long-term disturbance to pronghorn. To minimize adverse effects to pronghorn, road construction for the moving vehicle target will be done during the NTAC maintenance closure period which is outside of the fawning season. Though the moving vehicle target system will be built within active targeting areas on NTAC, implementation of the system will result in additional ground-based disturbance from the moving vehicle. Target vehicle speeds will generally be from 35 to 45 mph, however, speeds may increase to 60 mph for about 15 percent of track operations. This ground-based disturbance may cause pronghorn, which occur regularly within NTAC, to startle or flee or may prevent pronghorn from using or passing through the immediate or near-by areas. Additionally, the moving vehicle could collide with a pronghorn. To minimize the risk of the target vehicle colliding with or causing disturbance to pronghorn, target closure standards will be enforced such that if pronghorn are detected within the target closure radius, the mission will be cancelled or rescheduled. In addition to standard monitoring, remote control cameras will be used to ensure no pronghorn are present on or near the track prior to live fire. Monthly maintenance and periodic EOD clearance of the moving vehicle target road could result in long-term, though intermittent, disturbance to pronghorn. To minimize adverse effects to pronghorn, EOD clearances for the moving vehicle target system will be scheduled with other NTAC clearances (outside of the fawning season). Following construction of the system, the presence of target facilities could alter (decrease) pronghorn use of the unmanned target area. However, as stated above, we do not anticipate presence of the target facilities will completely exclude use of the area, as pronghorn are known to frequently use target sites on STAC and NTAC.

EOD clearance activities, analyzed in 2003, may disturb pronghorn. However, to minimize disturbance to pronghorn, Luke AFB has been and plans to continue to conduct this work outside of the fawning season on STAC and NTAC (see conservation measure #1). Since the issuance of the 2003 biological opinion, Luke AFB has significantly reduced the distances to which EOD personnel clear expended weapons as well as the duration and frequency of such clearances (see Table 3). As described in the "Description of the Proposed Action", as a result of the reduction in range clearance distances, the current biennial EOD clearance areas of the tactical and manned ranges in aggregate (including those within and outside of the current Sonoran pronghorn range) encompass about 10,900 acres, compared to about 25,500 acres that were previously cleared annually. Current decennial clearance area is about 23,000 acres combined for the three tactical ranges. This is about a 45 percent reduction compared to the 42,000 acres that were cleared every 5 years after 2001 until July 2007. Pronghorn will benefit from those reductions within the current pronghorn range (see the discussion below under "Habitat Destruction or Modification" for a comparison of acres impacted by EOD clearance and other activities within pronghorn habitat under the 2003 biological opinion and the current proposed action). Additionally, as a result of the significant reduction in range clearance distances, the duration of effort has also been reduced by over half. Previously, EOD clearances and maintenance for each area took a total of eight weeks, with EOD clearance lasting about seven weeks and maintenance occurring over the full eight weeks). Currently, EOD clearances and maintenance for each area last a total of six weeks, with EOD clearance lasting about three weeks and maintenance occurring over the six weeks.

The presence of troops on the ground was briefly analyzed in the 2003 biological opinion; however, Luke AFB currently proposes additional on-the-ground training activities that may disturb Sonoran pronghorn. Human presence, vehicles, and helicopters associated with training activities may cause pronghorn to startle or flee or may temporarily exclude pronghorn use of areas where these training activities occur. Because the training patrols could be anywhere within BMGR-East, it is difficult to predict where and how frequently troops may encounter pronghorn. However, the principal areas of insertion and extraction will be in Area B with teams moving into the military target areas of ETAC. Because both Areas B and

ETAC are outside of the current Sonoran pronghorn range, we anticipate the majority of the proposed training activities will not result in disturbance to pronghorn. Training activities in general will be short in duration (one to several days) and sporadic (there will be about 30 events per year lasting up to one day and four events per year that will include an overnight component). To minimize impacts to Sonoran pronghorn, the USAF will consider data from the ongoing Sonoran monitoring program and attempt to schedule the small tactical team training exercises in a manner that minimizes impacts to Sonoran pronghorn to the extent possible. Ground troops will be provided with pre-coordinated locations, access, and allowable operations during maneuvers (such as walking, camping, length of time on the Range, etc.). All vehicular activity associated with on-the-ground training will only occur on authorized roads and will comply with speed limits described in OI-13-01. In addition, all ground troops will be provided with training regarding their environmental responsibilities including those related to avoiding and minimizing impacts to pronghorn.

Certain events, including the Marine Corp's WTI course, could include up to 100 troops. These events will be infrequent (typically no more than two or three events per year) and will generally occur within the tactical ranges in areas of previous military ground disturbance. These larger-scale events (i.e., WTI course) generally involve land maneuvers over distances less than 3 miles (from the point troop insertion to their objective). To minimize impacts to Sonoran pronghorn, Luke AFB will revise OI-13-01 to apply to team training maneuvers. The revisions will preclude WTI course maneuvers (involving greater than 50 troops) within a 1 km radius of areas occupied by Sonoran pronghorn. In addition, as mentioned above, all ground personnel will be provided with training regarding their environmental responsibilities, including those related to avoiding and minimizing impacts to pronghorn.

Sand and gravel excavation, stockpiling, and use on BMGR-East may disturb pronghorn. Sonoran pronghorn have previously been observed in the areas of four of the 10 washes where borrow material will be excavated and three of five stockpile sites where borrow material will be deposited. Excavation and stockpiling activities may cause pronghorn to flee or may temporarily prevent pronghorn from using or moving through the area. The excavation activities, however, will be of short duration and adjacent to existing roads. Furthermore, excavations will not create deep pits into which pronghorn could fall or become entrapped.

Effects of Aircraft Crashes and Crash Rescue and Clean Up

Aircraft crash infrequently in currently occupied pronghorn habitat on the BMGR. Krausman *et al.* (2001) witnessed pronghorn response to a crash of an F-16. On February 16, 2000, five pronghorn were observed running at the moment of impact of an F-16 on the South TAC. The pronghorn were not visible before the crash, but ran more than 30 feet after the event. Pronghorn could potentially be hit by an aircraft or pieces of an aircraft, but this is highly unlikely. The noise and visual stimuli of a crashing aircraft is likely to be disturbing to pronghorn, and as witnessed by Krausman *et al.* (2001), they may flush or leave the area. Rescue operations and crash cleanup, involving emergency vehicles, trucks, and foot traffic are also expected to result in a flush response or pronghorn leaving the area. If natural fuels, such as dried annual plants, occur in abundance at the point of impact, a fire may result. However, because of generally low fuel loads in the desert scrub of the BMGR, a wildfire is not likely to carry far except in extraordinary conditions, such as in 2005 when a fire burned over 63,000 acres on BMGR-East.

Habitat Destruction or Modification at Tactical Ranges, Manned Range 1, Air-to-Air Live Fire Area, and Other Areas

In the 2003 biological opinion, Luke AFB estimated the area within their target ranges affected by various impacts and also estimated the area of the U.S. Sonoran pronghorn range overlapped by these areas of impact. Category 1 included areas regularly impacted by air-to-ground ordnance deliveries within manned and tactical target ranges. In these areas, habitat disturbance was the greatest and ranged from moderate to, at such sites as HE Hills, complete disturbance of soils and lack of vegetation. For this biological opinion, Category 1 includes areas within STAC, NTAC, and Manned Range 1 affected by annual target maintenance; a total of 6,330 acres are currently affected within this category. Roads are used for traveling into Manned Range 1 towers, access to ranges for operation for electronic warfare equipment maintenance, resource management, and EOD activities; and occasional use by ground, forward air controllers, security guards, contractors, and RMO staff. Ground spotters use existing roads to access areas for ground-based coordination with aircraft for targeting on an occasional basis.

In the 2003 opinion, Category 2 included areas subject to regular range munitions clean up; a total of 8,539 acres within STAC, NTAC, Manned Range 1 area were affected within this category. For this biological opinion, Category 2 includes areas affected within STAC, NTAC, and Manned Range 1 by biennial range clearance; a total of 4,840 acres are currently affected within this category. The range clearance process at BMGR-East is typically conducted using large six-wheeled drive trucks spaced at approximately 100-foot intervals in a line-abreast formation. The trucks are driven in parallel transects across the areas surrounding each target so that ordnance delivered to that target may be located. Clean up activities result in vehicle tracks and other disturbance associated with removal/disposal of ordnance, crushing or destruction of vegetation, and disturbance of soils.

In the 2003 opinion, Category 3 included areas subject to 5-year range munitions clearances. A total of 74,098 acres within STAC, NTAC, and Manned Range 1 were affected within this category. Currently, no areas are subject to 5-year munitions clearances. Instead, the 5-year clearance was replaced with a 10-year clearance with a smaller clearance radius. The 10-year clearance now extends to either 1) a radius of 1,000 feet or 2) the shorter radius where the density of debris is less than five per acre. As a result, a total of 14,225 acres within STAC, NTAC, Manned Range 1 area will be affected within Category 3 under the proposed action.

In the 2003 opinion, Category 4 included all roads in BMGR-East for which data were available. A total of 1,915 acres within STAC, NTAC, and Manned Range 1 were impacted within this category. For this opinion, Category 4 includes all roads, including primitive roads (10 foot width) and maintained roads (25 foot width) within the current pronghorn range (not just limited to STAC, NTAC, and Manned Range 1) not including those segments that fall within the categories listed above; a total of 738 acres are affected in this category.

As in the 2003 biological opinion, under the proposed action a total of 187,944 acres of the Air-to-Air Live Fire Areas continue to be subject to potential effects from rare events of live air-to-air fire, and falling spent shells.

Construction of the proposed STA target site in the San Cristobal Valley will impact up to 640 acres of Sonoran pronghorn habitat, with the main array of simulated targets potentially covering up to 400 of those acres, which will likely be rendered unsuitable habitat for pronghorn. Sonoran pronghorn will be completely excluded from 4.5 acres by safety fencing surrounding a portion of the STA. Some of the areas within the 640-acre site will also be degraded by maintenance and periodic EOD clearance

activities. To minimize ground disturbance, STA clearance will be completed with the fewest and lightest trucks possible. An additional 0.25 acre or less outside the STA may also be impacted by the placement of stacked containers that would serve as a vantage point for ground-based forward air controllers. The proposed STA target area represents a small percentage of the total available Sonoran pronghorn habitat in the San Cristobal Valley. We do not know the exact number of acres of Sonoran pronghorn habitat within the San Cristobal Valley; however, the INRMP Management Unit 4 includes San Cristobal Valley and a portion of the Mohawk, Aguila, and Granite Mountains, and totals 278,045 acres. Based on a map of Management Unit 4, it is reasonable to assume that at least half of this is pronghorn habitat.

Road construction for the proposed moving vehicle target system will disturb about 50 acres of Sonoran pronghorn habitat within the north TAC Range, but this area is co-located with Target 104/106 and has been previously disturbed for target features associated with the 104/106 complex (analyzed in the 2003 biological opinion). Sonoran pronghorn habitat surrounding the track will also be impacted as it will be used for the target system and will be affected annually during EOD clearances (as addressed above).

Sand and gravel excavation will degrade Sonoran pronghorn habitat; though this impact will be small (a total of 2.68 acres will be impacted by excavation). Stockpiling will not likely impact Sonoran pronghorn habitat as it will be done in disturbed areas along roads.

Because non-native plants often thrive in disturbed areas (Tellman 2002), the aforementioned activities (i.e., construction, maintenance, EOD clearance, etc.) could encourage the spread and establishment of these plants. Disturbed ground will be susceptible to colonization by invasive non-native plants such as buffelgrass, Sahara mustard, and *Eruca vesicaria*. Non-native species may outcompete native species, upon which pronghorn rely, and are known to carry fire, which could also impact pronghorn habitat. Many non-native plants carry fire better and often burn hotter than the native plants (Bock and Bock 2002, Esque and Schwalbe 2002) and most Sonoran Desert trees, shrubs, and cacti are very fire intolerant. For example, fires at Saguaro National Park resulted in greater than 20 percent mortality of mature saguaros (Schwalbe et al. 2000). As discussed above, the amount of habitat loss due to potential fire cannot be predicted; however, fire could at least temporarily impact a significant amount of pronghorn habitat. Again, fire could be beneficial if it stimulates growth of pronghorn forage and increases visibility or detrimental if it leads to a long-term decrease in forage.

In summary, the greatest contributor to habitat loss and degradation is the EOD clearances that occur at the Manned Ranges, TAC ranges (including at the proposed moving vehicle target system), along access roads, and at the proposed STA. Other contributors to Sonoran pronghorn habitat loss and degradation include the construction or reconfiguration of targets, including the construction of the proposed STA and the moving vehicle target system, and sand and gravel excavation and stockpiling. Permanent destruction/loss of habitat due to military activities reduces available resources for Sonoran pronghorn; however, disturbance of habitat due to military activities probably has mixed effects on pronghorn. In extremely affected areas, perennial forage and cover may be absent or scarce. In less affected areas, perennial forage and cover may still be reduced. However, as discussed in the overview, pronghorn are often attracted to these disturbed areas because of available water, annual forage – which may grow in greater abundance in these areas - and greater visibility. Pronghorn have been observed drinking water collected in a bomb crater (Hervert *et al*. 2000).

The proposed enhancements will result in additional loss and degradation of Sonoran pronghorn habitat. However, EOD clearance activities have substantially decreased in size, frequency, and duration since analyzed in the 2003 biological opinion.

Effects of Noise and Aircraft Overflights

Sonoran pronghorn may be affected by noise from and visual impacts of aircraft overflights. Pronghorn have been exposed to aircraft overflights on BMGR since 1941. Pronghorn are exposed to military aircraft overflights on most of BMGR-East (including those within the Air-to-Air Range, Manned Range 1, NTAC, STAC, and the northern portion of the CPNWR). However, most aircraft maintain a minimum altitude of 500 feet, with an increasing trend toward medium altitude operations (above 5,000 feet). While A-10, helicopter, and other aircraft still require flights below 500 feet, it is estimated this is less than 10% of all range sorties. It is also estimated that only a very small percentage of training flights require supersonic operations, and the minimum altitude for such activities is above 5,000 feet, but normally occurs above 15,000 feet. Most helicopter use of the BMGR-E is in R-2304, which is outside the current range of Sonoran pronghorn. In fiscal year 1995, helicopter flights over all of R-2301E, much of which overlies pronghorn range, were limited to 232 sorties in 72 flights. In 2008, helicopter flights over all of R-2301E totaled about 150 sorties in 45 flights. In the 2003 biological opinion, Luke AFB authorized helicopter use of the tactical ranges. With the proposed action, in addition to authorizing helicopter use of the tactical ranges, they will authorize such use at the STA and in association with ground troop training.

As discussed in the overview, Krausman *et al*. (2001) observed few biologically significant responses of pronghorn to overflights. Pronghorn broke into a trot or ran 3.7 percent of the time when exposed to direct overflights, and 1.6 percent of the time during overflights greater than 328 feet to one side of an animal. Krausman *et al*. (2001) did not distinguish between fixed wing and helicopter flights; however, because most overflights in R-2301E are by fixed wing aircraft at >1,500 feet AGL, the data collected by them probably reflect responses to high-level jets. Studies conducted by Landon *et al*. (2003) concluded that Sonoran pronghorn used areas with lower levels of noise more than expected and areas with higher levels less than expected. Areas with the highest sound pressure levels are also the areas with the highest levels of military activity (Landon *et al*. 2003).

Low-level helicopter flights are most likely to elicit biologically significant responses from pronghorn (see the overview, Workman *et al*. 1992, Weisenberger *et al*. 1996, Luz and Smith 1976). Helicopter use may result in flight response by pronghorn away from low-level helicopter flight routes. Disturbance and flight of pronghorn may result in numerous physiological effects that can be adverse, including elevated metabolism, lowered body weight, reduced fetus survival, and withdrawal from suitable habitat (Geist 1971). More information on the effects of helicopter use by the Marine Corps and ARNG can be found in the revised biological opinions for the activities of those agencies on the BMGR.

In addition to noise and visual impacts from aircraft overflights, other military activities on the BMGR-East that may adversely affect pronghorn behavior include noise from practice and live ordnance, use of air-dropped flares during night training, and ground-based human activity on manned and tactical ranges. Krausman *et al*. (2001) monitored noise levels at the BMGR. The loudest sound recorded was near HE Hill on the North TAC in 1998 that measured 121.8 decibels and had a duration of 59.1 seconds. Thirty-five of 737 hours monitored at this site had average sound levels of more than 70 decibels. At another site, five miles from the first site, noise levels were lower, and the maximum noise was 119.3 decibels. Krausman *et al*. 2001 did not specifically evaluate effects of noise on pronghorn at the BMGR. However, biologically significant responses to bombs, flares, and smoke were recorded infrequently (1.0 percent).

Krausman *et al*. (2001) found that because of low fawn productivity and recruitment, they could not draw specific conclusions about fawn behavior in the presence of military activity. Fawns appeared to respond to military stimuli as do their mothers, which may be more sensitive to anthropogenic stimuli than other

pronghorn. The endangered status of the pronghorn, the apparent heightened sensitivity of fawns and their mothers to disturbance, and the critical nature of fawn survival to population persistence suggests disturbance from aircraft overflights and other sources of noise or visual stimuli should be minimized during critical fawning periods (March 15-July 15), or during times of drought when pronghorn are in poor physical condition. If winter and spring rains have been spatially concentrated in portions of the Childs or Granite Valleys subject to military activities, pronghorn could be excluded from important foraging areas. In years with good winter/spring rainfall and abundant forage when pronghorn are in good physical condition, presence of troops or other personnel probably have minimal effects to pronghorn. Since the 2003 biological opinion, the U.S. Sonoran pronghorn population has increased, which consequently increases the likelihood of interactions between pronghorn and military activities. Forage enhancement projects and water developments will improve the ability of SOPH to survive drought periods and decrease the effects of human disturbance on the sub-population during these otherwise stressful periods.

In addition to those analyzed in the 2003 BO, noise and aircraft overflights associated with a number of the proposed enhancements, including the 1) STA, 2) moving vehicle target, 3) lowered flight altitude over CPNWR, 4) reduced Sonoran pronghorn target closure distances, and 5) ground training may result in additional disturbance to Sonoran pronghorn.

Sonoran pronghorn are occasionally present throughout the San Cristobal Valley and within the Air-to-Air Range, and may occur in the area of the proposed STA target site, though as previously mentioned, based on recent radio-telemetry data, this area is not currently frequently used by Sonoran pronghorn. Military training operations occurring within the Air-to-Air Range include both the air-to-air high range (11,000 – 80,000 feet AGL) and the air-to-air low range (surface – 10,000 feet AGL). During Mojave Viper and WTI exercises (which last up to six weeks), helicopters may land at the STA on an average of twice per week to support on-the-ground troop training. However, most helicopter training at the STA will not include landings but will normally be conducted at very low levels (50 feet AGL or less). An increase in UAV training is anticipated after the STA is developed, as it will provide enhanced opportunities for UAV mission training. With implementation of the proposed STA and the continued use of the Air-to-Air Range, there will likely be an increase in aircraft presence in this airspace. Sonoran pronghorn may experience some increased level of disturbance due to low-level aircraft associated with the STA and the air-to-air low range as well as the presence of UAVs and helicopters, including landings by helicopters at the STA site. Generally, however, increased use of the STA will result in decreased use of STAC, NTAC, and ETAC. Reduced aircraft use at NTAC and STAC will result in decreased disturbance to pronghorn at these sites, which are more frequently occupied by Sonoran pronghorn than STA.

Sonoran pronghorn have been documented throughout most of NTAC Range, including near the proposed moving vehicle target system south of the Crater Range. Due to scheduling conflicts between the moving vehicle target system and NTAC operations, use of the moving vehicle target track will not likely result in increases in airspace use of the NTAC, but could result in the more frequent overflights in the area of the moving vehicle target system. More frequent overflights of this area could result in increased disturbance to pronghorn. However, because the number of sorties within NTAC will not substantively increase, the standard Sonoran pronghorn monitoring and target closure protocol will be followed, and Sonoran pronghorn throughout the BMGR-East are likely habituated to noise from some aircraft overflights, we anticipate increased disturbance will be small.

Sonoran pronghorn occur on the valley bottoms and alluvial slopes throughout the area identified for low-level flights over the adjacent CPNWR (proposed enhancement 5). Low-level overflights (down to 500 feet AGL for F-16s and 200 feet AGL for A-10s) have been consistently conducted on BMGR-East over occupied Sonoran pronghorn habitat for many decades. Over the CPNWR, military aircraft previously maintained a minimum altitude of 1,500 feet except in MTRs, where aircraft may operate down to 500 feet AGL. Under the current proposal, up to 6,200 fixed-wing sorties per year will operate down to 500 feet AGL over a portion of the CPNWR (see figure 3). Though Sonoran pronghorn have likely habituated to some military overflights, particularly fixed wing, the long-term ramification of increased numbers of overflights at low altitudes is not fully understood. However, while monitoring pronghorn at the captive breeding pen on CPNWR, biologists have observed jets on numerous occasions flying over the pen at low levels (about 500 feet) and noted that pronghorn did not react to the jets in a detectable manner (personal communication with James Atkinson, Cabeza Prieta National Wildlife Refuge, April 12, 2010). Pen-raised pronghorn have been observed reacting to other stimuli. For example, helicopter overflights of the pen have caused fright responses in pronghorn, including fleeing, as was recently observed on March 29, 2010, when a USBP helicopter flew over the pen (personal communication with James Atkinson, Cabeza Prieta National Wildlife Refuge, April 12, 2010).

From 2008 to present, Sonoran pronghorn have been heavily using STAC. Additionally, since 2009 they have also increased their use of NTAC. As a result, in accordance with OI-13-01, numerous missions have been diverted to other targets or cancelled completely due to the high numbers of targets that have been closed. With reduced target closure distances, fewer targets are likely to be closed in the future. Open targets are used regularly for air-to-ground weapons training opportunities; therefore, Sonoran pronghorn present within STAC and NTAC may be subject to increased disturbance (both noise and visual) by overflights in these areas and, as discussed above under “Effects of Ordnance Delivery, by closer ordnance delivery. However, based on the high level of pronghorn use of the TACs, Sonoran pronghorn appear to be at least somewhat acclimated to aircraft overflights and other military training activities.

Helicopter use will increase in association with the proposed CSAR or similar small tactical team training exercise, as teams could be inserted into BMGR-East by helicopter. As discussed above under “Effects of Ground-based Activities,” human presence, vehicles, and helicopters associated with these training activities may cause pronghorn to startle or flee or may temporarily exclude pronghorn use of areas where these training activities occur. Because the training patrols could be anywhere within BMGR-East, it is difficult to predict where and how frequently helicopters may fly over pronghorn in association with team insertions. However, the principal areas of insertion and extraction will be in Area B with teams moving into the military target areas of ETAC. Because both Areas B and ETAC are outside of the current Sonoran pronghorn range, we anticipate the majority of the proposed training activities will not result in disturbance to pronghorn. To minimize impacts to Sonoran pronghorn, the USAF will consider data from the ongoing Sonoran monitoring program and attempt to schedule the small tactical team training exercises in a manner that minimizes impacts to Sonoran pronghorn to the extent possible.

Recreation, Natural Resources, and Cultural Resources Management

The effects of recreation, natural resources, and cultural resources management were analyzed in the 2003 biological opinion; however, they will not be analyzed in this BO, as they were comprehensively addressed in our August 26, 2005 biological opinion on the BMGR Integrated Natural Resources Management Plan.

Conservation Measures

Measures incorporated into the project will significantly help minimize project impacts to Sonoran pronghorn and their habitat. For example, 1) implementing the monitoring and target closure protocol (including modifying OI-13-01 to include the target closure protocols for the Manned Ranges 1, 2, and 4) greatly diminishes the risk that a pronghorn may be killed or injured due to ordnance delivery; 2) implementing the use of electronic scoring systems to reduce the number of air-to-ground weapons deliveries in pronghorn habitat reduces disturbance and the risk of death or injury due to ordnance deliveries; 3) conducting EOD activities on NTAC and STAC outside of the critical period for fawns and their mothers reduces the adverse effects of these activities on pronghorn; 4) limiting vehicles to designated routes and implementing low speed limits reduce disturbance and the risk of death or injury to pronghorn from vehicle collisions; 5) limiting surface disturbance minimizes habitat degradation and loss; and conducting sensitive species' briefings helps to decrease potential impacts to pronghorn and their habitat; and 6) scheduling small tactical team training in a manner that considers pronghorn locations reduces disturbance to pronghorn. Because, however, many significant adverse effects cannot be avoided or sufficiently minimized and because Sonoran pronghorn remain critically endangered, it is imperative that adverse effects are offset to the greatest extent possible. Accordingly, Luke AFB has been and will continue to make considerable contributions to fund and implement priority recovery actions identified by the Sonoran Pronghorn Recovery Team to ensure the continued survival of pronghorn. The implementation of recovery projects, such as forage enhancement plots, permanent waters, and temporary food and water stations, help improve pronghorn fitness, which should help them better withstand the effects of drought and human disturbance.

Changes in Pronghorn Status with the Project

Three populations of Sonoran pronghorn exist throughout their range, including two in Mexico and one in Arizona. The two smallest populations occur primarily within federally protected lands (in Sonora, Mexico and Arizona). The largest population occurs primarily outside of protected lands in Mexico and consequently, is at greatest risk (i.e., authorities have much less of an ability to control activities that may harm pronghorn outside of federally protected lands). The survival of all three of these populations is critical to the survival of this species. However, because the largest population occurs outside of a protected area, ensuring the survival of the two populations within federally protected areas, including the one in Arizona, is even more imperative.
Of these two populations, the one in Arizona, which comprises 14% of the total number of wild pronghorn, is the only one over which we have management authority. Additionally, critical recovery projects, including the captive breeding pen, forage enhancement plots, and pronghorn waters, are all located in Arizona. Therefore, though the majority (86%) of Sonoran pronghorn occur outside of the U.S. and will not be affected by the proposed action, because of the importance of the U.S. population, it is critical that project impacts are minimized and offset to the greatest degree possible. Accordingly, as part of their proposed action, Luke AFB will implement or fund the implementation of a number of measures that will significantly minimize and offset the impacts of the proposed project and will help to ensure these impacts do not significantly affect the reproduction, numbers, and distribution of Sonoran pronghorn in the wild in Arizona.

As mentioned above, implementation of forage enhancement plots, pronghorn waters, and food and water stations help improve pronghorn fitness, which should help them better withstand the effects of drought and human disturbance (i.e., improve numbers and reproduction). Contributing to the captive breeding effort helps ensure the continued survival of the current pronghorn population (i.e., improve numbers and reproduction). Even though it will likely be listed as an experimental, non-essential population,

establishment of a second population outside of the current distribution of Sonoran pronghorn (to which Luke AFB has contributed) will contribute to meeting the downlisting criteria (a population size of 300 animals within the current U.S. range and establishing a second, separate population) and will improve the distribution (i.e., two populations in separate geographical ranges in the U.S. in contrast to the one that currently exists), numbers (i.e., a new captive breeding population will be established at the second site using animals from the captive breeding pen at CPNWR; captive bred individuals at the new site will then be released into the wild, thus increasing the overall number of Sonoran pronghorn in the wild); and reproduction (i.e., as mentioned, a new captive breeding population will be established at the new site, which will increase overall reproduction of the species).

In conclusion, though many aspects of the proposed action will result in significant impacts to Sonoran pronghorn in the U.S., the USAF's commitment to implement and/or fund minimization measures and recovery actions and will help to ensure these impacts do not significantly affect the reproduction, numbers, and distribution of Sonoran pronghorn and thus not appreciably reduce the likelihood of the survival and recovery of the species in the wild.

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 levels are still high, the trend in overall CBV apprehensions and drive-throughs has declined in recent years within the action area likely due to increased law enforcement presence, the border fence, and the status of the economy in the U.S. Despite high levels of CBV activity and law enforcement response throughout the action area, pronghorn in the U.S. have managed to increase since 2002, although their use of areas subject to high levels of CBV use and law enforcement appear to have declined. We expect CBV activities and their effects on pronghorn

to continue, though they should be reduced in the vicinity of OPCNM after the Ajo 1 towers are operational.

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 following:

1. Only minor amounts of Sonoran pronghorn habitat are expected to be lost or degraded.

2. Luke AFB will continue to update OI-13-01 to ensure it effectively protects Sonoran pronghorn.

3. Measures included in the proposed action will help reduce disturbance to and the risk of injury or death of Sonoran pronghorn from project-related activities.

4. Measures included in the proposed action (i.e., implementing or providing funding to implement priority pronghorn recovery actions) will help offset adverse effects to pronghorn that could result from implementation of the project. Thus, the project is not expected to significantly affect the distribution, numbers, and reproduction of Sonoran pronghorn in the wild.

INCIDENTAL TAKE STATEMENT

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

The measures described below are non-discretionary, and must be undertaken by USAF so that they become binding conditions of any grant or permit issued to the (applicant), as appropriate, for the exemption in section 7(o)(2) to apply. USAF has a continuing duty to regulate the activity covered by this incidental take statement. If USAF (1) fails to assume and implement the terms and conditions or (2) fails to require any applicant, contractor, or permittee to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the contract, permit, or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, USAF must report the progress of the action and its impact on the species to the FWS as specified in the incidental take statement. [50 CFR '402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE

Because 1) the behavior of pen-raised animals is generally more erratic and less predictable than that of the wild animals; 2) more males are being released from the semi-captive breeding pen than females; and 3) males tend to make greater movements than females, we anticipate incidental take of one wild Sonoran pronghorn every 10 years, one pen-raised (free ranging) female pronghorn every 10 years, and four pen-raised (free ranging) male pronghorn every 10 years in the form of direct mortality or injury from the following activities:

1. Vehicle use by or authorized by the USAF on BMGR-East (including the unmanned vehicle associate with the proposed moving vehicle target) that results in collision with, and injury or mortality of Sonoran pronghorn.

2. Ordnance delivery on BMGR-East that results in injury or mortality of Sonoran pronghorn.

Though it will be difficult to detect, we anticipate incidental take of one wild Sonoran pronghorn of either sex, one pen raised (free ranging female) every 10 years, and two pen-raised (free ranging) male pronghorn every 10 years in the form of harassment from the following activities by or authorized by USAF on BMGR-East and/or CPNWR:

1. Disturbance of pronghorn due to ongoing aircraft activities.

2. Disturbance of pronghorn due to ongoing ground-based military activities, including equipment maintenance conducted by vehicle; road improvements and maintenance; maintenance of targets; and EOD clearance activities.

3. Disturbance of pronghorn due to reduced target closure distances.

4. Disturbance of pronghorn due to the implementation of proposed enhancements, including the 1) construction, operation (including increased aircraft presence), maintenance, and EOD clearance of the STA and improvements to and maintenance of its associated access road; 2) construction, operation, maintenance, and EOD clearance of the moving vehicle target; 3) paving and maintenance of the 7-mile road segment; 4) reduced flight altitude over part of CPNWR; and 5) on-the-ground training exercises, including the use of helicopters in association with these exercises.

The aforementioned disturbance is anticipated to result in decreased use of preferred habitat (such as foraging and watering areas) and increased adverse behavioral responses (such as fleeing), both of which may cause decreased physical condition of animals and increased mortality. Furthermore, fleeing responses to human activities may cause fawn abandonment and mortality.

EFFECT OF THE TAKE

In this biological opinion, the FWS determines that this level of anticipated take is not likely to result in jeopardy to the species for the reasons stated in the Conclusions section. If there is a significant decline in the numbers of free-ranging pronghorn or the sex ratio of male to female free ranging pronghorn markedly increases, the effects of this level of take may need to be reconsidered.

REASONABLE AND PRUDENT MEASURES

The following reasonable and prudent measure(s) are necessary and appropriate to minimize take of Sonoran pronghorn:

> USAF shall monitor incidental take resulting from the proposed action and report to the FWS the findings of that monitoring.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, USAF must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

The following terms and conditions implement reasonable and prudent measure for Sonoran pronghorn:

> If mortality or injury of Sonoran pronghorn is detected, the instructions provided below under "Disposition of Dead or Injured Listed Species" will be followed. In addition, however, the USAF shall update the existing "Critical Incident Team Response" document. USAF shall ensure the document is reviewed and approved by CPNWR, AGFD, and AESO, and shall submit it to CPNWR, AGFD, and AESO within 90 days of the issuance of the final biological opinion. This protocol will be reviewed by USAF, AGFD, and AESO on an annual basis to ensure it is kept up to date. Among other items, the document will describe the manner in which the sex and origin of dead or injured pronghorn will be determined. To assist USAF in identifying animals, AGFD will tag all pen-raised pronghorn on both ears when they are released from the pen.

Review requirement: The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize incidental take that might otherwise result from the proposed action. If, during the course of the action, the level of incidental take is exceeded, such incidental take would represent new information requiring review of the reasonable and prudent measures provided. USAF must immediately provide an explanation of the causes of the taking and review with the FWS-AESO the need for possible modification of the reasonable and prudent measures.

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, Organ Pipe Cactus National Monument). 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 with the exception of the SBI*net* Ajo-1 Tower Project, has generally 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 2009 biological opinion on implementation of the CBP's SBI*net* Ajo-1 Tower Project (including the construction, operation, and maintenance of communication and sensor towers; construction, use, and maintenance of new associated access roads; repair, improvement, use, and maintenance of associated approach roads; USBP operations, including relocating and operating a FOB; and implementation of conservation measures for endangered species) included incidental take of up to 31 lesser long-nosed bats per year in the form of direct mortality or injury as a result of collision with towers; up to all bats in one roost in the form of harassment from the date of the opinion to one year after the towers become operational, or up to all bats in one roost every 5 years thereafter; and an unquantifiable number of bats in the form of harm due to contraction of foraging range caused by avoidance of noise, lights, human activity, and electromagnetic emissions caused by the project. The 2008 biological opinion for implementation of CBP's 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, 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

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR §402.02). The action area for the bat includes BMGR-East and airspace above CPNWR used by the USAF and an area around these defined by a circle

with a radius of 36 miles (the maximum documented one-way foraging distance of the lesser long-nosed bat). The action area represents only a small portion of the lesser long-nosed bat's range.

Management of the action area is largely by Federal agencies, as described in the "Action Area" for Sonoran pronghorn. The action area for the lesser long-nosed bat also includes part of the Tohono O'odham Nation (TON) and lands near the border in Sonora.

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).

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

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 Growler Mountains is within 36 miles of the three TACs; about 40, 30, and 20 miles from Manned Range 3, 2, and 1 respectively; and about 25 miles from low-level flight corridors. Higher level fixed wing flights occur directly over the mine. 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 36 miles of the three TACs and low-level 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 within 36 miles from the nearest flight corridor. 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 CPNWR. 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 36 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).

The BMGR-East represents some of the westernmost locations of the bats range in the US. Though lesser long-nosed bats have been recorded foraging on the BMGR (Dalton and Dalton 1994), no lesser long-nosed bat roosts have been documented on the BMGR East despite a number of bat surveys (AGFD 2006, Dames and Moore 1997, Dalton and Dalton 1994, Cockrum and Petryszyn 1991).

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 land. 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 OPCNM and CPNWR and part of the BMGR; 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). The western plains of BMGR-East have few saguaros and therefore would not likely support quality lesser long-nosed bat foraging habitat. The easternmost areas of the BMGR-East, particularly near the Sand Tank Mountains, represent the best habitat for foraging and possibly roosting (Hall et al. 2001). Dalton and Dalton (1999) consider lesser long-nosed bat presence likely in this part of the BMGR East.

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. As mentioned above, our 2009 biological opinion on implementation of the CBP's SBI*net* Ajo-1 Tower Project (including the construction, operation, and maintenance of communication and sensor towers; construction, use, and maintenance of new associated access roads; repair, improvement, use, and maintenance of associated approach roads; USBP operations, including relocating and operating a FOB; and implementation of conservation measures for endangered species) included incidental take of up to 31 lesser long-nosed bats per year in the form of direct mortality or injury as a result of collision with towers; up to all bats in one roost in the form of harassment from the date of the opinion to one year after the towers become operational, or up to all bats in one roost every 5 years thereafter; and an unquantifiable number of bats in the form of harm due to contraction of foraging range caused by avoidance of noise, lights, human activity, and electromagnetic emissions caused by the project.

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

In the 2003 biological opinion, we concurred with USAF's finding that the proposed action may affect, but was not likely to adversely affect the lesser long-nosed bat. Under this proposed action, however, proposed enhancement numbers 4, 5, 6, and 7 may result in adverse effects to lesser long-nosed bats. As such, they are analyzed below. Additionally, ongoing activities are briefly addressed below because they may result in some impacts, though we anticipate very few, to lesser long-nosed bats.

Proposed enhancements 1, 2, 3, 8, 9, and 10 are not addressed below for the following reasons. Proposed enhancements 1, 8, 9, and 10 are not anticipated to affect bats in roosts, foraging bats, or bat foraging habitat and therefore are not analyzed below. Proposed enhancement 2 streamlines LAFB's existing environmental review procedures for target reconfigurations. Implementation of the streamlined procedure will not result in adverse effects to lesser long-nosed bats. As part of the procedure, if LAFB determines any target reconfigurations would result in effects to listed species not considered in this biological opinion, they would reinitiate section 7 consultation. Proposed enhancement 3 (moving vehicle target) will not impact any bat forage plants. Though this proposal may result in more frequent overflights in the area of the new target, overall aircraft activity in NTAC is not likely to increase as a result of this proposal. Therefore, we do not anticipate implementation of this proposal will result in additional impacts to bats.

Direct and indirect effects to lesser long-nosed bats from military operations could include disturbance during foraging activities, effects to foraging habitat, and injury or mortality from aircraft overflights. No ground-disturbing activities are proposed by USAF at or near any known roosts. However, aircraft will fly over roosts; low-level aircraft flights, including helicopters, could generate noise that may disturb bats, and winds (from downward rotor-wash) may disturb, injure, or kill bats. Furthermore low flying aircraft could collide with bats and some ground-based activities will disturb habitat and may locally reduce densities of bat forage plants. No low-level fixed-wing or helicopter aircraft flights are proposed over any of the maternity roosts in the action area; however, fixed-wing aircraft flights above 1,500 feet AGL could occur over the roosts in the Agua Dulce Mountains and at Bluebird Mine.

Dalton and Dalton (1993) investigated the effects of low-level (500 feet AGL) military jet flights on the lesser long-nosed bat at the Copper Mountain roost at OPCNM. Bats exposed to low-level flights exhibited no acute responses (panic flights, falling young bats, or startle responses). No significant differences in bat orienting responses were noted before, during, or after jet flights, but depressed levels of bat flights were noted for up to 30 minutes following the jet noise.
Lesser long-nosed bats are not very sensitive to sounds below frequencies of 10 kHz (Howell 1974), and the high frequency sounds to which the bat is sensitive attenuate very rapidly with distance and terrain (Howell 1992). Low-level jet noise attenuated rapidly within Copper Mountain Mine, particularly the high frequency sounds. Dalton and Dalton (1993) note that extrapolation of the results to other sites with different terrain or mine tunnel geometry may not be valid. They also found that the study did not address any potential long-term effects to the bat colony. As only higher level fixed-wing flights over bat roosts (above 1,500 AGL) are proposed by USAF, the effects of such flights would be less than what were described by Dalton and Dalton (1993).

<u>Habitat Destruction or Modification</u>

The following proposed enhancements may impact lesser long-nosed bat foraging habitat: Proposed enhancement 6: Reconfiguration of Manned Range 3 for helicopter training and Proposed enhancement 4: Construction of a new target area for air-to-ground missiles in ETAC. Additionally, aircraft crashes, rescues, and clean up could also result in impacts to foraging habitat. As analyzed below, bats at roosts may be affected by some proposed enhancements; however, no bat roost habitat will be destroyed or modified as a result of the proposed action.

More than 400 acres of lesser long-nosed bat foraging habitat could be impacted by the conversion of Manned Range 3 into helicopter gunnery, including associated strafing and EOD activities; however, because saguaros occur at very low densities within Manned Range 3, we anticipate that few saguaros will be impacted as a result of this enhancement.

Up to 50 acres of lesser long-nosed bat foraging habitat could be impacted by the construction of a new target area for air-to-ground missiles in ETAC, including associated strafing and EOD activities; however, because saguaros occur at low to moderately low densities within the proposed target area, we anticipate that few saguaros will be impacted as a result of this enhancement. Furthermore, to minimize impacts to lesser long-nosed bat forage plants, the USAF will place targets away from saguaros to the greatest degree possible.

Aircraft crashes, rescues and clean up could impact lesser long-nosed bat habitat depending on the location; however, because such events are a very rare occurrence, the likelihood of this type of forage habitat degradation would be equally rare. Continued use of the tactical and manned ranges prevents recovery of lesser long-nosed bat foraging habitat; however, due to their location, areas impacted by military activities within these ranges have never supported high densities of lesser long-nosed bat forage plants. Furthermore, the amount of lesser long-nosed bat habitat impacted from the proposed action represents a very small portion of the foraging habitat available to the bat in southwestern Arizona.

As discussed under the “Effects of the Proposed Action” for Sonoran pronghorn, a number of military activities (i.e., ordnance delivery, use of flares, etc.) increase the risk of fire on and near BMGR-East. On the BMGR, fuel loads are generally very low, making the likelihood of a military-caused fire very low. However, in some years, like in 2005, with abundant ephemeral vegetation, military activities could ignite fires. If ignited, fires would not likely carry far due to discontinuity of fuels. However, as evidenced in 2005, when over 63,000 acres burned on BMGR-East and 7,500 acres burned on CPNWR as a result of fires ignited by military training and CBVs, there is a real potential for large fires on BMGR-East and adjacent areas. Cacti are very fire intolerant. Fires at Saguaro National Park resulted in greater than 20 percent mortality of mature saguaros (Schwalbe et al. 2000). The amount of lesser long-nosed bat foraging habitat loss due to potential fire cannot be predicted; however, fire could impact a significant amount of habitat.

Effects of Aircraft Overflights

Aircraft overflights associated with the following proposed enhancements could result in disturbance, injury, or mortality to foraging lesser long-nosed bats: Proposed enhancement 6 Reconfiguration of Manned Range 3 for helicopter training; Proposed enhancement 4 Construction of a new target area for air-to-ground missiles in ETAC; Proposed enhancement 5 Lowering the flight training altitude over a portion of CPNWR; and Proposed enhancement 7 On-the-ground training exercises. Ongoing aircraft overflight activities in the Air-to-Air Range, manned ranges, and tactical ranges could also result in disturbance, injury, or mortality to foraging lesser long-nosed bats.

Under proposed enhancement 6 (reconfiguration of Manned Range 3 for helicopter training), helicopters will occasionally train at night (about 40 sorties per year will occur at night) and adjacent to suitable forage habitat. The majority of these flights will occur between 300 feet and 1,000 feet AGL; however, some flights may occur as low as 100 feet AGL. As such, foraging lesser long-nosed bats at Manned Range 3 may be killed or injured from collisions with low flying aircraft (fixed wing or helicopters); disturbed, injured, or killed by downward rotor-wash from low flying helicopters (wind generated from the rotors could blow bats to the ground or into vegetation); or disturbed by noise generated from aircraft. However, because Manned Range 3 is located nearly 40 miles from the closest known roost site and because saguaros occur at very low densities within Manned Range 3, lesser long-nosed bats likely only use this area in a limited manner. Because of this and because only a relatively small number of helicopter sorties will occur annually at night, we anticipate the risk of disturbance from or collision with helicopters or other low level aircraft is small.

Lowering the flight training altitude over a portion of CPNWR (proposed enhancement 5) may impact foraging lesser long-nosed bats as they will be more susceptible to disturbance from noise from and collisions with fixed-winged aircraft that are training at night at low levels (500 feet AGL). We anticipate the risk of collision is very small because it is unlikely that lesser long-nosed bats likely fly above 500 feet AGL. The Bluebird Mine maternity roost in the Growler Mountains is outside of the proposed lowered flight floor and therefore will not be affected by this proposal.

Saguaros occur at low to moderately-low densities in the proposed new target area for air-to-ground missiles in ETAC (proposed enhancement 4) and light-tracking studies following lesser long-nosed bats from known roost sites documented minimal foraging activity in the Sand Tank Mountains to the north of the project area. The majority of training flights, both fixed wing and helicopter, associated with the new target area will occur between 1,000 and 1,500 feet AGL, though some flights may occur as low as 100 feet AGL. However, only a small percentage of these will occur at night in this area. Therefore, while there is some risk of foraging lesser long-nosed bats being disturbed (from aircraft noise and downward rotor-wash from helicopters) or injured or killed (from collisions with aircraft and downward rotor-wash from helicopters), we anticipate this risk is small.

Helicopter activity associated with ground-based troop training (Proposed enhancement 7) could disturb, injure, or kill foraging lesser long-nosed bats. However, the risk of this occurring is likely small because only a small portion of 30 annual troop training missions will be inserted or extracted by helicopter at night. Furthermore, insertion and extraction of troops is not proposed in areas with high numbers of bat forage plants.

Ongoing military operations occurring within the Air-to-Air Range include both the Air-to-Air High Range (11,000 – 80,000 feet AGL) and the Air-to-Air Low Range (surface -10,000 feet AGL). Foraging lesser long-nosed bats could be disturbed (from noise) or injured or killed (from collisions) by flights occurring on the Air-to-Air Low Range at night. However, we anticipate the likelihood of this occurring is small because the majority of the Air-to-Air Range does not support lesser long-nosed bat forage species and furthermore, the proximity of the nearest known roost site is on the CPNWR over 25 miles away.

Foraging lesser long-nosed bats could also be disturbed, injured, or killed by ongoing low level night flights (both helicopter and fixed wing) occurring on the manned and tactical ranges. However, because Manned Ranges 1, 2, and 4 generally do not support lesser long-nosed bat forage plants, we anticipate bats infrequently use these areas and therefore are not likely to be affected by aircraft use of the areas. Manned Range 3 supports very low densities of lesser long-nosed bat forage plants; however because it is

in closer proximity to areas that support higher densities of forage plants than the other manned ranges, the risk of disturbance to foraging bats at or near Manned Range 3 is likely higher than at the other manned ranges.

NTAC and STAC generally do not support lesser long-nosed bat forage plants except in the mountains. Because low level flights do not occur over the mountains at night, we anticipate the risk of disturbance, injury, or death to foraging lesser long-nosed bats from aircraft overflights on NTAC and STAC is small. Ongoing overflight activities on ETAC, which supports low to moderately-low densities of saguaros, may adversely affect foraging lesser long-nosed bats; however, the highest potential for impacts to bats on ETAC is in association with the new target area which is addressed above.

We anticipate flights over the roosts in the Agua Dulce Mountains and at Bluebird Mine will minimally, if at all, affect bats in the roosts because these flights will only occur above 1,500 feet AGL. No overflights of the other roosts are expected.

Changes in Lesser Long-Nosed Bat Status with the Project

The lesser long-nosed bat ranges from southern Arizona and extreme southwestern New Mexico, south through western Mexico to El Salvador. In Arizona and Mexico, populations of this species appear to be increasing or are stable at many roost sites. Within the Action Area (including the Pinacate roost in Sonora), at least 165,000 lesser long-nosed bat bats seasonally occur. Though some portion of lesser long-nosed bats throughout the action area may be affected by the proposed project, the greatest impacts will be to bats occurring on the BMGR-East which supports limited areas of foraging habitat and does not support any roost sites. Therefore, though some aspects of the proposed action could adversely affect lesser long-nosed bats, in the context of the overall lesser long-nosed bat population and distribution, the proposed action is not likely to significantly reduce the numbers and distribution of lesser long-nosed bats in the wild.

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, it is 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 following:

1. No roosts occur near any proposed activities, with the exception of fixed-wing aircraft which overfly two of the roosts at 1,500 feet AGL or above. Bats at these two roosts are expected to be affected minimally, if at all, by the proposed action.

2. Only a small amount of lesser long-nosed bat foraging habitat will be affected by the proposed action. Continued use of the tactical and manned ranges prevents recovery of lesser long-nosed bat foraging habitat; however, due to their location, areas impacted by military activities within these ranges have never supported high densities of lesser long-nosed bat forage plants. Furthermore, the amount of lesser long-nosed bat habitat impacted from the proposed action represents a very small portion of the foraging habitat available to the bat in southwestern Arizona.

3. Foraging lesser long-nosed bats may be killed or injured from collisions with low flying aircraft (fixed wing or helicopters) or killed or injured by downward rotor-wash from low flying helicopters (wind generated from the rotors could blow bats to the ground or into vegetation). However, we anticipate the risk of injury or mortality due to collision with aircraft or from being blown to the ground or into vegetation by downward rotor wash is very small because few low level flights will occur at night over foraging habitat. The number of individuals that may be affected would be small in comparison to the number of bats that occur in the action area (at least 165,000 bats).

4. Foraging lesser long-nosed bats may be disturbed by downward rotor-wash from low flying helicopters or by noise generated from aircraft. However, we anticipate the likelihood of disturbance is relatively small because few aircraft will fly at low levels at night. Of those, only a portion will fly over or adjacent to lesser long-nosed bat foraging habitat.

INCIDENTAL TAKE STATEMENT

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

AMOUNT OR EXTENT OF TAKE

As stated above, we anticipate the risk of injury or mortality due to collision with aircraft or from being blown to the ground or into vegetation by downward rotor wash is very small. However, because the proposed action is open-ended - until reinitiation is needed - incidental take as a result of these aircraft overflights is reasonably certain to occur. Though it will be difficult to detect, we anticipate incidental take of 10 lesser long-nosed bats every 10 years in the form of direct mortality or injury as a result of collision with aircraft or downward rotor wash from helicopters.

EFFECT OF THE TAKE

In this biological opinion, the FWS determines that this level of anticipated take is not likely to result in jeopardy to the species for the reasons stated in the Conclusions section.

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

No reasonable and prudent measures and terms and conditions are necessary to minimize incidental take of lesser long-nosed bats.

Disposition of Dead or Injured Listed Species

Upon locating a dead, injured, or sick listed species initial notification must be made to the FWS's Law Enforcement Office, 2450 W. Broadway Rd, Suite 113, Mesa, Arizona, 85202, telephone: 480/967-7900) within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph if possible, and any other pertinent information. The notification shall be sent to the Law Enforcement Office with a copy to this office. Care must be taken in handling sick or injured animals to ensure effective treatment and care, and in handling dead specimens to preserve the biological material in the best possible state.

CONSERVATION RECOMMENDATIONS

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

1. Continue to pursue funding for research needs identified by the Sonoran Pronghorn Recovery Team.

2. Participate in the implementation of, including providing financial support to agencies to implement, the lesser long-nosed bat recovery plan.

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

REINITIATION NOTICE

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

Thank you for your cooperation and assistance throughout this consultation process. Any questions or comments should be directed to Erin Fernandez (520) 670-6150 (x238) or Jim Rorabaugh (520) 670-6150 (x230).

Sincerely,

/ s / Sherry Barrett for
Steven L. Spangle
Field Supervisor

cc (hard copy):
Field Supervisor, Fish and Wildlife Service, Tucson, AZ (2)
Assistant Field Supervisor, Fish and Wildlife Service, Tucson, AZ
Fish and Wildlife Service, Tucson, AZ (Attn: Erin Fernandez)

cc (electronic copy):
Refuge Manager, Cabeza Prieta National Wildlife Refuge, Ajo, 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 4. 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 5. 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 6. Comparison of Mexico Sonoran pronghorn population surveys, 2000-2009.

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
Dec 2009	53	258	311	101	381	482

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

Figure 2. Sonoran pronghorn distribution in the United States: Records from 1994-2001.

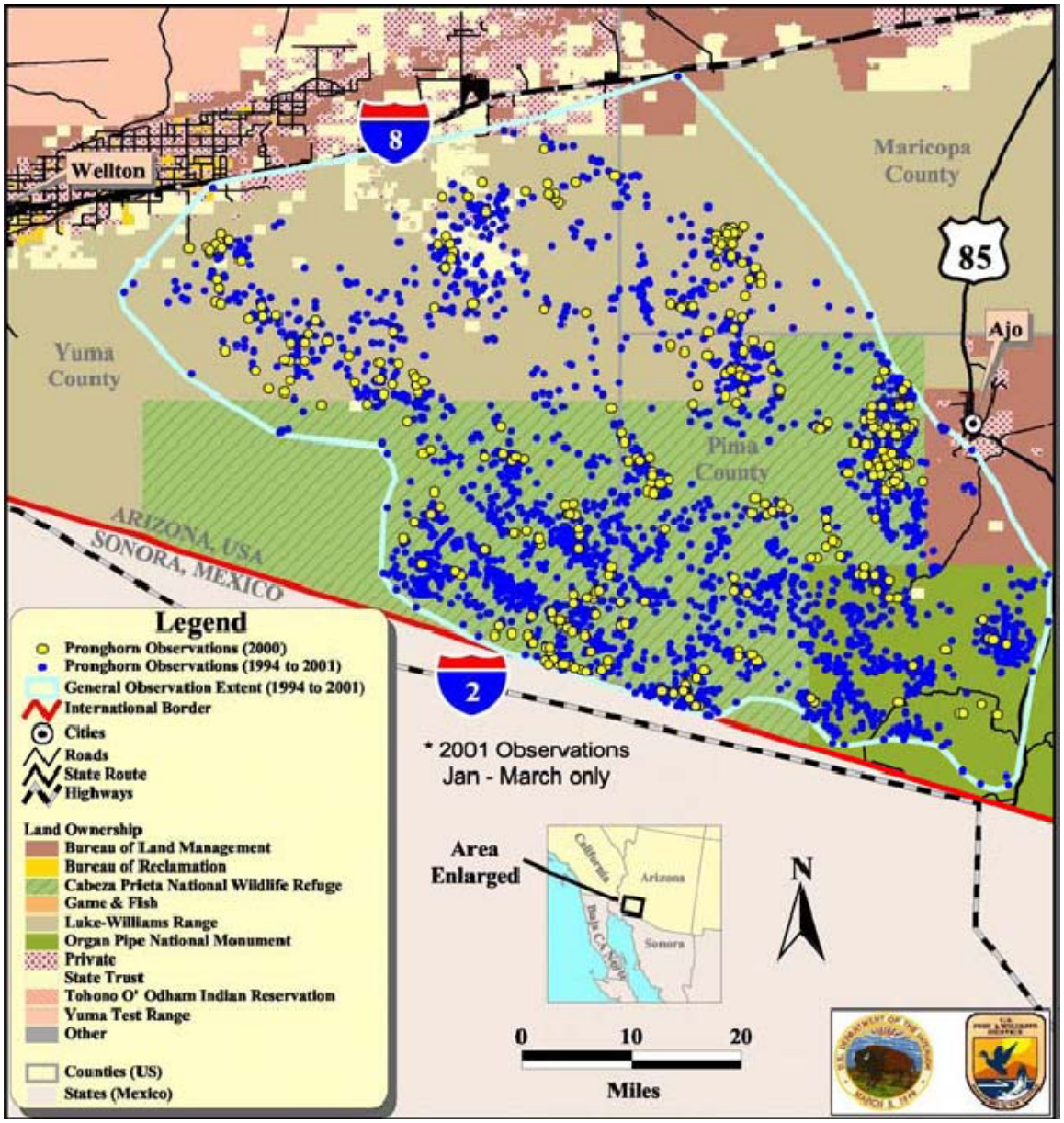


Figure 3. Sonoran pronghorn distribution in the United States: Records from 2000-2008.

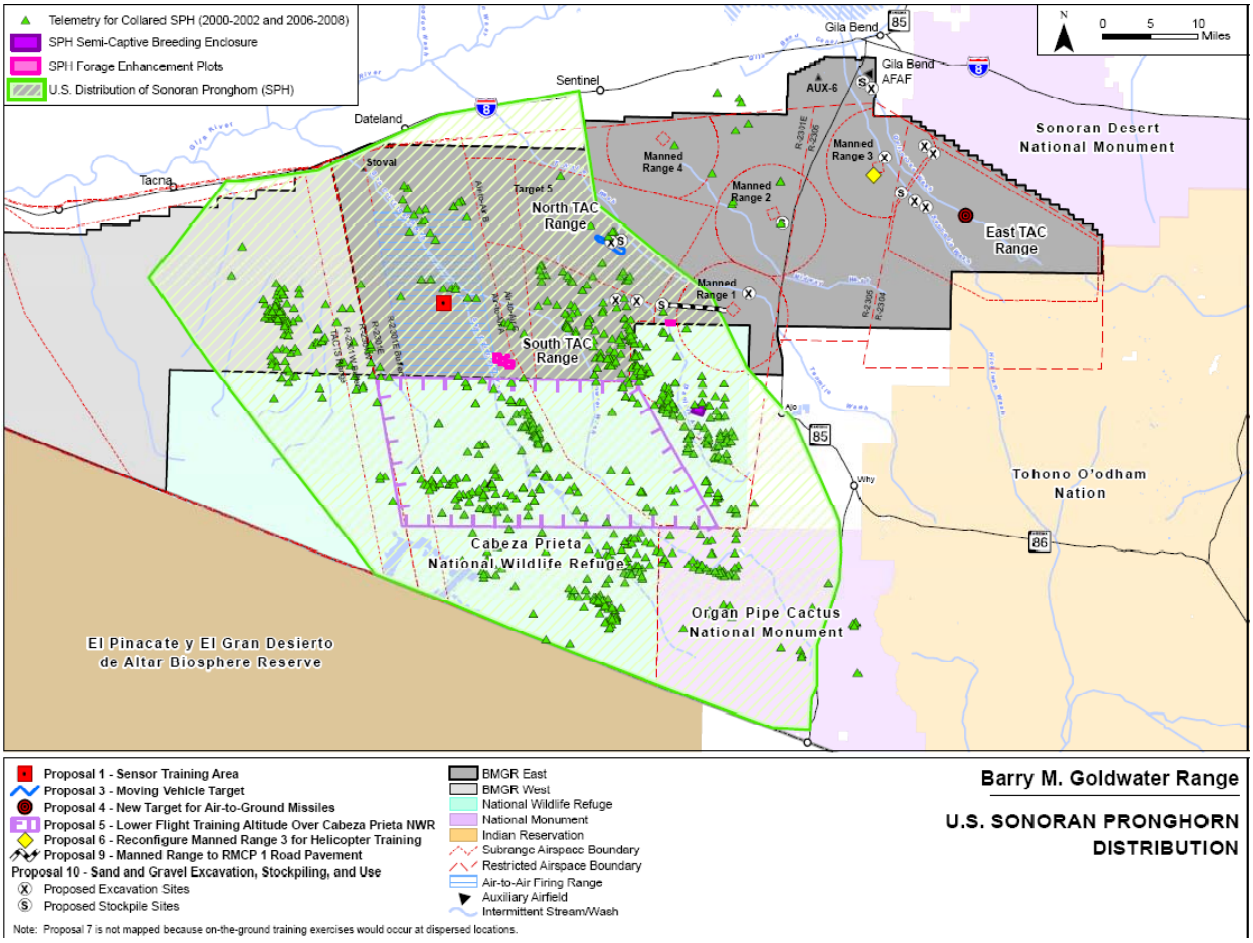


Figure 4. Changes in Sonoran pronghorn distribution in the United States: Records from 1994-2008.

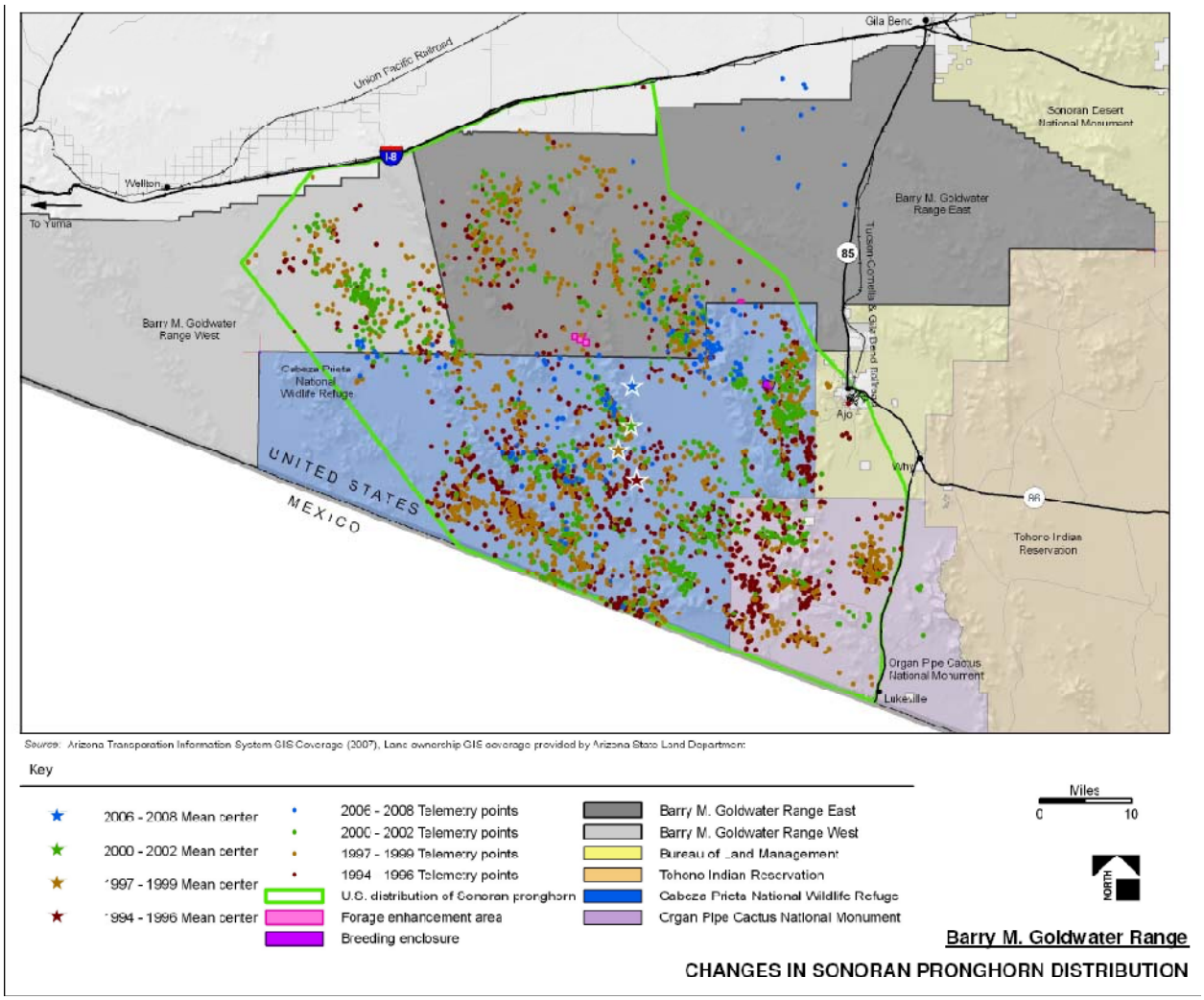
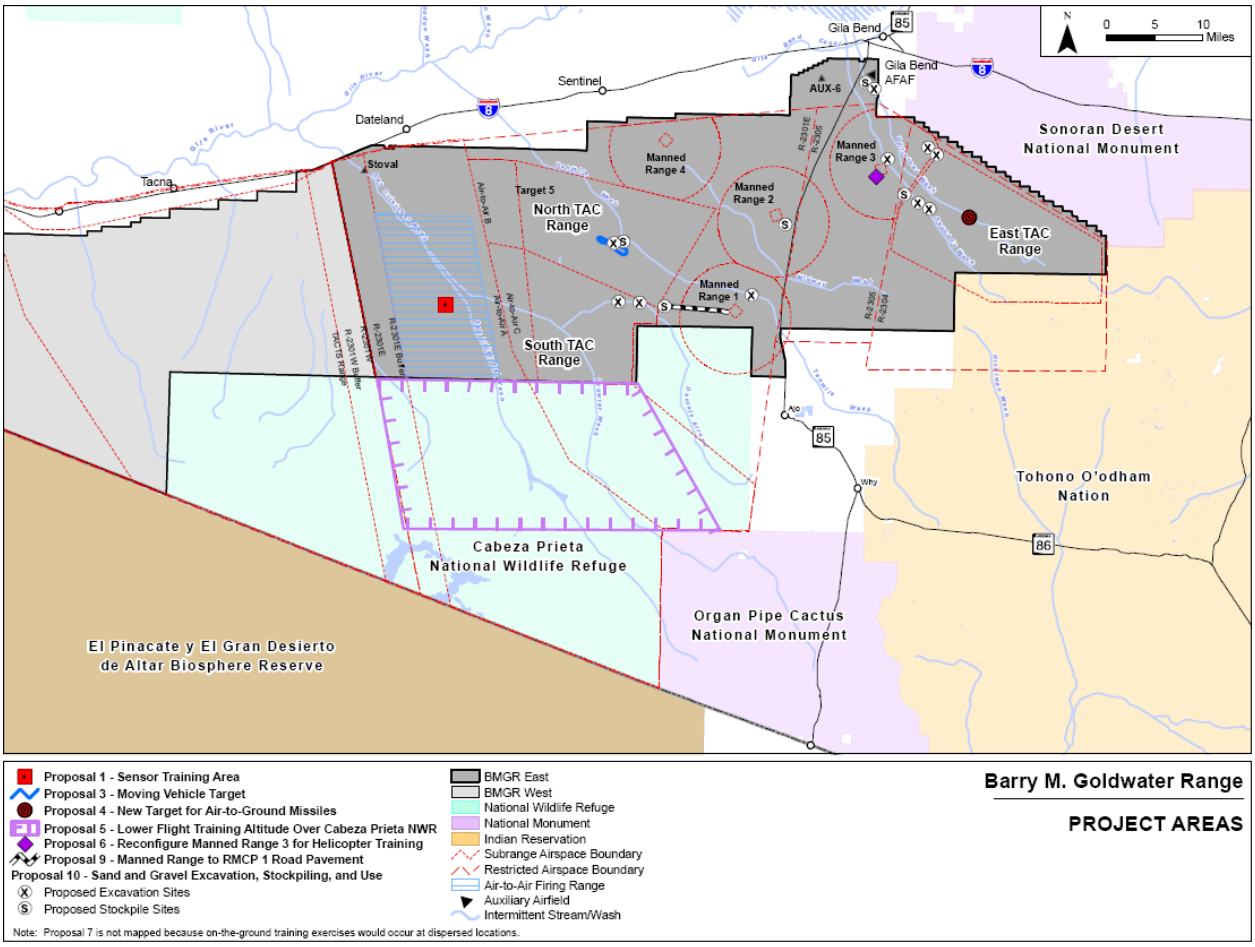


Figure 5. Project Areas, BMGR-East.



APPENDIX 1

Operating Instruction 13-01

BY THE ORDER OF THE COMMANDER
56TH RANGE MANAGEMENT OFFICE
LUKE AIR FORCE BASE, ARIZONA 85309

OPERATING INSTRUCTION 13-01

2 DECEMBER 2008

Civil Engineering

SONORAN PRONGHORN MONITORING

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

ACCESSIBILITY: This publication is available through 56 RMO Office. Contact OPR if you need a copy.

RELEASABILITY: There are no releasability restrictions on this publication.

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(Mr. Richard Whittle)
Supersedes 56 RMO OI 1-1, 30 October 2004

Approved by: 56 RMO/CC
(YC-03 James Uken)
Pages: 11

This Operating Instruction (OI) establishes standardized scheduling, monitoring, and reporting procedures for Sonoran pronghorn on the North and South Tactical Ranges (NTAC and STAC) and Manned Ranges 1, 2, and 4 of the Barry M. Goldwater Range (BMGR), and it establishes precautionary procedures for ground operations. This OI pertains to range scheduling, range operations, and biological monitoring pursuant to munitions delivery missions and ground operations on NTAC and STAC from date of signature until changed or superseded by 56th Range Management Office (56 RMO). Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with AFMAN 33-363, *Management of Records*, and disposed of in accordance with the Air Force Records Disposition Schedule located at https://www.my.af.mil/gcss-af61a/afrims/afrims/rds_series.cfm.

SUMMARY OF REVISIONS

This OI is substantially revised, renumbered, and must be completely reviewed.

1. **Authority.** Authority for this OI rests with the Director, 56 RMO.

2. **Supporting documents.** This OI implements the requirements of the August 6, 2003 biological opinion (consultation number 2-21-96-F-094-R2) issued by the US Fish and Wildlife Service.

   2.1. AFI 13-212, *Range Planning and Operations*

2.2. RMO OI 2-2 *Regular User Programming* and RMO OI 2-1 *Casual User Programming*

3. General. The following procedures are designed to identify and protect Sonoran pronghorn on the BMGR.

3.1. **Monitoring.** Monitoring requirements are as follows.

3.1.1. Two monitors are required per tactical range to monitor for pronghorn prior to high explosive (live) ordnance deliveries. Exceptions to this staffing level shall be coordinated with the Director, 56 RMO. The monitoring will take place during daylight only, as the first event of the day on the scheduled range. The scheduling office will afford at least 2 hours on STAC and 2 hours 10 minutes on NTAC (plus an additional 1 hour if the Maverick target is also scheduled) for monitoring (to include transit). Monitoring will include visual and telemetry surveillance from the ground, hillsides, or observation towers.

3.1.2. Monitor both NTAC and STAC on the first fly day of the week (usually Monday), even if live ordnance is not scheduled for that day. This will ensure each range is monitored at least weekly, even if no animals were sighted in the previous weeks. When an animal is detected, follow-up monitoring is required the next day. When no animals are sighted on a tactical range on a particular day, a second day of monitoring will be required if animals were sighted there within the previous 7 days. This will provide 2 non-sighting days before ceasing to monitor a range for the week.

3.1.3. The Range Control Officer (RCO) assigned to Manned Range 1 will scan the downrange area and around the conventional circles before commencing daily operations. If a pronghorn is sighted within 3 km, strafe activities at that range will be closed for the day. Release of practice bombs will be limited to the conventional circle that is more distant from the pronghorn. No ordnance will be released if the pronghorn is within 1 km of the target. This smaller radius (vs. 3 km on tactical ranges) is appropriate because the cleared target circles are under direct observation by the RCO. If monitors identify pronghorn north of the Crater

Range and within 10 km of Manned Ranges 2 and 4, the assigned RCO will implement theses measures, as well.

3.2. **Target Restrictions.** If a pronghorn is detected (through telemetry or visual sighting) within 5 km of either the NTAC or STAC high explosive (HE) hill (excluding the Crater Mountains and the area north of the Crater Mountains, and excluding the area south of Okie Hill (located at approximately N 32°35' W113°09') or the live Maverick target, no high explosive ordnance deliveries will be authorized on the affected range. Furthermore, no deliveries of any kind will be made within 3 km of any pronghorn location as described below. The monitors will report pronghorn detection locations to Range Operations via radio a half hour before the first scheduled mission, and each monitoring event will be documented and compiled into an annual report.

3.3. **Ground Operations.** Ground operations refers to any personnel operating on the BMGR including, but not limited to, maintenance crews, Explosive Ordnance Disposal (EOD) crews, archaeological survey crews, biologists, and ground forward air controllers. The pronghorn monitors will maintain a map under the canopy at the Range 1 main ground shack to display that day's pronghorn report. All ground crews must stop at the Range 1 main ground shack to obtain the most recent pronghorn location data from that map and implement the appropriate measures. Ground personnel shall also determine if monitors are present on the range. When monitors are present, ground crews shall obtain updated reports and coordinate activities with monitors via radio. During annual range maintenance periods, ground crews shall follow the instructions in paragraph 4.2.8.

3.4. **Vehicle Speed Limits and Group Size.** Vehicle speed limits for all ground personnel will be reduced as described below when approaching known pronghorn locations (as allowed by soil conditions on the road, such as patches of deep sand or mud). Speed limits for the entire BMGR within pronghorn habitat is 45 mph on paved roads leading to manned ranges, 35 mph on major dirt roads (graded with a ditch on either side) and 25 mph on all other roads. If pronghorn are observed running due to ground disturbance, vehicles near pronghorn locations shall stop until animals have stopped running and new buffers can be measured from the sighting. To the greatest extent possible, travel

in maximum group size when passing known sightings to minimize the number of times groups pass SPH to minimize occurrence of potential disturbance.

3.4.1. Within 1 – 2 km of SPH sightings: 15 mph.

3.4.2. Less than 1 km of SPH sightings: If a pronghorn is located within 1 km of a road, every effort will be made to use an alternate route to the desired destination. If a practical alternate route does not exist, and movement is mission essential, the ground crew may proceed. The speed limit is 15 mph when traveling within 1 km of a pronghorn. If pronghorn run from ground disturbance, approaching vehicles shall stop until animals have stopped running or have moved out of sight.

3.5. **Non-vehicular Ground Activities:** Archaeologists and biologists on foot may approach to within ½ km of a known SPH location if postponing their work could result in a work stoppage. Similar access by other personnel (e.g., EOD, range maintenance) requires approval by the 56 RMO Director or Operations Officer. See paragraph 4.2.8 for coordination of daily activities during range maintenance periods.

3.6. **EOD Detonations.** Routine detonations by the EOD Flight are restricted if a pronghorn is detected within 3 km of the detonation site.

4. Procedures.

4.1. **Scheduling.** 56 RMO/ASMS, the primary scheduler for the BMGR, and Range Operations Coordination Center ("Snake Eye") who manages current day schedule will comply with the following.

4.1.1. Assign the first 2 hours on the STAC schedule and 2 hours ten minutes on the NTAC schedule for monitoring every day, beginning up to 30 minutes before official sunrise, but not earlier than official civil twilight. To the extent possible, provide another 30-minute buffer (demand vs. availability of range time in winter months may preclude this).

4.1.2. Live Maverick deliveries require scheduling of both NTAC and STAC.

4.1.3. Weekend Scheduling of Live Missions. Biological monitors require at least 7 days notification of any requirement for weekend monitoring. Confirm with the monitors on the Friday prior to the weekend where monitoring is required. Any requests within the 7-day window will be told they should attempt to use ETAC (if available) or the live mission may be disapproved if monitors are unavailable.

4.1.4. Actions to be taken the day prior.

4.1.4.1. If live missions are scheduled for the next day on NTAC and/or STAC, scheduling of monitors is required. If an animal is sighted, follow-up monitoring is required the next day.

4.1.4.2. To the maximum extent possible, schedule live missions on only one tactical range (NTAC/STAC) per day.

4.1.4.3. Follow scheduling procedures in para 4.1.1. If NTAC, STAC, and the live Maverick target require monitoring, provide the first 2 hours on STAC and 3 hours 10 minutes on NTAC for monitoring. These times may overlap.

4.1.4.4. Attachment 1 is a listing of key personnel and telephone numbers. Monitors will call Range Scheduling after 1200L to confirm the monitoring requirements for the next day.

4.1.4.5. If a unit calls in with a live mission to NTAC and/or STAC after 1200L the day prior and no monitoring is scheduled on that range for the next day, scheduling and or range operations will first try to move the mission to the range where monitoring is already scheduled. If no monitoring is scheduled, the mission will be scheduled for ETAC if available. If neither option can be coordinated, then advise the requesting unit that no live missions are authorized. If this happens, document the information and notify 56 RMO/ASMS, 56 RMO/ASM, or 56 RMO/DO.

4.1.4.6. The morning pronghorn monitoring time block will be released only after 1200L the day prior. The gaining unit will be advised that they may lose the period if a pronghorn is sighted that afternoon (requiring a morning re-monitoring) or if other circumstances require use of that period.

4.1.5. Actions to be taken if a pronghorn is detected.

4.1.5.1. Update range Notice to Airmen (NOTAMS) with closed targets closed for the day.

4.1.5.2. Ensure the following day's first 2-hour block for STAC and 2-hour 10-minute block for NTAC are scheduled for follow-up monitoring.

4.2. **Monitoring.** "Snake Eye" will receive the pronghorn sighting locations via radio from the monitors and identify targets to be closed for the day, then coordinate with 56 RMO/ASMS to post them in the Range NOTAMS. Biological monitors will conduct all monitoring and provide results via radio to Range Operations a half hour before first mission time. Monitors shall comply with the following.

4.2.1. Monitors will coordinate with 56 RMO/ASMS every day before 1200L to verify whether monitoring is required for the next day.

4.2.2. The monitors will be at the designated range boundary at or before the beginning of the scheduled pronghorn monitoring block, and will notify Range Operations upon departing the range at the end of the monitoring period.

4.2.3. Each monitor will drive a separate vehicle (unless not available).

4.2.4. If only one range is scheduled for high explosive ordnance delivery, at least two monitors will drive to the area of scheduled impact, NTAC HE hill, STAC HE hill, or live Maverick target 123 (in NTAC). Monitors will then begin the monitoring effort from high-ground vantage points and the observation towers surrounding the HE hills. Use telemetry equipment, spotting scopes, and binoculars to search for any pronghorn within the area.

4.2.5. If both TAC ranges are scheduled for high explosive ordnance delivery, the same procedure will be followed for each range.

4.2.6. The monitors will check all specific locations around target areas in NTAC and STAC where they believe pronghorn may be present. The monitors will use their own discretion, within the parameters of this OI and within the scheduled monitoring time, to determine where to monitor within NTAC and STAC, how much time to spend observing from vantage points, walking and driving the area, etc., in order to maximize the monitoring effectiveness.

4.2.7. Actions to be taken when monitoring is completed. Call by radio to Range Operations to provide at least location coordinates and number of pronghorn. Monitors will also record other relevant information, such as animal activities, gender, presence of fawns, method of observation (visual or telemetry), etc. This information will be compiled by the monitors and distributed electronically by 1100 each day (unless precluded by other duties) to the recipients designated by 56 RMO/ESM. Weekend monitoring reports may be distributed electronically on the next duty weekday. The monitors may use the attached worksheets or some other format that collects at least the same information. The 56 RMO/ESM pronghorn biologist will forward monitoring reports to US Fish and Wildlife Service and the Cabeza Prieta National Wildlife Refuge.

4.2.8. During range maintenance periods, EOD, range maintenance ground parties, and other significant group traffic shall not proceed beyond designated meeting locations until after receiving the pronghorn report either via the radio or in person from the pronghorn monitors. These personnel shall also coordinate their next day's activities with the monitors to get an early warning on possible conflicts with pronghorn sightings. The meeting locations are shown on Attachment 2 (the STAC base camp and the NTAC intersection of the east perimeter road and the double-bladed road). This will allow all parties to receive the pronghorn report and implement the preventive measures described above. The monitors will maintain a map under the canopy at the Manned Range 1 main ground shack to display that day's pronghorn report. Any ground personnel who do not receive the morning report from the monitors shall review the map and implement preventive measures accordingly.

4.3. **Range Incidents.**

4.3.1. Range incidents with potential to injure pronghorn (such as weapons releases on closed targets) are significant and require reporting and follow-up. Range Operations will dispatch an e-mail notification to key 56 RMO personnel, and then advise the pronghorn monitors to inspect the location at next opportunity but not later than the next morning to look for signs of pronghorn injury or mortality. The Lead Biologist should be contacted at home if necessary. The monitors shall include the results of their findings with their daily report.

4.3.2. The 56 RMO/ESM pronghorn biologist will notify US Fish and Wildlife Service of the incident, preferably on the same day of occurrence, and provide a follow-up notice to report the monitors' results. If a dead, injured, or sick pronghorn is found on the BMGR, initial notification must be made to Service Law Enforcement, Federal Building, Room 105, 26 North McDonald, Mesa, Arizona, 85201 (telephone: 480-835-8289) within one working day of its finding. Additionally, Cabeza Prieta National Wildlife Refuge must be contacted at
520-387-6483. These telephone contacts will be documented in telephone logs. Written notification must be made within five calendar days and include the date, time, and location of the finding, a photograph of the animal, and any other pertinent information.

4.4. **Reporting and Documentation.**

4.4.1. Monitors shall maintain field notes, electronic files of sighting information, and a database or spreadsheet log of all monitoring activity.

4.4.2. Each month the monitors shall provide 56 RMO/ESM an electronic copy of the data being recorded. 56 RMO/ESM will compile the data into the geographic information system (GIS).

4.4.3. Monitors shall prepare an annual report (January - December of each year) detailing the results of the monitoring efforts. The report will be due to 56th RMO/ESM NLT 15 February of the new year and shall contain all the elements of a scientific report including background, methods, results, discussion, and a bibliography section. The report shall include a description of the monitoring methodology, data tables, data interpretation, and descriptions of trends or other significant information. The monitors will coordinate with the 56 RMO/ESM GIS analysts for data analysis and development of graphical representations of the data. This report will be used as part of the compliance report to the US Fish and Wildlife Service as required by the biological opinion.

JAMES R. UKEN, YC-03, DAF
Director, Range Management Office

4 Attachments:

1. List of Key Personnel
2. Map of Meeting Locations
3. Range Operations SPH Sighting Checklist
4. 56 RMO/ESM SPH Daily Monitoring Report

Attachment 1

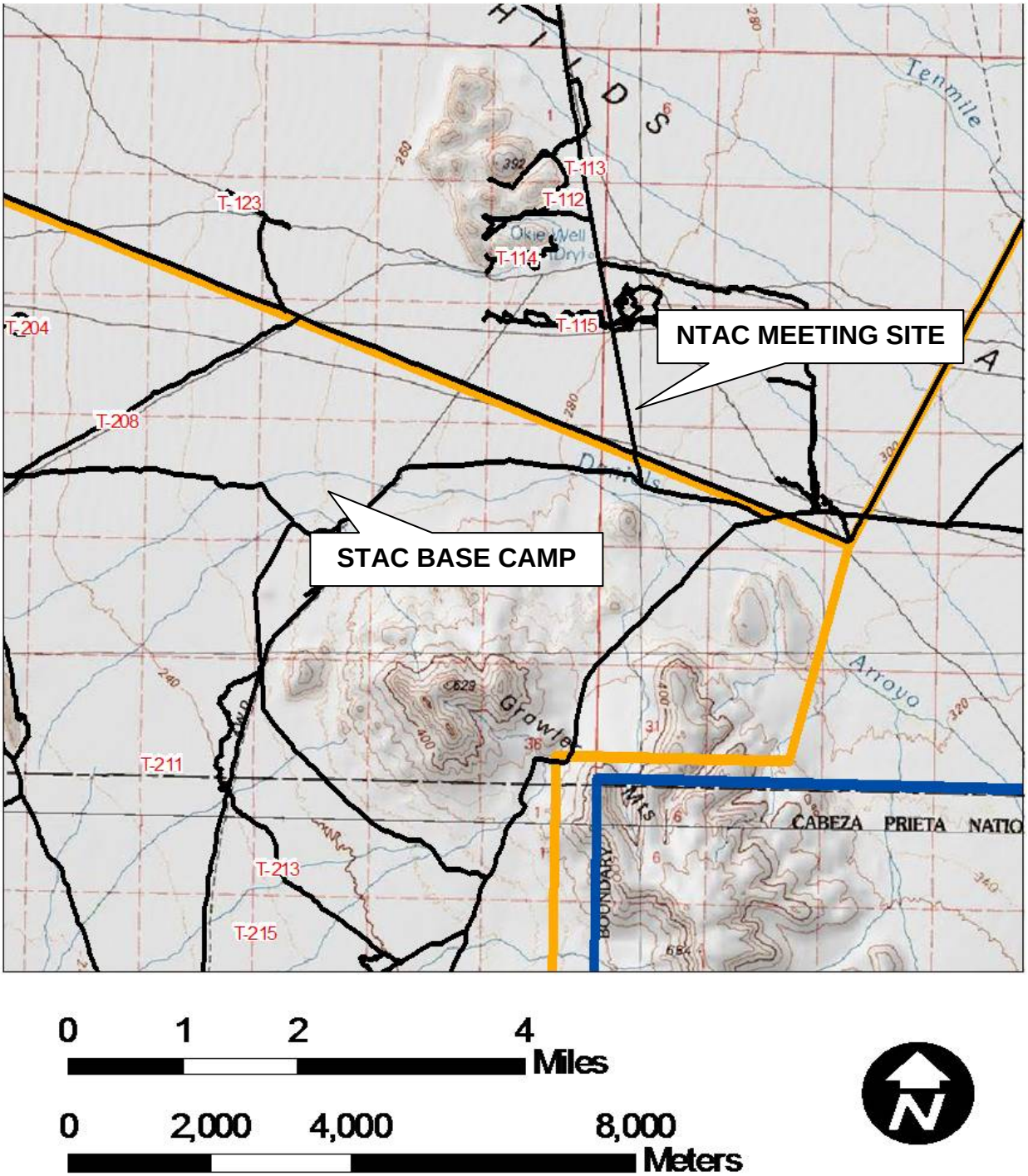
KEY PERSONNEL

As of 27 October 2008

Name	Office	Phone	E-Mail
BIOLOGICAL MONITORS			
April Howard Lead Biologist	Yulista Management Services, Inc.	(928) 683-1745	April.Howard@luke.af.mil
Nicole Tautfest	Yulista Management Services, Inc.	(928) 683-1745	Nicole.Tautfest@luke.af.mil
RANGE SCHEDULING			
David Blokland	56 RMO/ASMS	(623) 856-3185	David.Blokland@luke.af.mil
ENVIRONMENTAL SCIENCE MANAGEMENT			
Daniel Garcia Chief, ESM	56 RMO/ESM	(623) 856-4265	*Daniel.Garcia@luke.af.mil*
Aaron Alvidrez (primary pronghorn biologist)	56 RMO/ESMN	(623) 856-8487	Aaron.Alvidrez@luke.af.mil
Rick Whittle (alternate pronghorn biologist)	56 RMO/ESMN	(623) 856-9476	Richard.Whittle@luke.af.mil
Range Operations Coordination Center			
"Snake Eye"	56 RMO/ROCC	(623) 856-8818/ 8819	
GILA BEND AFAF			
David Mendez	56 RMO/QAE	(928) 683-6261	David.Mendez@luke.af.mil
US Fish and Wildlife Service (USFWS)			
	Service Law Enforcement (Mesa Ofc)	(480) 967-7900	doug.mckenna@fws.gov
Jim Atkinson	Cabeza Prieta National Wildlife Refuge	(520) 387-4989	James_Atkinson@fws.gov

Attachment 2

Map of Meeting Locations



Attachment 3

Range Operations SPH Sighting Checklist

☐ NTAC ☐ STAC

DATE. _____

☐ **Call Received from _____ @ _____**

☐ **Location of Sighting. _____**

UTM Coordinates._____

Targets Affected._____

Restrictions
No Live Ordnance of any kind allowed for remainder of day (2400 hours).
No Deliveries of any kind allowed within 3km of sighting.
If sighting is close to H.E. Hill (≤ 0.5km) use H.E. Hill as center. If sighting is outside these limits use the sighting location.

☐ **Notify any units entering NTAC and/or STAC for the remainder of the day that no live deliveries are allowed on that range. Also notify all units entering those ranges that no deliveries are allowed within 3km of (Location and if required, UTMs and/or Target(s) affected).**

☐ **Notify RMO/CC, RMO/DO, or RMO/ARO.**

Location and if required, UTMs and/or Target(s) affected.

Contacted. _____ @ _____

☐ **Notify RMO/ASMS (Range Scheduling).**

Location and if required, UTMs and/or Target(s) affected.

Contacted. _____ @ _____

☐ **Checklist completed @ _____. Sign. _____**

Attachment 4

56th RMO/ESM Sonoran Pronghorn Daily Monitoring Report

Sonoran Pronghorn Observed?

Tactical Range:

Date:

Time:

UTM Coordinates:

Closed Targets:

Type Of Monitoring:

Monitor 1:

Monitor 2:

Monitor 3:

Monitor 4:

Location Of Sighting:

Contacted ROCC @ :

Activity When Sighted:

Total Number Of Pronghorn:

Number Of Collared Pronghorn:

Collared Number:

Sex:

SPH Were Heading:

Number Of Fawns:

Additional Information:

Checklist Completed @:

Signer:

Attachment: Daily Map Of Pronghorn Locations

Email Checklist To: 56RMO.Pronghorn@luke.army.mil