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In Reply Refer to:
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April 12, 2010

Memorandum

To: Linda Dansby, Abandoned Mine Lands ARRA Program Manager, National Park Service, Intermountain Region, Santa Fe, New Mexico

From: Field Supervisor

Subject: Biological Opinion on a Proposal to Close Abandoned Mine Lands (AMLs) within Coronado National Memorial, Organ Pipe Cactus National Monument, Saguaro National Park, and Grand Canyon National Park

Thank you for your request for formal consultation with the U.S. Fish and Wildlife Service (FWS) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act). Your request was dated February 11, 2010, and received by us on February 16, 2010. At issue are impacts that may result from the proposed closure of Abandoned Mine Lands within Coronado National Memorial, Grand Canyon National Park, Organ Pipe Cactus National Monument, and Saguaro National Park located in Cochise, Coconino, Mohave, and Pima counties, Arizona. The proposed action will adversely affect the endangered lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*).

In your correspondence, you requested our concurrence that the proposed action is not likely to adversely affect the lesser long-nosed bat (in Saguaro National Park only), the threatened Mexican spotted owl (*Strix occidentalis lucida*) with critical habitat, the endangered Sonoran pronghorn (*Antilocapra americana sonoriensis*), the endangered southwestern willow flycatcher (*Empidonax traillii extimus*), and endangered California condor (*Gymnogyps californianus*). We concur with your determinations and our rationale is provided in Appendix 2.

This biological opinion is based on information provided in: (1) the February 2010 biological assessment (BA); (2) the February 2010 environmental assessment (EA); (3) supplemental information provided on March 15 and 29, 2010; and (4) 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 species of concern, mine closures and assessments and their effects, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at this office.

Consultation History

- September 30, 2009: FWS provided scoping comments, species information, and conservation recommendations in response to the National Park Service's (NPS) August 10, 2009, letter regarding the project.
- November 2009 – January 2010: Several meetings and conference calls were conducted among FWS, NPS, and Westland Resources (consultants for NPS) to refine the project description, conservation measures, and discuss potential effects to listed species with an emphasis on lesser long-nosed bats.
- February 11, 2010: Formal consultation/concurrence was requested by NPS, accompanied by the BA and the EA.
- March 12, 2010: We requested additional information and clarification on issues in the BA and EA.
- March 15, 2010: NPS provided the requested information and approved our transmittal of a final biological opinion without first reviewing a draft.
- March 24, 2010: We requested further information and clarification regarding issues at Grand Canyon National Park.
- March 29, 2010: NPS provided the requested information and formal consultation/concurrence was initiated.

BIOLOGICAL OPINION

Description of the Proposed Action

The complete description of the proposed action, including conservation measures, is found in the NPS's February 2010 BA, prepared under contract by Westland Resources, and the NPS's February 2010 EA (prepared under contract by Louis Berger Group and Westland Resources. These descriptions are incorporated herein by reference. In general, the proposed action is the implementation of specific closure measures to mitigate human health and safety hazards at specific mine features in four units of the National Park System in Arizona. The specific units are Grand Canyon National Park (GRCA), Saguaro National Park (SAGU), Organ Pipe Cactus National Monument (ORPI), and Coronado National Memorial (CORO) (Figure 1, Appendix 1). Table 1 (Appendix 1) provides a description of the type of closure action proposed at AML features within each Park. The proposed actions will restrict human access to abandoned mine openings with identified health and safety risks and/or a high level of wildlife use, while minimizing impacts to bats and other wildlife and significant cultural resources. A variety of closure methods may be used, depending on site-specific conditions and features. In some cases, the decision for a particular feature that is not a high risk (based on conditions at the site and/or low accessibility) would be to do nothing, but to continue to monitor that site. For most openings of substantial depth however, the proposed actions will be some type of gate, fencing, backfill, or other closure method.

A key feature of the proposed action is the implementation of an adaptive management plan to guide long-term implementation of the closure activities. The plan provides for pre- and post-construction monitoring of bat use of the mine features and allows for the modification and refinement of proposed closure activities as new information is obtained and analyzed. This adaptive management program will guide and inform modifications of the specific actions currently proposed for individual abandoned mine openings to protect human health and safety and the sensitive resources at these mine features. Any changes to a proposed closure action at a specific feature will be selected from the range of potential actions considered in the BA and this Biological Opinion (BO). For example, should the impacts of a selected closure method to lesser long-nosed bat exceed limits considered acceptable by the NPS and the FWS, the closure method implemented at that site will be removed and replaced with a method anticipated to have less effect, and this information will be used to guide future closure actions contemplated as part of this BO and the BA. Similarly, should sites currently planned for no closure action be determined to require closure and should those sites support lesser long-nosed bat, the selection of the appropriate closure method would be based on the programmatic analysis provided in the BA and this BO, and the information gained from pre- and post-construction monitoring efforts related to the proposed action.

Tables A-1 (CORO), A-2 (ORPI), A-3 (SAGU), and A-4 (GRCA) in Appendix A of the BA list all mine features included in this analysis and are incorporated herein by reference due to the size of the tables. For the mine features for which initial closures are proposed, the NPS has adequate data on which to base the closure design. **For other mine features listed in the BA for which no action is proposed at this time, the NPS may, in the future, determine that closure is needed and would develop the appropriate closure design based on the adaptive management procedures outlined in the BA and this BO. Thus, this consultation and the associated documents form the basis for a programmatic approach to NPS AML closure activities for effects to lesser long-nosed bats. As such, should the NPS determine that a mine feature on any of the three Park units that are within the range of the lesser long-nosed bat requires future closure (GRCA does not fall within the range of the lesser long-nosed bat), the process outlined in the BA and this BO will guide that closure. If the NPS provides documentation to FWS that the process in this document has been followed with respect to determination of effects to lesser long-nosed bats and the proposed closure method, no further section 7 consultation under the Act is required for lesser long-nosed bats. NPS will follow the appropriate NEPA process for future closures and will determine if potential effects to other listed species require additional section7 consultation.**

The following section describes the various types of closures and the process used to construct them. Note that any type of gate or cupola would be designed to keep people out of the openings while minimizing airflow restriction and allowing bats and other wildlife uninhibited access.

All of the proposed bat gate designs have been used effectively throughout the U.S. to accommodate various bat species under certain conditions. The selection for each opening addressed in the BA was done by the NPS based on the primary factors that need to be

considered in selection of a gate design, including: (1) biological factors, especially bat species, type of use (e.g., maternity colony, night roost), and bat numbers; (2) the characteristics of the mine opening itself, especially size of opening, plus safety/site conditions, airflow, potential vandalism, location/accessibility; and (3) site cultural resource values. The gates can be removed or modified if management directions change (see Section 2.2 Monitoring and Adaptive Management in the BA).

Timing of construction would vary from Park to Park, but it is anticipated that several teams would work simultaneously within each Park over a period of about 1 to 3 years to complete the planned closures (from May 2010 into 2013 for the adaptive management approach at ORPI, and upon issuance of BO and FONSI covering the EA for other closures and up to 3 years or longer, depending on the availability of funds). Teams would be coordinated to minimize disruption to high-use visitor areas and any special events, while maximizing the efficacy of Park staff use. Work would be done mainly in late fall to early winter to avoid sensitive biological periods such as nesting or breeding periods for birds such as the Mexican spotted owl and willow flycatcher, and breeding or migration periods for bats, including the lesser long-nosed bat.

Bat Adit Gates

Bat gates are designed to keep people out of mines while minimizing airflow restrictions and allowing bats relatively uninhibited access (Burghardt 2000). Bat gates consist of several different styles and materials and are usually placed near the entrance of an adit. Typical adit gates and generic design diagrams are included in Appendix D of the BA. Those that are being considered for use in this project include the following:

- 3- or 4-inch angle iron. Consists of 3- or 4-inch angle iron for structural member and cross member supports with angle steel “stiffeners” inside each horizontal cross member; 3-inch is considered if material weight is an issue (to reduce weight and number of helicopter loads).
- 2- or 3-inch square tube. Tubular steel construction, which would be hardened.
- Chute gate. Gate with a large opening or chute, often constructed at an incline.

For those closures requiring special designs to accommodate other wildlife or water access (e.g., water piping or tortoise access), the generic designs would be modified to allow for site-specific needs. Also, for any site requiring a special design for listed bat species, the design would be customized to the opening as discussed with the FWS and as presented in the BA.

The NPS recognizes there is variability in bat-accessible gating design, and the agency strongly supports innovation in designing bat-accessible gates that are based more importantly on bat species, type of use, population size, and the particular characteristics of the given mine or cave feature (Dansby pers. comm. 2009). The types of gates selected and listed in the tables in Appendix A of the BA reflect this position, and the NPS is committed to pre- and post-construction monitoring to ensure that the selected closures do not cause adverse effects.

Bat-accessible gates are typically constructed of a non-reflective material and installed into the dark zone of an adit or deeper if the adit widens appreciably to blend into the historic or natural scene and allow for the greatest size gate for bat flight.

Regarding the construction process for any gate, construction would take place during specified times of year that would not adversely affect wildlife utilizing the mine or surrounding area. Construction would take place during daylight hours. The average construction time per adit gate is estimated at 1 day for small to medium adits and up to 4 days for large bat gates or cupolas. Most projects would involve two to four people but would not exceed about ten on a large, complex closure. Minimal clearing of non-sensitive vegetation and rock debris may be necessary at some sites. Although some limited off-site cutting and pre-fabrication can be done, most construction must occur on location to ensure that the gates meet site-specific conditions. Gate construction would consist of hand carrying of steel, mule/horse packing, vehicle access, and possibly the use of helicopter sling loads depending on site accessibility. Generally, the on-site staging and work area would utilize the waste rock debris created by mining at the site. The construction process for a typical gate is generally as follows; variations would occur based on selected design and materials:

- Mobilization
- Clearing minimal rock debris or vegetation as needed from the gate site
- Installation of an angle sill plate
- Installation of two vertical uprights
- Installation of horizontal bars with spacing at 5 ¾ inches or other appropriate spacing for the design selected
- Installation of a removable bar to retain mine access
- Installation of 1-inch round bar pins into the mine walls
- Clean-up and re-vegetation if necessary
- De-mobilization

The construction would utilize welders, generators, rock drills, cutting torches, and miscellaneous small tools. Within each Park, all construction would be done by several teams working sequentially from site to site, with timing restrictions followed to minimize impacts on bats and other sensitive wildlife species, Wilderness, as well as any special visitor use events or high visitation periods if possible.

Bat Cupola Gates

A cupola is a box-like structure that fits over a vertical opening or shaft, flush to the ground, but not level with the ground. Instead, the gate is built up several feet to allow bat passage into the opening in a horizontal then vertical direction. Typical cupolas and generic design diagrams are included in Appendix D of the BA.

Cupola construction would take place during times of the year specified to not adversely affect wildlife utilizing the mine or surrounding area. Construction would take place during daylight hours. The average construction time per cupola would be 2 to 4 days for medium cupolas. Larger cupolas may take as many as 9 days to complete. There would likely be less than ten people on site during construction. Minimal clearing of non-sensitive vegetation and rock debris may be necessary at some sites. Concrete footers may be necessary at some sites to stabilize loose mine shafts. Gate construction would consist of hand carrying of steel, mule/horse packing, vehicle access, and possibly the use of helicopter sling loads depending on site accessibility. Generally, the on-site staging and work area would utilize the waste rock debris created by mining at the site. Variations in materials would occur based on selected design, but the use of angle iron for the sides is generally preferred since it can span longer lengths without vertical supports, which maximizes horizontal flying space for bats. The construction process is generally as follows:

- Mobilization
- Clearing minimal rock debris or vegetation as needed from the gate site
- Possibly the installation of concrete footer where required
- Installation of an angle sill plate
- Installation of vertical uprights
- Installation of horizontal bars with spacing at 5 ¾ inches (for 4-inch angle iron) or other appropriate spacing
- Installation of a removable bar to retain mine access
- Installation of 1-inch round bar pins into solid rock or concrete footers
- Installation of an expanded metal grating cap
- Possibly the installation of expanded metal skirting around the lower section of cupola where required to block animals from crawling into the opening, to increase stability of the structure, or to discourage digging around the base of the cupola
- Clean-up and re-vegetation if necessary
- De-mobilization

The construction would utilize welders, generators, rock drills, cutting torches, and miscellaneous small tools. Similar to bat-accessible gates, cupolas are typically built using non-reflective materials.

PUF/Backfill Closures (Polyurethane Foam/Backfill)

A PUF/backfill closure uses polyurethane foam with a backfill cover to plug openings where the mine does not provide significant wildlife habitat and alternative habitat that is less dangerous is available nearby. PUF/backfills are also used at features that are eligible for listing in the National Register of Historic Places (NRHP) to avoid adverse impacts under

Section 106 of the National Historic Preservation Act (NHPA), since they are not considered permanent closures. At mine features listed in or eligible for listing in the NRHP proposed to be closed by PUF/backfill, a 3-foot shaft with a wildlife ramp would remain over the PUF plug, allowing the mine feature to be visible on the landscape as well as allowing for future evaluation and study of the mine feature. The underground workings below the plug would remain unchanged in appearance, and any artifacts left by the miners in the mines would remain underground with the potential for future evaluation. Although both adits and shafts can be closed with PUF, shafts are generally easier and more commonly closed with this technique. The foam is produced by mixing two liquid reagents, a resin and a catalyst. The mixture is then poured on top of a lightweight form constructed in the opening and a rapid exothermic reaction occurs, generating foam that expands to fill all voids and cracks in the mine opening. Within 15 to 30 minutes, the foam hardens to create a hard plug. Since the foam is subject to decay when exposed to light and can be cut, the plug is covered with about 3 feet of backfill. A vent pipe is often included that helps as a closure locator in the future. Typical PUF/backfill installations and generic design diagrams are included in Appendix D of the BA.

PUF/backfill closures would take place during times of the year specified to not adversely affect wildlife utilizing the mine or surrounding area. The application of a wildlife exclusion material such as 1-inch chicken wire or other acceptable material would be installed 4 to 7 days prior to closure to allow wildlife to leave the mine feature but discourage re-entry. Installation of the closure would take place during daylight hours. The average construction time per average closure is 1 day; larger closures may take several days to complete. There would likely be less than ten people on site during construction. Minimal clearing of non-sensitive vegetation and rock debris may be necessary at some sites. Site access would consist of hand carrying, mule/horse packing, vehicle access, and possibly the use of helicopter sling loads depending on site accessibility and the overall weight of closure materials. Generally, the on-site staging and work area would utilize the waste rock debris created by mining at the site. The PUF/backfill closure process is generally as follows:

- Mobilization
- Clearing minimal rock debris from the closure site
- Installing a bottom form to hold the first layers of foam
- Installing a 2-inch-diameter vent pipe for water and air exchange, where required; this pipe would also help in locating the PUF after it is completed
- Installing the foam with 1.5-foot intervals to avoid over-heating and fire hazard
- Installing the foam using a formula of 1.5 times in vertical thickness as the widest horizontal dimension of the shaft or as specified by the manufacturer
- Foam level would be 3 feet from the form surface, with 2 to 3 feet of soil/rock debris to ground level, except at mine features listed in or eligible for listing in the NRHP, backfill would to 3 feet below surface with a wildlife ramp to protect historic fabric

- Clean-up and re-vegetation if necessary
- De-mobilization

PUF/backfill would not be used for sites supporting lesser long-nosed bats as this method results in making the feature unusable by lesser long-nosed bats.

Backfill Closures

Like PUF/backfill closures, backfills are used where the mine feature does not provide significant wildlife habitat and alternative habitat that is less dangerous is available nearby, and especially where there is a source of backfill material onsite. Backfill closures generally use on-site material (the waste rock dump or spoil material left from the original mining) to fill the openings, although if the hole is large and a source of off-site material is available, material could be hauled into the site. Backfills fall into several categories, as follows:

"Heavy" and "Full" Backfills - Heavy backfills require the use of heavy equipment such as backhoes, track hoes, or excavators to move the larger quantity of backfill into place. These are a type of full backfills, which fill the openings completely to the surface, with no remains of the feature left visible. These backfills are not used at any feature that is eligible for listing in the National Register of Historic Places.

"Light" Backfills, including "Partial Backfills." - A "light" backfill is generally used at smaller features, so the material used to fill the opening is shoveled in using hand-held tools, not heavy machinery. Most of the light backfill closures that are proposed under this plan would be completed as a "partial" backfill, where the feature is filled only part way to the surface, which ensures that evidence of the prospect opening at the surface remains on the mine site landscape with all associated cultural features undisturbed. These are generally used at shallower prospect pits or openings where there is sufficient waste rock to use as backfill, but the amount needed would not eradicate the visible outline of the waste rock dump on the landscape, but may reduce its depth. A wildlife ramp is constructed along one side using the backfill material, so as to avoid adverse impacts to wildlife that could become otherwise trapped in the remaining depression. Partial backfills are proposed at many relatively shallow features that are eligible for listing in the National Register of Historic Places to avoid adverse impacts under Section 106 of the NHPA.

Depictions of a typical full backfill and a conceptual partial backfill sketch are included in Appendix D of the BA.

Backfill closures would take place during times of the year specified to not adversely affect wildlife utilizing the mine or surrounding area. Wildlife exclusions would be installed prior to closure and would remain in effect during the closure process. Backfill would take place during daylight hours. The average time per "light" (and most partial) backfill closures would be less than 1 day; larger closures and "heavy" backfills may take several days to complete. There would likely be less than five people on site during a "light" backfill and up to ten for a "heavy" closure. Minimal clearing of non-sensitive vegetation and rock debris may be necessary at some sites. Site access for "light" backfills would consist of hand carrying or

mule/horse packing and possibly vehicle access, while site access for a “heavy” closure would consist of access for vehicles or heavy equipment and use of existing roads. Generally, the on-site staging and work area would utilize the waste rock debris created by mining at the site.

The backfill closure process (allowing for partial backfill) is generally as follows:

- Mobilization
- Utilizing available waste rock, the feature would be filled to within 2 feet of the surface or, for some “heavy” closures, utilizing outside source clean material the feature would be filled to within 2 feet of the surface
- A wildlife ramp would be created on one side of the feature to allow small animals an exit
- Clean-up and re-vegetation if necessary
- De-mobilization

Backfill closures will not be used at sites where lesser long-nosed bats occur. This method results in making the feature unusable by lesser long-nosed bats.

Grates

Only a few features are proposed for grating if subsequent monitoring shows no bat use and there is a need to maintain airflow or prevent exposure to hazardous conditions. Horizontal shaft grates are placed at or below collar level and can be constructed of various types of metal products, including angled or square steel tubing, roundbar or expanded steel mesh. The grate provides adequate spacing for ventilation but the openings are spaced sufficiently close so animals cannot fall in and people cannot trip or fall through the cracks. Adit grates would be similarly constructed and installed at the entrance to the feature. This method will not be used at sites occupied by lesser long-nosed bats. This method makes the feature unusable by lesser long-nosed bats.

Helicopter Use

In developing the proposed action, consideration was given to avoiding or minimizing use of mechanized equipment in designated or proposed Wilderness. However, as indicated in the BA, in many cases, access for construction is not possible by roads or trails due to extremely steep slopes, lack of trails, and/or remote locations. These conditions, in combination with the excessive weight and size of gating and other closure material and equipment, justify the use of “minimum tools” and limited use of mechanized equipment in Wilderness. In these areas, helicopter support would be needed (see Table 2). Helicopters may be used at other sites that are listed as foot, stock, or helicopter, subject to minimum requirements analyses.

Table 2. Site Closures for which Helicopters Would Likely Be Needed

Park	Total
CORO	45
ORPI	15
SAGU	7 known
GRCA	13

Equipment would be sling-loaded in bags or other containers and lowered, via cable, to target areas at mine closure locations. The minimum altitude for helicopter access would be 100 feet to minimize noise at ground level. The helicopter staging area or helipad would be located in previously-disturbed areas near roads; however, minimal vegetation may need to be cleared or trimmed to sling-load equipment or supplies safely. Flight paths would avoid designated or proposed Wilderness wherever possible; however, that is not possible at ORPI or GRCA or most of SAGU, since most or the majority of these Parks are designated or proposed Wilderness (CORO has no Wilderness areas).

Helicopter flight times would vary based on type of closure (which determines weight of materials and equipment) and the distance from the helipad. However, assuming use of a helicopter that can carry a 600-pound load, and an average 20-minute flight time (10 minutes in; 10 minutes out per load), typical flight times for the various closures would be as follows:

- Bat gate – ranging from 3 to 5 hours total (2 to 4 hours in and 1 hour to remove the equipment at the end of the work); would depend on size of gate; most gates would require about 3 hours to transport about 6,000 pounds total.
- Cupola or grate – ranging from about 5 hours total (for an 8-foot × 10-foot cupola) to 9 hours (for a 14-foot × 20-foot cupola); would depend on size of structure.
- PUF/backfill – small closures would take less than 1 hour, while large PUF/backfill closures (e.g., about 7,000 pounds) could take up to 4 hours total; most PUF/backfills would be in the 500- to 3,000-pound range for materials and equipment and the 1- to 2-hour range for helicopter transport.

Also, larger helicopters can carry up to 6,000 to 8,000 pounds. If determined appropriate under the Minimum Requirement Analysis, the contractor selected for the work could use a larger craft, which would reduce the number of trips and flight hours considerably, but would increase noise levels. In any case, helicopter loads would be managed and scheduled to minimize the number of trips needed and to keep trips to the shortest time period possible. The trips would not all occur at the same time, as the construction schedule in each Park would span several months and possibly extend over a 2-year period to complete all closures, since work would not be done during the spring-summer breeding season for bats and birds of

special concern. Helicopters would land only at the designated helipads (see Conservation Measures below for measures to reduce impacts of helicopter use on listed species).

Conservation Measures

Proposed conservation measures are provided below.

Helicopter Use

- Proposed helicopter transport of gate materials would minimize impacts by scheduling trips to the fewest number of days possible consistent with safe air operations and cost considerations.
- Helicopter flight times and routes would be limited to time periods and assigned corridors developed in coordination with Park wildlife and recreation personnel to minimize impacts to Wilderness values, visitor use, and sensitive wildlife species.
- Drop zones would use already disturbed areas such as waste rock piles. Helipads would also be located in disturbed areas or areas already designated for such use and would be located away from areas occupied by listed wildlife species.
- When transporting sling loads, helicopters would remain a minimum of 100 feet above the ground to minimize noise impacts at ground level.

General Protection of Listed Species and Other Wildlife

- The NPS would monitor construction activities to minimize potential environmental impacts. A biological monitor will be onsite for all project activities.
- To minimize impacts on wildlife, work will be done during daylight hours only. Disruption and noise will be reduced by limiting the number of people on site to fewer than ten people at any time and each project would be completed over a span of several days, with projects grouped to reduce long-term noise impacts.
- When a mine opens to the surface at multiple points, every effort would be made to keep all points open. Multiple access points also provide diversity of access for the bats. Airflow through underground passages often makes a mine desirable for bats, warming some areas while cooling others. If this airflow is interrupted, it can have a negative effect on bat use. Maintaining airflow is a prime concern.
- For bats, pre-construction monitoring would be done where information is needed about use of a feature before implementing a closure, and post-construction monitoring would be done at gates and cupolas. If disturbance from monitoring activity is an issue, remote methods of monitoring would be investigated for use.
- Bat gate and other closure methods will be scheduled to avoid key reproductive or hibernation periods. Specific construction periods have been established for each Park and are described in the BA.

- Protocol for Prevention of the Spread of White-Nose Syndrome in Bats - Per NPS directive issued April 17, 2009, regarding the prevention of the spread of white-nose syndrome in bats, anyone who has done work at a cave or abandoned mine in the east regardless of whether white-nose syndrome has been confirmed needs to either bring new clothes, boots, gloves, and equipment or follow decontamination procedures when performing work in caves or abandoned mine lands in units of the National Park System. The NPS can require either approach. A White-Nose Syndrome in Bats Decontamination Protocol Form must be signed by anyone performing work in the Park prior to beginning work in abandoned mines in the Park.

- In desert tortoise habitat, contractors would be educated prior to mobilization to increase their awareness of the potential effects to tortoises related to the onset of construction activities, especially if construction occurs during August and September. Shaft closures, particularly cupola gates, should be screened or skirted around their lower perimeter to prevent tortoises from passing under the closure and falling into the shafts. If tortoise use is high, and depending on the availability of other habitat, adit gates should provide suitable openings for desert tortoise to pass beneath the gate and enter the opening for protection. If there is available habitat in the vicinity of the gate and the particular mine opening is not essential as habitat, then all tortoises should be excluded prior to gate construction and the gate should be constructed so that tortoises are kept out of potentially dangerous mine openings.

- At the site in GRCA with potential southwestern willow flycatcher habitat nearby, activities would be conducted outside the breeding season (typically early May through July) to avoid potential disturbance to breeding populations. In addition, activities would avoid disturbance to, or removal of, riparian habitat.

- If possible, and if there are no overriding concerns with undocumented alien use, adit gates would generally be placed far enough away from the portal to provide protection for larger mammals.

- At features with a water source, the proposed design would include directing the water outside the gate to a buried tank ("drinker") near the mine entrance to allow continued use of the water source.

Bat Gate Mitigation

This mitigation would occur to minimize impacts on various special status species during key reproductive or hibernation periods. Gate construction would avoid the period of March to August to avoid disrupting the Mexican spotted owl breeding season at sites where the owl is a concern. The Mexican spotted owl may occur at SAGU, CORO, and GRCA.

Bat-compatible gates or cupolas will be constructed during non-critical periods for bats (i.e. would avoid maternity season for maternity roosts, occupancy season for non-maternity roosts, and hibernation season). For lesser long-nosed bats, this means restricting closure actions from April until October, depending on the Park. At ORPI, construction would not

occur from March15 through July 31 to avoid impacts during the Sonoran pronghorn fawning season. In general, construction would occur at the Parks in late fall and early winter. Construction timing would also consider other wildlife that could be affected, such as nesting birds disrupted by helicopter transport of materials. However, the restrictions in place for bats and other special status species would generally protect most other wildlife breeding and nesting seasons.

Bat Fencing Mitigation

This mitigation would be used where temporary fences are proposed at ORPI in conjunction with the longer term adaptive management approach for protection of the lesser long-nosed bat. Measures would include no construction during breeding or hibernation periods and consultation with the FWS regarding placement and design so as not to hinder or affect bat movements at the feature, as well as avoiding enhancement of predator access and perch sites.

Backfill Mitigation

This mitigation would also be followed to minimize impacts from this type of closure. For sites proposed for backfilling that are known to be used by wildlife, the NPS would follow standard wildlife exclusion techniques prior to the closures to ensure that no wildlife is trapped in the openings. The Parks would check for wildlife presence before PUF/backfilling or grating and use 1-inch mesh material (chicken wire, polypropylene, or similar material) to exclude bats from the mine (Sherwin *et al*. 2009), taking care to minimize trapping or entangling other wildlife during the exclusion process. Exclusion fencing would be secured at 2-foot intervals with rebar or other equivalent method approved by the NPS to ensure that wildlife does not enter the mine feature after the exclusion survey and prior to permanent closure.

California Condor – Specific Conservation Measures – GRCA Only

GRCA has developed a set of mitigation measures to avoid potential adverse impacts to the California condor or its habitat. These measures require: (1) work stoppage if condors arrive on site; (2) instruction to employees to refrain from interactions with condors; and (3) site clean-up in condor habitat. If condors begin nesting in the vicinity of the proposed activities, the NPS would re-initiate consultation with the FWS. Re-initiation of consultation would be restricted to the closure site affected by nesting activity and would not affect implementation of other proposed closure actions proposed at the Park or any of the other Parks considered in this BA.

The section below provides additional discussion regarding the effects of these conservation measures.

- Cover all water when not in use – This will reduce the potential for condors to be attracted to the work areas; and in the unlikely event water at the site would be contaminated during the construction process, it would preclude condors from drinking that water.

- Keep camp areas free of trash – This also reduces the potential for the proposed actions to create circumstances that would attract condors to the proposed project site. Biological monitors will ensure that adequate clean-up measures are completed daily at each site.
- Provide all project personnel with literature or instruction regarding condor concerns – Education of staff involved in the project will minimize the potential for unforeseen interactions by providing a knowledge base that will allow staff to make proper decisions in the context of the project and condor conservation. This will also reinforce the importance of adhering to the conservation measures proposed by the Park to avoid adverse effects to California condor during implementation of the AML closures.
- Record and report immediately any condor presence in the project area to a Resource Advisor or a Park wildlife biologist. – This conservation measure will, if a condor is present in the project area, allow project staff to interact with a specialist to review their planned actions in the context of these conservation measures and ensure that proper procedures are followed to avoid adverse effects should the condor then enter into the project site.
- Avoid any condors that arrive at any area of human activity associated with project activities. Notify the assigned Resource Advisor or a Park wildlife biologist, and only permitted personnel will haze the birds from the area. – Condors are innately curious and are commonly seen frequenting areas of high human activity, such as Grand Canyon Village on the south rim. This conservation measure reinforces the requirement of all project staff to avoid interaction with condors. Similar to the prior measure, this measure will allow project staff to interact with a specialist, to review their planned actions in the context of these conservation measures, and ensure that proper procedures are followed to avoid adverse effects. It also requires that should hazing be necessary to protect condors by moving them away from project activities and minimize habituation to construction activities that only trained, permitted personnel would conduct the hazing activities.
- Minimize aircraft use along the rim to the greatest extent possible. This will minimize and avoid, to the extent practical, the risk of collision between a condor and aircraft as the aircraft flies over or along the rim and it will minimize noise disturbance to potential condor nesting sites along the rim.
- Keep aircraft at least 437 yards (400 meters) from condors in the air or on the ground unless safety concerns override this restriction. This restriction does not apply to North Rim Helispot. We believe that maintaining this distance will provide substantial protection for the condor and give the pilot sufficient time to safely react and avoid interactions with condors if they fly towards the aircraft. Please note that the North Rim Helispot is not proposed as a staging point for this project (Figure 6 of the EA). Staging will occur at the South Rim Helispot.
- Aircraft would give up airspace to the extent possible if airborne condors approach aircraft, as long as this action does not jeopardize safety. This conservation measure reinforces the Park's approach to minimize interactions between condors and aircraft and clearly articulates our determination that as long as safety considerations are not compromised, condors have the right of way within Park airspace.

- Projects would not occur within ½ mile of active condor nesting sites. The active nesting season for condors is February 1 through September 30 however; there have been relatively few nesting attempts by individual condors since reintroductions began. So while both the south and north rims contain suitable nesting habitat, the likelihood of nesting activity disturbance or disruption from closure of the AML features is limited. This conservation measure will ensure that proposed project activities will not adversely affect any known, active condor nesting sites.
- Crews would stop activity if condors arrive on site and immediately notify appropriate NPS personnel. If condors are actually present within any of the AML sites or its immediate surroundings, project staff will cease activities at that site until the condors leave on their own or are hazed by permitted Park personnel. The project crew will notify qualified Park personnel and will not take any other action. Qualified GRCA personnel will determine if hazing or other mitigation measures are warranted. Hazing would be the last choice and would only be conducted by permitted, qualified staff. This conservation measure will avoid direct interaction between the project staff and condors to the maximum extent possible and allow follow-up actions by the Park staff and its contractors to be carefully considered in a site specific context.

Bald Eagle – Specific Conservation Measures – GRCA Only

Specific Conservation Measures for the bald eagle are similar to conservation measures for the California condor and would be implemented during construction of mine closures at GRCA as indicated below:

- Cover all water when not in use
- Keep camp areas free of trash
- Provide all project personnel with literature or instruction regarding bald eagle concerns
- Record and report immediately any bald eagle presence in the project area to a Resource Advisor or a Park wildlife biologist
- Avoid any bald eagles that arrive at any area of human activity associated with project activities. Notify the assigned Resource Advisor or a Park wildlife biologist.
- Keep aircraft at least 437 yards (400 meters) from bald eagles in the air or on the ground unless safety concerns override this restriction.
- Aircraft would give up airspace to the extent possible if airborne bald eagles approach aircraft, as long as this action does not jeopardize safety
- Projects would not occur within ½ mile of active bald eagle nesting sites
- Crews would stop activity if bald eagles arrive on site and immediately notify appropriate NPS personnel

Please note that these measures do not include hazing, which is one of the conservation measures proposed for condor.

The benefits of these conservation measures to the bald eagle would be generally similar to the benefits that would be expected from the implementation of similar measures for California condor.

Sentry Milkvetch – Specific Conservation Measures – GRCA Only

Although no sentry milkvetch plants were found during pedestrian surveys of the abandoned mine features, there is a possibility that suitable habitat near sites proposed for closure could become occupied in the future. At sites containing suitable habitat for sentry milkvetch, additional pedestrian surveys for this species would be completed prior to any construction activities at mine features. These surveys could be conducted during planned pre-construction monitoring efforts incorporated as part of the proposed monitoring and adaptive management program. If any sentry milkvetch are found near the proposed closure site, suitable clear limit fencing would be placed to protect plants during construction activities from trampling or other adverse effect. If adverse impacts to sentry milkvetch cannot be avoided, the Park would contact the FWS and will not proceed with closure activities at that particular site until authorized.

Sonoran Pronghorn – Specific Mitigation Measures – ORPI Only

Construction activities for the abandoned mine lands project would be restricted to avoid the fawning season for the Sonoran pronghorn (March 15 through July 31). In the unlikely event that pronghorns are encountered during flight operations, supply flight paths would be altered to maintain a ½-mile distance from the pronghorns and to maintain minimum elevation above the ground surface of at least 500 feet during transit unless safety concerns override this restriction. If Sonoran pronghorn are located within ½ mile of the AML site or staging area, helicopter operations for closure activities at that site would cease until operations can resume within the constraints imposed by this conservation measure. To enhance the likelihood that Sonoran pronghorn will be avoided during helicopter overflights:

- Biological monitors will regularly monitor the flight paths. This will be accomplished by the biological monitors traveling with the helicopter as an observer at the start of construction activities and at least once a week after the start of proposed construction activities.

- Biological monitors will contact AGFD and monitors for the Customs and Border Protection (CBP) Ajo 1 project immediately prior to the start of construction activities and once per week thereafter to obtain the locations of any Sonoran pronghorn (detected through aerial and ground survey). Communication protocols will be established among ORPI, the biological monitors, AGFD, and the CBP monitors to ensure that data are exchanged on a timely basis. If pronghorns are in the vicinity or appear to moving into the vicinity of the planned flight paths, appropriate adjustments will be made to ensure helicopter activities will avoid Sonoran pronghorn.

Monitoring and Adaptive Management – Programmatic Assessment for AML Features with Regard to Effects to Lesser Long-Nosed Bats

Pre-construction assessment of site conditions, post-construction monitoring of gated structures, and long-term routine monitoring and inspection by NPS staff to confirm the continuing integrity of the closures and identify areas needing additional corrective action are integral components of the proposed action. Pre-construction data are already available for many of the mine features proposed for closure. Additional pre-construction monitoring will be completed in 2010 at sites where no data exist and where a closure is planned that could affect the use of the openings by bats. Following construction of a gate or cupola, post-construction monitoring will be conducted to document and assess the effects of the closure activity on bats. Pre-construction and post-construction monitoring activities will vary somewhat for each of the Parks considered in this BA and are described in greater detail for each of the Parks in Section 3 of the BA.

In all cases, if the actions are not having the desired effect or if the adverse effects exceed those contemplated in the BA and this BO, the Parks will review their goals and modify the action appropriately. Monitoring will provide feedback based on selected parameters to be assessed and allow corrections to be made as needed. This type of approach is critical for those features used by listed bat species and where the outcome of gating the feature is uncertain. This approach is needed to verify that features with no prior documented use by listed bat species are not being used at the time of closure. The information obtained from this effort will also be invaluable in making future decisions on closure designs and mitigations.

Two pre-construction and post-construction monitoring/survey protocols will be implemented. Monitoring Method 1 will be a relatively low-intensity effort that will be employed for pre- and post-construction monitoring at all mine features that are not known to support lesser long-nosed bats. The objective of this effort is to document the presence/absence of bats within a given feature, and if bats are present, the species present, the estimated numbers of bats present by species, and the type of use (e.g., maternity roosts, male day roosts, temporary night roosts, hibernacula, etc.) should be noted. Multiple visits will be made to each feature subjected to Monitoring Method 1 to gather the presence/absence, use type, and estimated number of bats using each feature data. The number of visits will be specified by the NPS, in cooperation with the FWS, in contracting and scope-of-work requirements. If lesser long-nosed bats are detected during a Monitoring Method 1 survey during pre-construction monitoring efforts, Monitoring Method 2 will be implemented and the closure method re-evaluated in light of this new information in conformance with the adaptive management strategies outlined in this BA. For all non-lesser long-nosed bat sites closed with a gate, cupola, or chute structure, post-construction monitoring will be conducted using Monitoring Method 1 for at least 2 years following the construction of the gate structure to ascertain the effects of the closure method on the bat species present.

Monitoring Method 2 is an intensive survey and monitoring effort that will be used at sites with known or the historic presence of lesser long-nosed bat. Currently, lesser long-nosed bats are known to occur at ORPI and CORO, and Monitoring Method 2 would be implemented at these Parks. There are no records of lesser long-nosed bat utilizing mine features at either the Tucson Mountain District (TMD) or Rincon Mountain District (RMD) of SAGU[1], and GRCA occurs outside the range of the lesser long-nosed bat. Monitoring Method 2 would only be implemented at SAGU if lesser long-nosed bats were detected during pre- and post-construction monitoring efforts. Because lesser long-nosed bats have separate and distinct maternity and post-maternity distribution in Arizona, Monitoring Method 2 will be applied in different Park units in different seasons. Monitoring Method 2 will require multiple visits to each feature known to be used by lesser long-nosed bat to document the numbers of bats (distinguished by species when possible) and the type of site use (e.g., maternity roost, male day roost, temporary night roost, post-maternity dispersal roost, etc.). The number of visits will be specified by the NPS in cooperation with the FWS. Site visits will be conducted in a manner that minimizes the level of disturbance to lesser long-nosed bat but allows for limited entry into the mine feature. Exit counts at sites with large numbers of bats will be documented with video recordings to enhance the accuracy of the exit counts and to provide a permanent monitoring record for both pre-construction and post-construction monitoring efforts.

Monitoring Method 2 will also include pre- and post-construction monitoring of the microclimate within mine features known to be used by lesser long-nosed bat. Microclimatic data collected during these investigations will include at a minimum recording temperature and relative humidity with programmable data loggers that will be installed in the roost area prior to the arrival of bats for the season. These data loggers should be located proximate to the location of lesser long-nosed bat roost sites and programmed to collect data as frequently as possible within the memory constraints of the device. To minimize disturbance at a roost site, the site would not be entered for data retrieval during the season of bat presence. Long-term post-construction monitoring of bats and maintenance of the closure structures and surroundings are critical. Long-term monitoring is necessary to detect changes in bat populations, correctible problems of the closure device, natural deterioration, excavation or other problems created by animals and plants, conditions caused by weather such as erosion, and the risk of human vandalism. However, caution must also be used to prevent “over-monitoring” to the extent that monitoring becomes a disturbance. Low-disturbance techniques should be used during monitoring. For nighttime observation, observers should be limited to one at each entrance. Night-vision devices and appropriate lighting should be used. When night-vision gear is not available, dim visible red light should be substituted. Use of a video camera (with night vision and auxiliary infrared light) to record an emergence flight provides the opportunity to get a more accurate count than by simply watching the flight. Videotaping also creates a permanent record that can be used for other purposes (such as behavioral study) later.

1 A lesser long-nosed bat roost is known from the Rincon Mountain Unit of SAGU. This roost site is in a natural feature and is not being considered as part of the AML project.

Park-Specific Actions and Environmental Settings

Specific actions and features for each Park unit, as well as the environmental settings for each Park, are described in detail in the BA, and are incorporated herein by reference. A general summary of important features by Park follows:

CORO - CORO is located in Cochise County in southeastern Arizona, at the south end of the Huachuca Mountains. The Huachuca Mountains are one of many north-south trending mountain ranges in the Basin and Range physiographic province of Arizona, with a high point of 9,466 feet at Miller Peak. This range extends from Fort Huachuca and Sierra Vista on the north across the international boundary into Mexico on the south. The international boundary is also the southern boundary of CORO. Elevations within CORO range from about 4,900 feet in its southeast corner up to 7,676 feet at the summit of Montezuma Peak.

CORO contains elements of both the Madrean evergreen woodland and the Plains grassland biotic communities as described by Brown (1982a and 1982b). Areas classified by Brown (1982c) as semidesert grassland are located near CORO, and elements of this grassland association are present within CORO as well. Most of the mine features evaluated in this project were within either the Madrean evergreen woodland community or an ecotonal association between woodland and grassland. While not an exhaustive list, vegetation in the vicinity of most of the mine features is dominated by a number of oak species, including Emory oak (*Quercus emoryi*), gray oak (*Q. grisea*), silverleaf oak (*Q. hypoleucoides*), and netleaf oak (*Q. reticulata*), and a variety of grass species. Other common and widespread species observed within CORO include alligator juniper (*Juniperus deppeana*), beargrass (*Nolina microcarpa*), Schott's yucca (*Yucca schottii*), border pinyon (*Pinus discolor*), agave (*Agave* sp.), prickly pear and cholla cacti (*Opuntia* spp., *Cylindropuntia* spp.), and mountain mahogany (*Cercocarpus montanus*).

Sixty-five mine features have been considered at CORO. A detailed listing of each of the features is provided in Appendix A, Table A-1 in the BA. Of the 65 features considered in this project, bat adit gates are proposed for 17 features and cupolas or large grates are proposed for 13 features. All of these 30 features have some evidence of bat or other wildlife use. PUF closures are proposed for 21 features and a simple backfill is proposed at one feature. Features proposed for PUF or backfill have no current evidence of bat use. No actions are proposed for the remaining 13 features.

At the State of Texas Mine feature 93-006, a cupola gate has been constructed, and at features 93-003, 93-004 and 93-005 an existing experimental gate has been constructed with wood and PVC under a prior BO. Additional work at this site will replace the lower section of this gate with 3-inch-square tube steel during the first construction period (April–June 2010). In addition, four new roof panels made from wood, PVC fence post material, or similar material will be placed on the open framework. This material will mimic 3-inch-square tubing, with bars spaced 6.5 inches apart on all new panels. Post-construction monitoring in July–October 2010 will provide estimates of bats using the site throughout the season. If the numbers of bats using the site are consistent with regional population trends and expectations, based on

the opinion of CORO staff with input from the FWS, the structure will be considered successful and can proceed to the next stage. During the 2011 construction season, the bar spacing on the roof panels will be reduced to 6.25 inches. Narrower spacing will reduce the risk of unauthorized entry. If post-construction monitoring in 2011 indicates a reduction in bat numbers, the final panels will be constructed with 6.5-inch spacing. Final construction will use the 6.25-inch spacing only if bat numbers are consistent with expectations. If bat numbers are down significantly with either experimental spacing, a further evaluation will be needed, with the option of removing the roof panels during the season of use by lesser long-nosed bat. The baseline data set for this site is the colony with a cable net and not with an open entrance. Count comparisons will be based on the numbers of bats exiting and will not include bats from the alcove outside the entrance. During emergence surveys, the bats will be observed for behavioral responses to the gate structures. The area immediately inside the gate will be checked after each census for dead or injured bats. Criteria of success are: (1) the colony size meets expectations based on regional population trends, with evaluations by CORO staff and the FWS; (2) there are no massive pileups and dead or injured bats are very rare; and (3) the number of bats per minute exiting the mine is comparable to the rate recorded with the cable net. For consistency, this number needs to be based on the number exiting and does not include the number coming from the alcove just outside the entrance.

In the late summer and early fall of 2011, intensive post-construction surveys (Method 2) should be conducted at the State of Texas Mine features previously gated under the existing BO and at other features where lesser long-nosed bat may have been found in the 2010 surveys. In the four sites mentioned above with unidentified nectivorous bat guano, Method 2 surveys should be conducted, even if no lesser long-nosed bats are confirmed.
In 2012 and later years, the monitoring and construction scheduling would be the same as that for 2011, until all closure actions have been completed. Features without confirmed use by lesser long-nosed bat should have at least 1 year of post-construction monitoring. All features that have not been backfilled would continue to have post-construction monitoring for at least 3 years following construction activities.

ORPI - ORPI is located in the western part of Pima County, Arizona, in the Basin and Range physiographic province. This Park unit is dominated by north-south trending mountain ranges and broad alluvial valleys. Elevations range from about 1,000 feet at its southwestern corner to 4,808 feet at the summit of Mount Ajo in the Ajo Mountains. Perennial surface water is scarce within ORPI, and there is no surface water in or near any of the abandoned mine features under consideration in this project.

This Park includes large areas of designated Wilderness—virtually the entire Park—except for the visitor center area, the north-south highway corridor, and a few corridors along gravel roads. Areas adjacent to the north boundary of ORPI include lands administered by the Bureau of Land Management (BLM) and the FWS (Cabeza Prieta National Wildlife Refuge). The Tohono O'odham Indian Reservation (Tohono O'odham Nation; TON) is adjacent to the eastern boundary of ORPI. These adjacent lands have been or are being used for a variety of purposes, including grazing, farming, and mining. The southern boundary of the Park is the

International Boundary with Mexico. Adjacent land uses in Mexico include a major east-west highway, urban development, and grazing. Abandoned mine features in the Growler Pass vicinity are very close to a boundary with the Cabeza Prieta National Wildlife Refuge. Abandoned mine features of the Kuakatch Group are very close to the boundary corner with the Tohono O'odham Nation and the BLM.

Most of ORPI is within the Arizona Upland Subdivision of the Sonoran Desertscrub biotic community, as described by Turner and Brown (1982). All the mine features evaluated in this project were within this subdivision. The dominant species in this region include foothill palo verde (*Parkinsonia microphylla*), saguaro (*Carnegiea gigantea*), organ pipe cactus (*Stenocereus thurberi*), triangle bursage (*Ambrosia deltoidea*), creosote (*Larrea tridentata*), and ironwood (*Olneya tesota*). Some areas of the Lower Colorado River Subdivision (LCRS) (Turner and Brown 1982) were seen near Growler Pass, but none of the mine features are within this subdivision. Vegetation diversity is very limited in this part of the LCRS, with creosote, triangle bursage, brittlebush (*Encelia farinosa*), and ocotillo (*Fouquieria splendens*) as the dominant species.

Three-hundred eighty-seven mine features are considered for closure at ORPI, all of which are either listed in or eligible for listing in the National Register of Historic Places, or potentially eligible. Of these, nearly 300 are small prospects that have been determined to be non-hazardous to humans. These features may be partially backfilled opportunistically and as warranted to eliminate the "pitfall trap" hazard posed to some wildlife, particularly the desert tortoise. At the point these 300 features are addressed, all applicable measures included in the BA and this BO will be applied. Eighty-seven features are more substantial. A detailed listing of each of the features is provided in Appendix A, Table A-2 of the BA.

ORPI contains the largest known maternity colony of the endangered lesser long-nosed bat in the U.S. Table 3 (Appendix 1) summarizes the known mine features being considered in this BA that support or are suspected to support lesser long-nosed bats. There are no examples of gates on any lesser long-nosed bat maternity colonies in the U.S. Because of the lack of information on this species' response to a gate at a maternity colony and mixed results on their response to gates at post-maternity roost sites, the potential for any gate to have an adverse impact on a lesser long-nosed bat maternity colony is neither insignificant nor discountable. In response to this uncertainty, an adaptive management strategy will be implemented for the features proposed for closure at ORPI to minimize the risk of adverse impacts from gating activities to lesser long-nosed bat. Implementation of this strategy will require both pre- and post-construction monitoring and review and evaluation of the data obtained during monitoring by ORPI staff, the FWS, and other NPS experts to determine if modification of proposed closure plans is warranted and, if so, how best to proceed to achieve the desired outcomes. Potential modification of the closure plans in response to monitoring efforts can include closure structure modification, removal, selection of new design concepts for structures not yet built, or a decision not to close one or more lesser long-nosed bat sites. The adaptive management plan for ORPI is conceptually illustrated in Figure 2 and summarized briefly in the following paragraphs.

At ORPI, the presence of several smaller lesser long-nosed bat roost sites provides the opportunity to collect new information with regard to the response of lesser long-nosed bat to gate features. This knowledge will facilitate the scheduling of closure activities at more important sites. The adaptive management strategy will include both pre- and post-construction monitoring. During the late spring and early summer, monitoring will be conducted at the Copper Mountain Mine and at all other mine features known to support lesser long-nosed bats. Monitoring Method 2 would be implemented at all known lesser long-nosed bat sites. Monitoring Method 1 would be implemented at other sites not known to be utilized by lesser long-nosed bat but with the potential for use by bats. If any lesser long-nosed bats are detected in these other features, the monitoring procedure will change to Monitoring Method 2.

Four features, Kuakatch Mine No. 1, Victoria Mine No. 2, Victoria Mine No. 21, and Lost Cabin Mine No. 13, have been identified for initial gating efforts of lesser long-nosed bat sites. These sites were selected based on a number of factors, including ease of access for both monitoring and construction. Because of the Wilderness designation in this Park, heavy equipment and supplies for most of the construction will be sling-loaded by helicopter from a staging area near the Visitor Center. Construction personnel will walk into the sites and law enforcement personnel will be needed at most sites. Kuakatch Mine No. 1 is within a few hundred feet of a dirt road on the Tohono O'odham Reservation. If permission is granted by the Tohono O'odham, this road might be available for construction access. However, this road is extremely rough and substantial improvement might be necessary to provide access for construction vehicles and supplies. The Victoria Mine No. 2 adit and Victoria Mine No. 21 declining adit are both about 2 miles of relatively easy trail from the campground. Lost Cabin Mine No. 13 is about 3 miles from the nearest road access over more difficult terrain.

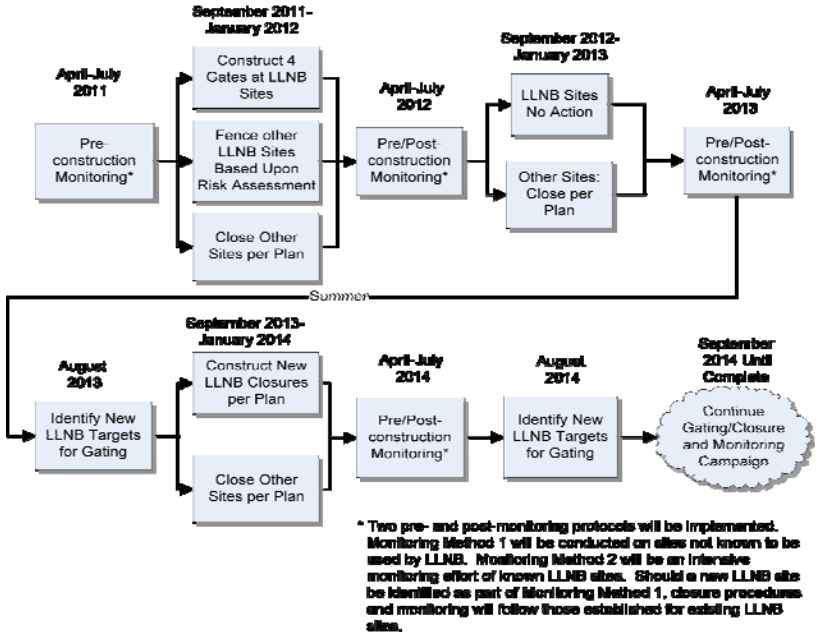

Figure 2. Organ Pipe Cactus National Monument Adaptive Management Approach

Kuakatch Mine No. 1 is about 40 feet long with a steep decline that becomes less steep with depth. At the present time, an old four-strand barbed wire fence is generally 2 feet or less from the actual opening. In addition, two palo verde trees are growing on the edge of the opening that could restrict bat access. ORPI is proposing a standard gate design for Kuakatch Mine No. 1, although a chute gate might also be considered.

Victoria Mine No. 2 is a horizontal adit about 200 feet long. The present closure includes a four-strand barbed wire fence around the adit at a distance of about 20 feet from the opening. In addition, a small section of chain link fence covers the lower half of the entrance. The proposed action at this feature is to remove the existing chain link blockage and install a folded gate design. The folded gate design is proposed to accommodate the relatively large number of bats that are expected to utilize this feature.

Lost Cabin Mine No.13 is a horizontal adit about 50 feet long with side drifts. The present closure is a four-strand barbed wire fence around the adit at a distance of about 10 feet from the opening. A standard bat gate design with 4-inch angle iron will be installed in this feature.

Victoria Mine No. 21 is a relatively shallow pit with a short decline under an overhang to a total depth of about 15 feet. The configuration of this feature is suitable for a test of a cupola gate design.

As noted in Table 3 (Appendix 1), there are 9 features at ORPI with evidence of lesser long-nosed bat and 11 openings, counting the three separate openings into Copper Mountain Mine. Four of these have been discussed above for experimental closures during the first construction period in 2011. Baker Mine No. 1 is another site with substantial use by lesser long-nosed bat. This adit is about 100 feet long with a skylight at the shaft from Baker Mine No. 2. Based on the results of the initial phase of construction and post-construction monitoring, a decision will be made on the appropriate gate design for these features. It is likely that a standard or folded gate could be used at the adit entrance and a cupola would be needed at the shaft entrance. These structures could be constructed during the second construction period, beginning in fall of 2013. No action is proposed at this time for Lost Cabin Mine No. 14 because of its remote location and relatively minor use by lesser long-nosed bat. No action is proposed at this time for Senita Basin Mine No. 3 because of its small size and relatively minor use by lesser long-nosed bat.

Because of conditions on the funding for actions at ORPI, no funding will be available until July 2010, which is too late for a full season of pre-construction monitoring at any sites. The initial pre-construction surveys will begin in the late spring of 2011. Following pre-construction monitoring in the spring/summer of 2011, and after surveys have confirmed that the bats have left for the season, construction will begin on these four lesser long-nosed bat roost sites in late summer or early fall of 2011. Construction must be completed prior to the bats' return in late spring of 2012. If Park staff determines that protection of the public or the resource warrants temporary closure, that work could begin during late summer and fall

of2010, after lesser-long nosed bats have left for the season. Temporary security fencing constructed from chain link and barbed or razor wire could be constructed at features supporting lesser long-nosed bats.

All other non-lesser long-nosed bat closures proposed at ORPI will commence following the pre-construction monitoring effort and confirmation that the bats have left for the season in accordance with the contractor's proposed construction schedule. Construction of the proposed shaft culverts and cupola gates at Victoria Mines No. 4, No. 7, No. 8, and No. 71 will proceed at this time. These features are currently covered with no reasonable bat access, and a cupola could make these features accessible for lesser long-nosed bat and other bats. Post-construction monitoring will be conducted at lesser long-nosed bat sites within ORPI in 2012. This monitoring will include those features with new gate structures or fencing as well as those where no action was taken in 2010. Monitoring Method 2 would be used for sites with known lesser long-nosed bat occupancy and Monitoring Method 1 would be used for those features not known to be used by lesser long-nosed bats.

Considering the lack of gating experience with maternity roosts for lesser long-nosed bats, new closure structures at known lesser long-nosed bat roosts in ORPI will not be constructed after the first post-construction monitoring period in 2012. Many bat species, including lesser long-nosed bat, will move around among a variety of roost sites. If bat numbers decrease at a gated site, the gate could have been the cause of the decrease. However, it is also possible that the bats could have moved for some other reason not related to the gate. With the limited sample size available, the potential cause for a change in bat numbers at a given feature cannot be determined with any degree of certainty based on a single season of post-construction monitoring. Considering the inherent uncertainties of a single season of monitoring, no further construction of gates is proposed at lesser long-nosed bat sites for 2012, but gating will continue at other sites in accordance with the contractor's approved schedule.

Post-construction monitoring at all lesser long-nosed bat roosts would continue in late spring and early summer of 2013 (Monitoring Method 2). In addition, all other sites considered for action must be monitored again in 2013 (Monitoring Method 1). The results of the monitoring efforts for 2012 and 2013 will be evaluated by ORPI staff, the FWS, and other NPS experts. After review, new targets for lesser long-nosed bat roost closure and closure methods will be developed for construction in late summer or fall of 2013. Other modifications of existing closures will be evaluated as well. Modification of the closure plans in response to monitoring efforts can include closure structure modification, removal, and/or selection of new design concepts for structures not yet built.

Post-construction monitoring of all features will continue in the late spring and early summer of 2014. As in previous years, the results of the monitoring efforts will be evaluated by ORPI staff, the FWS, and other NPS experts. After review, new targets for lesser long-nosed bat roost closure and closure methods will be developed for construction in late summer or fall of 2014.

If all closure activities have not been completed by the end of the 2014 construction period, monitoring and construction activities will continue. After all the proposed closure activities have been completed, all features that have not been backfilled (except for the 300 exploration pits) will continue to have post-construction monitoring for 3 years. The results of these monitoring efforts will be evaluated annually by ORPI staff, the FWS, and other NPS experts to determine what, if any, management actions are required.

SAGU - SAGU was established in 1933 to preserve the exceptional growth of saguaro cactus (Powell *et al*. 2006). The RMD is located on the eastern edge of the Tucson metropolitan area. The RMD extends from the foothills of the Rincon Mountains and includes the highest points of the range on Tanque Verde Ridge, Mica Mountain, and Rincon Peak, with an elevation range from about 2,950 to 8,664 feet. Most of the RMD is designated Wilderness, except for the region around the visitor center and the scenic loop drive. The RMD has natural, intermittently perennial water in Chimenea, Madrona, Rincon, and Wildhorse creeks. The most prominent hydrologic feature is Rincon Creek, which drains almost half of the district (Powell *et al*. 2006). There are no known natural limestone caves within the RMD, although Colossal Cave (a former maternity colony for the lesser long-nosed bat) is only about 4 miles from the southern boundary of the district. Areas adjacent to the Park include USDA Forest Service (Coronado National Forest) and private land to the north; Forest Service land to the east; Forest Service, private, and state land to the south; and private land to the west (Powell *et al*. 2006). Adjacent lands have been or are being used for a variety of purposes, including grazing and urban development. Mine features in the RMD are located within the 4,500 acres added to the southern boundary of the Park in 1996 and are close to adjacent private land.

Because the RMD encompasses a large area and elevational range, its vegetation communities are more diverse, ranging from Sonoran Desertscrub at the lowest elevations to coniferous forest at the upper elevations (Powell *et al*. 2006). However, the three mine features in the RMD are confined to the Arizona Upland Subdivision of Sonoran Desertscrub. Dominant plant species near these features include saguaro cactus, foothill palo verde, velvet mesquite, white-thorn acacia, ocotillo, creosotebush (*Larrea tridentata*), and several other species of cactus.

The TMD in the Tucson Mountains on the west side of Tucson is generally at lower elevations, ranging from about 2,300 feet to a high point of 4,687 feet on Wasson Peak. Most of the TMD is designated Wilderness, except for the region around the visitor center and corridors for paved and gravel roads. The TMD has no natural sources of perennial water. There are no known natural limestone caves within the TMD. Land adjacent to the TMD includes a mixture of state and private lands on the northern, eastern, and western boundaries, and Pima County's Tucson Mountain Park and private land to the south (Powell *et al*. 2007). Most of the TMD is within the Arizona Upland Subdivision of the Sonoran Desertscrub vegetation community, with semi-desert grassland represented in a small area around Wasson Peak (Powell *et al*. 2007).

All the TMD mine features evaluated in this project are within the Sonoran desertscrub vegetation community, except for one feature near Wasson Peak that is within semi-desert grassland. Vegetation assemblages vary at the mine features visited within the Sonoran desertscrub vegetation community, but generally include leguminous trees (foothill palo verde, velvet mesquite [*Prosopis velutina*], and/or desert ironwood, and saguaro and other cacti as major components. Other common species present, sometimes as co-dominants, included white-thorn acacia (*Acacia constricta*), ocotillo, creosotebush, wolfberry (*Lycium* spp.), ratany (*Krameria* spp.), and brittlebush. At TMD #028 near Wasson Peak, which is in semi-desert grassland, jojoba (*Simmondsia chinensis*) provided the dominant cover, with other common species including buckhorn cholla (*Opuntia acanthocarpa*), ocotillo, oreganillo (*Aloysia wrightii*), shin dagger (*Agave schottii*), and various grasses.

One-hundred forty-three mine features are considered for closure at SAGU. Of the 143 features, three are located in the RMD of SAGU and the remaining 140 features are located in the TMD. The Old Yuma Mine complex is being closed under a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) action and two of the

Old Yuma Mine features (#147 and #148) are proposed for either backfill or bat gates, depending on the results of bat surveys and pending the development of an engineering evaluation/cost analysis (EE/CA) under a separate CERCLA planning process. A detailed listing of each of the features is provided in Appendix A, Table A-3 of the BA.

Although lesser long-nosed bats are not known to be present at any of the features with proposed gating actions, the location of SAGU within the range of this species and the foraging resources present in SAGU suggest that there is the potential for them to occur at some time in the future. An adaptive management strategy will be implemented for the features proposed for closure at SAGU to minimize the risk of adverse impacts from gating activities to lesser long-nosed bat. Implementation of this strategy will require both pre- and post-construction monitoring and review and evaluation of the data obtained during monitoring by SAGU staff, the FWS, and other NPS experts to determine if modification of the proposed closure plans is warranted and if so, how best to proceed to achieve the desired outcomes. Potential modification of the closure plans in response to monitoring efforts can include closure structure modification, removal, and/or selection of new design concepts for structures not yet built. The adaptive management plan for SAGU is summarized briefly in the following paragraphs.

Because of the lack of records for lesser long-nosed bat at the abandoned mine features at SAGU considered in the BA, adaptive management of lesser long-nosed bat use at SAGU will have a different emphasis. During the spring and early summer of 2010, 9 sites that are funded for closure will be surveyed for the presence of bats using the low-intensity Monitoring Method 1. If any lesser long-nosed bat are encountered or if the characteristic guano evidence is observed in any feature, the higher intensity Monitoring Method 2 should be implemented. Assuming no lesser long-nosed bats are encountered, closure activities would commence during the fall and winter of 2010–2011.

During the spring and early summer of 2011, post-construction monitoring surveys would be conducted at each of the gated features using Monitoring Method 1 and pre-construction monitoring would be completed at the remaining features proposed for closure. As in 2010, if lesser long-nosed bat are encountered, the survey intensity should be increased to Monitoring Method 2. Closure activities would continue in the fall of 2011 and the winter of 2012. This schedule of pre- and post-construction monitoring will continue until funded closure activities have been completed. Post-construction monitoring of gated features will continue for at least 3 years following the gating action.

GRCA - GRCA is located in northern Arizona. Areas adjacent to the Park include lands administered by the BLM, the U.S. Forest Service (Kaibab National Forest), Lake Mead National Recreation Area, Glen Canyon National Recreation Area, the Navajo Indian Reservation, the Havasupai Indian Reservation, and the Hualapai Indian Reservation. Adjacent lands have been or are being used for a variety of purposes, including logging, grazing, and mining. None of the proposed action sites are close to the Park boundary or adjacent lands.

GRCA is located in Coconino and Mohave counties in northern Arizona. The canyon is incised into the Colorado Plateau physiographic province, which covers parts of four western states. Elevations in GRCA range from about 1,160 feet where the Colorado River enters Lake Mead up to a high point of 9,165 feet on the Kaibab Plateau.

The wide elevation range within GRCA allows for the presence of numerous biotic communities. The Kaibab Plateau, above the North Rim, includes Petran Subalpine Conifer Forest, Petran Montane Conifer Forest, and Subalpine Grasslands, as mapped by Brown and Lowe (1994). The South Rim is at a lower elevation and is dominated by Petran Montane Conifer Forest and Great Basin Conifer Woodland. Below the rims, the inner portion of GRCA includes Great Basin Conifer Woodland, Great Basin Desertscrub, and Mohave Desertscrub.

Not all these communities are represented in the vicinities of the mine features proposed for action. For example, none of the features are located on the Kaibab Plateau and the subalpine communities will have no impacts. Several features are located on or very close to the South Rim, including the Hermit Road Prospects, Rowe Well Claims, South Rim Adit, South Rim Prospects, and Yavapai Adit. The elevations of these features range from about 6,700 to 7,100 feet. These sites are either in Great Basin Conifer Woodland or in a transitional zone between that woodland and the Petran Montane Conifer Forest. Dominant tree species include two-needle pinyon (*P. edulis*) and one-seed juniper (*J. monosperma*). Ponderosa pine (*P. ponderosa*) is present in the vicinity of the Rowe Well Claims and South Rim Prospects, and Douglas-fir (*Pseudotsuga menziesii*) is present near the South Rim Adit. Gambel oak (*Q. gambelii*) is also present at the Rowe Well Claims, and single-leaf pinyon (*P. monophylla*) was recorded at Yavapai Adit. Some of the common understory shrubs near these features include rubber rabbitbrush (*Ericameria nauseosa*), big sagebrush (*Artemisia tridentata*), skunkbrush (*Rhus trilobata*), serviceberry (*Amelanchier* sp.), and currant (*Ribes* sp.).
The Grandview Mine and the Horseshoe Mesa area are in a transitional zone between Great Basin Conifer Woodland and Great Basin Desertscrub. Elevations of the features in this

vicinity range from about 4,600 to 5,000 feet. One-seed juniper is the common tree species in this area, and common shrubs include catclaw acacia (*Acacia greggii*), cliffrose (*Purshia mexicana*), fourwing saltbush (*Atriplex canescens*), ephedra (*Ephedra* sp.), snakeweed (*Gutierrezia* sp.), and black sagebrush (*A. nova*).

The Pinto Mine is the farthest west of the features considered for action in this project. This site is at an elevation of about 4,100 feet in Great Basin Desertscrub. Common shrubs in this area include catclaw acacia, skunkbush, ephedra, fourwing saltbush, and sandpaper bush (*Mortonia utahensis*).

The Tanner-McCormick Mine Site is the lowest and farthest east of the features covered in this BA. It is located at an elevation of about 2,800 feet and is close to the riparian area along the Colorado River. Upland vegetation in this vicinity is Mohave Desertscrub, with relatively little vegetation. The vegetation that is present includes Utah yucca (*Y. utahensis*), banana yucca (*Y. baccata*), Engelmann prickly pear (*Opuntia engelmannii*), and non-native Russian thistle (*Salsola tragus*). The riparian community includes coyote willow (*Salix exigua*), non-native tamarisk (*Tamarix* sp.), and western honey mesquite (*P. glandulosa* var. *torreyana*).

During the surveys, a search was made for the "Brady Mine" in Brady Canyon. However, several hours of searching failed to locate any evidence of mining activity and this site has been dropped from consideration.

In addition to the sites mentioned above, 16 other sites were considered for possible action based on prior knowledge or on bat surveys conducted by BCI and the Arizona Game and Fish Department (AGFD). No details are available of the vegetation in the vicinity of these sites, but they can be assigned to probable biotic communities based on location and elevation. Eleven of the sites are in Mohave Desertscrub. These are Bat Cave, Copper Grant Mine, Morning Star Mine, Bass Asbestos Mine, Cameron Claims, Snyder Mine, Bonnie Tunnel, Little Chicken Adit, Havasu Adit, Marshall Lazune Group, and Trail Canyon Mine. Bat Cave is a natural limestone cave that was mined for bat guano in the 1950s, but it has been dropped from further consideration. Four sites, Marble Canyon Dam Exploration adits, Marble Canyon Dam upper exploration site, Bass Copper Mine, and Boucher Mine, are likely to be in Great Basin Desertscrub. The Point Sublime Prospect Pit is in Petran Montane Conifer Forest on the Kaibab Plateau.

Forty-four mine features are considered for closure at GRCA. A detailed listing of each of the features is provided in Appendix A, Table A-4 of the BA. Bat gates are proposed at the following ten sites: Bass Copper Mine adit, Copper Grant adit, Havasu adit, Marble Canyon Dam exploration sites (four gates), Tanner-McCormick Mine adit, Pinto Mine adit, and South Rim Mine adit. A grate or cupola closure is proposed for the Pinto Mine shaft, depending on the results of cold season bat surveys. Backfill closures are proposed for three sites, an adit, a shallow shaft, and a prospect pit, all in the Grandview/Last Chance vicinity. No additional actions are proposed for the three adits at the Grandview/Last Chance Mine that are already closed with bat gates.

Closure construction activities at GRCA will be restricted to September, October, November, December, January, and February to avoid conflicts with Mexican spotted owls and southwestern willow flycatchers.

No actions are proposed at most of the mine sites, including Bass Asbestos Mine, Bonnie Tunnel, Boucher Mine, Cameron Claims, Grandview prospect pit, Hermit Road prospect pits (three), Marble Canyon Dam upper exploration site, Marshall Lazune group, Morning Star Mine, North Bass Mine adit, Point Sublime prospect pit, Rowe Well prospect pits (two), South Rim prospect pits (five), and Snyder Mine (four adits).

No actions are proposed at the present time, pending further survey work, at Little Chicken Mine and Trail Canyon Mine. No actions beyond fence and gate maintenance are proposed at the Yavapai Observation Station Tunnel. No actions are proposed at the present time for the Bat Cave, although the remains of the tram and cable system will be removed eventually.

Status of the Species and Critical Habitat

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 [*A. palmeri*]) (Hoffmeister 1986). The lesser long-nosed bat was listed (originally, as *Leptonycteris sanborni*; Sanborn's long-nosed bat) as endangered in 1988 (FWS 1988). No critical habitat has been designated for this species. A recovery plan was completed in 1997 (FWS 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 (FWS 2007b).

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 (FWS 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 (FWS 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 (FWS 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 ORPI (FWS 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.

The conservation and recovery of lesser long-nosed bats requires the presence of secure and appropriate roost sites throughout the landscape (including maternity roost sites, as well as transitional and migration roost sites) and adequate forage resources in appropriate juxtaposition to provide for life history needs including breeding, parturition, and migration.

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, FWS 2007b; electronic mail from Tim Tibbitts 2009). Lesser long-nosed bat populations additionally appear to be increasing or stable at other roost sites in Arizona and Mexico not included for monitoring in the recovery plan (Sidner 2005, Arizona Game and Fish Department 2009). Less is known about lesser long-nosed bat numbers and roosts in New Mexico. Though lesser long-nosed bat populations appear to be doing well, many threats to their stability and recovery still exist, including excess harvesting of agaves in Mexico; collection and destruction of cacti in the U.S.; conversion of habitat for agricultural and livestock uses, including the introduction of buffelgrass (*Pennisetum ciliare*), a non-native, invasive grass species; wood-cutting; alternative energy development (wind and solar power); illegal border 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 (FWS 2007b). 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 individuals crossing the border illegally for a number of reasons. 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 (FWS 2005). For example, the illegal activity, presumably by individuals crossing the border, 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 buffelgrass and other invasive species that can carry fire in Sonoran Desert scrub; wood-cutting; urban development; fires; and drought and climate change.

Large fires supported by invasive vegetation in 2005 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 wildfires could also affect foraging habitat. For example, slurry drops can leave residue on saguaro flowers, which could impact lesser long-nosed bat feeding efficiency or result in minor contamination.

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

Examples of more recent BOs that anticipated incidental take for lesser long-nosed bats are summarized below. The 2009 and 2008 BOs for implementation of the SBI*net* Ajo 1 and Tucson West Projects, including the installation, operation, and maintenance of communication and sensor towers and other associated infrastructure, each 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 BO 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 (FWS 2007c). The 2005 BO 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 BO 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 BO for Marine Corps Air Station (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 2007 BO for Department of the Army Activities at and near Fort Huachuca (Fort), Arizona anticipated incidental take in the form of direct mortality or injury (six bats over the life of the project), harassment (20 bats per year), and harm (10 bats over the life of the project) (FWS 2007a).

The lesser long-nosed bat recovery plan (FWS 1997), listing document (FWS 1988), and the 5-year review summary and evaluation for the lesser long-nosed bat (FWS 2007b), 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 FWS has determined that the action area for the lesser long-nosed bat includes the areas directly impacted by closure activities at the mine features identified, including routes used to transport materials by foot, vehicle, and helicopter. In addition, the action area includes the area defined by a circle with a radius of 36 miles (the maximum documented one-way foraging distance of the lesser long-nosed bat) around all occupied lesser long-nosed bat roosts within and adjacent to the Park units within the known range of the lesser long-nosed bat. Lesser long-nosed bats may occur anywhere within this foraging radius around roosts occupied by lesser long-nosed bats during the time of annual occupancy in the area. 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 (Forest Service, NPS, BLM, FWS, and Fort Huachuca), but there are also significant areas of private land. The action area for the lesser long-nosed bat also includes lands near the border in Sonora, Mexico, and also includes part of the Tohono O'odham Nation.

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

Because this project covers three Park units within the range of the lesser long-nosed bat, the terrain, vegetation communities and climate vary by Park unit. For a more detailed description of the vegetation communities within the action area, see the Park-specific environmental settings describe in the "Description of the Proposed Action" section above. However, all Park units are found in southern Arizona, within which the action area can be characterized as rugged mountainous or hilly terrain characterized by cool winters, hot summers, and an active monsoon season during the summer period. Key mountain ranges within the action area include the Huachuca Mountains, Ajo Mountains, Puerto Blanco Mountains, Growler Mountains, Copper Mountain, Sonoyta Hills, Tucson Mountains, and Rincon Mountains.

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

Based on the known foraging distances for lesser long-nosed bats, it is likely that this species forages throughout all or portions of CORO, ORPI, and SAGU, where flowers and fruit of saguaro, organ pipe, and agave are available.

Three large lesser long-nosed bat maternity roosts, including Bluebird Mine, Copper Mountain Mine, and Pinacate Cave occur in the action area. Inventory work associated with this project identified a number of other potential day roost/maternity roosts in ORPI. Bluebird Mine, located along the eastern border of the Cabeza Prieta National Wildlife Refuge (CPNWR) in the Growler Mountains, is just north of the AML features in the Growler Mountains, and generally supports an estimated 3,000 lesser long-nosed bats at the peak of

annual occupancy (FWS 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 illegal border crossers. The 2009 count was 2,427 in May.

Copper Mountain Mine, located within ORPI, is one of several features at Copper Mountain that is included in this project. The Copper Mountain 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, ORPI, 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. Illegal border crossing activities have typically used the valley adjacent to the roost area. In 2005, trails, trash, and other indicators of illegal border activities moved to an area right below the Copper Mountain Mine roost site.

The largest maternity roost in the action area is Pinacate Cave in northern Sonora, Mexico, just south of ORPI. This roost is estimated to support about 130,000 bats each year (FWS 1997). 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.

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 (FWS 1997). Observations at Copper Mountain and Pinacate Cave indicate that they are occupied from mid-April to early-to-mid-September (FWS 1997), although they reach their peak occupancy in late spring/early summer.

Though ORPI 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.

Inventory work in ORPI associated with this project identified a number of other mine features that likely support smaller roosts of lesser long-nosed bats (see Table 3, Appendix 1). Because of the increasing numbers of lesser long-nosed bats found in the Copper Mountain Roost, these smaller satellite sites may be temporary overflow sites, or they may represent important permanent or alternative roost sites for this species. 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 (FWS 1997).

Flowers and fruits of saguaro, organ pipe cactus, and cardon provide nearly all of the energy and nutrients obtained by pregnant and lactating females roosting in the Sonoran Desert in the spring and early summer (FWS 1997). Saguaro, which is common and abundant throughout much of the action area; and organ pipe cactus, which is common at ORPI and localized in other portions of the action area, flower in May and fruit mature in June and July (Benson and Darrow 1982). Lesser long-nosed bats feed on both the nectar and fruits of these cacti. When cacti fruit are scarce or unavailable in late July or early August, agave nectar, primarily from Desert Agave, may be the primary food resource for lesser long-nosed bats in action area. Desert Agave typically bolt or flower and provide a nectar resource for foraging bats from about early summer onward, depending on climatic conditions. Desert Agave occurs in mountainous areas within the action area.

Lesser long-nosed bats occur in transition or post-maternity roost in other portions of the action area, including SAGU and CORO. In SAGU, a large roost is known from a natural crevice in the RMD. This roost may have originally been an overflow roost from the historical maternity roost at Colossal Cave, located just south of the RMD of SAGU. However, recent monitoring has not documented any maternity activities and occupancy by lesser long-nosed bats is primarily in late summer and early fall. As many as 10,000 lesser long-nosed bats have been documented in this roost, but numbers fluctuate annually.

A second post-maternity roost is found just east of the RMD of SAGU on Arizona State Trust Lands. This roost has been consistently occupied during the fall transition period and numbers have remained stable at around 4,000. Two smaller roosts were discovered in the Catalina Mountains, just NW of the RMD of SAGU in 2008 and 2009 as a result of the hummingbird feeder study in the Tucson area. Lesser long-nosed bat numbers at these two roost ranges from 10 to 2,000.

In CORO, the only confirmed lesser long-nosed bat roost is State of Texas Mine. This is a key post-maternity roost with numbers consistently occurring at around 12,000 – 15,000. Another major post-maternity roost also occurs in the Huachuca Mountains within the Fort Huachuca Military Installation. This roost is monitored annually and occupancy numbers have been increasing since protective measures have been incorporated by the military. Numbers in excess of 20,000 were counted in 2008 and 2009.

Lesser long-nosed bat numbers at post-maternity or transition roosts tend to fluctuate more than do numbers at maternity roosts. This fluctuation is apparently based on local forage availability (agave blooms). Agave blooming is subject to climatic conditions and during the

ongoing, extended drought, some portions of the action area have been subject to forage failures. Lesser long-nosed bats are highly mobile and will switch to areas and roosts where forage is available.

As mentioned above under "Status of the Species", the introduction of buffelgrass 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 illegal border activities, non-Federal activities that occur on the TON, and 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 BO on the ORPI 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 ORPI 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 BO on the Customs and Border Protection (CBP) - Office of the Border Patrol's (USBP) installation of a permanent vehicle barrier (as well as access improvements, construction or improvement of border roads, and associated maintenance and patrol activities) along the border from the western end of the ORPI 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 BO 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.

High levels of illegal border 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 illegal border traffic occurs through the Growler Mountains, and Bluebird Mine on CPNWR in the Growlers was vandalized by suspected illegal border crossers 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 border crossers. Both ORPI 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. CORO has initiated a research project to investigate the feasibility of gating the State of Texas roost. CORO consulted on the project and some incidental take of lesser long-nosed bats was authorized. However, the long-term effects of this project should benefit lesser long-nosed bats range-wide if an effective gate design can be developed. The AML Closure project will also test and monitor gate design at ORPI for four smaller roost locations. This project will contribute to our knowledge of protective measures for lesser long-nosed bat roost. However, until these projects are completed, it remains unknown how feasible the use of bat gates is to protect these lesser long-nosed bat roosts.

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. In general, the lesser long-nosed bat populations within the action area are stable to increasing, but threats are ongoing, and in some cases increasing (climate change, invasive species, border activities, etc.).

Effects of the Proposed Action

The lesser long-nosed bat is expected to be affected both directly and indirectly by the proposed action. While closure activities will occur at features when lesser long-nosed bats are not present, the structures used to close the mine features may result in abandonment of the roost when lesser long-nosed bats return to the roost. Direct mortality may occur if bats collide with the structures. The number of bats that can occupy a roost or productivity of the roost may decline if the closure structures affect conditions within the roost such as flight space, temperature, humidity, or air flow. If mine closures shift disturbance and activity to other roosts that are not protected, this project would then indirectly affect those roost sites if abandonment or mortality of lesser long-nosed bats resulted. Closure structures may also make the site more visible and attract additional disturbance to the site. If the project is effective in reducing disturbance and other impacts at lesser long-nosed bat roost sites, the overall effects of the action will be beneficial.

The need for protection of important roost sites for lesser long-nosed bats is clear. The potential roost disturbance threats, principally in the form of visitation by either illegal border crossers or their pursuers, have increased drastically in the past ten years. Additional potential disturbance is expected because projected population growth in the vicinity of lesser long-nosed bat distribution means that recreational disturbance may become a bigger problem (FWS 2007b).

How best to provide protection for lesser long-nosed bats is not as clear. Fencing is the least intrusive of the methods available, but it is more easily breached than properly constructed gates. Gates have had mixed success at lesser long-nosed bat sites. When sites have been gated, the lack of appropriate post-construction monitoring and other confounding variables, such as failure to control access to sites during critical times of the year, have made interpretation of the results difficult at best.

Fencing in various forms has been successfully used at lesser long-nosed bat roosts. Perimeter fences are less secure than steel gates, but they can be constructed without impacting roosting bats or cave microenvironments (Ludlow and Gore 2000). Fences may attract attention to a site, but fences can be painted with appropriate colors and materials to conceal them.
At lesser long-nosed bat roosts where it is demonstrated that appropriate reinforced perimeter fencing fails to keep out intruders or where fencing is precluded for other reasons, it will be necessary to have a lesser long-nosed bat-acceptable gate. In order to know what type of gate will be acceptable, experimentation will be necessary, including "looking at gate design, effectiveness, and potential impacts to lesser long-nosed bats at large roosts" (FWS 2007b).

Gate installation could have serious consequences if a roost is gated and the bats abandon the site. Extreme caution must be used in gating lesser long-nosed bat roost sites. If a site is gated and the lesser long-nosed bat colony abandons the site, it may be possible to undo the damage. Previous examples of lesser long-nosed bat abandonment have led to later reoccupation (FWS 1997; Sidner 2009). However, other examples, such as Cave of the Bells and Colossal Cave, indicate that reoccupation of a roost once it has been abandoned is not certain; although in these cases ongoing disturbance may be a contributing factor. Multiple closures potentially would take away alternate roost sites that lesser long-nosed bats would need if they were displaced from a primary site. Multiple closures may also have a secondary effect if they displace other bat species that must also look for alternate roosts. Such an indirect effect has been reported to have caused the displacement of endangered Mexican long-nosed bats (*Leptonycteris nivalis*) from Emory Cave in Big Bend National Park. In 1995, many mine openings were changed from aircraft cable or perimeter fence closures to conventional bat gates. These gates excluded some insectivorous bats, which moved into Emory Cave and displaced the *Mexican long-nosed bats* (Burghardt 2000).

Given that pregnant lesser long-nosed bat have a greater reduction in flight maneuverability than male or non-reproductive females (Sahley *et al*. 1993), fragmentation of the portal and reduction in flight space could negatively impact access to maternity sites. To date, no data were found that would suggest that pregnant female lesser long-nosed bat will accept or not accept gate structures at maternity sites. Unfortunately, the fear of vandal disturbance at roosts of lesser long-nosed bat is well-founded and recent examples show that a solution is needed to physically protect roosts.

The following sections summarize the expected effects, or range of effects possible, from proposed closure actions based on the limited case history of closures at known lesser long-nosed bat sites. This analysis is based on a limited number of case studies and post-construction monitoring activities that are largely anecdotal. Considering this scarcity of data, the NPS has developed their AML approach for the four Parks in this BA as an adaptive management program. The key elements of the adaptive management program rely on a strong pre- and post-construction monitoring effort, implementation of various closure types in a phased approach that does not commit important resources to a specific course of action without first gathering information, and flexibility in implementation to allow for modification of proposed designs in response to monitoring results.

Closure Option Effects to Major Maternity Roost

No action. The No Action alternative maintains the status quo at the roost site. The risk of human entry and use of the mine feature remains unchanged. Human access during certain times of the year can cause roost abandonment and possibly high levels of mortality to young-of-the-year if they are not moved by their mothers (only possible during the first few days). The risks to the public and the potential consequences to sensitive resources vary among the Park units. In some cases, such as ORPI, there is little evidence of human trespass at features known to support important roosts for lesser long-nosed bat. While the probability of trespass may be low, the consequences of unauthorized trespass could be significant. Other Park units, such as CORO, have a known trespass problem that has created unacceptable risks to human health and safety and presents known conflicts with lesser long-nosed bat that would be adversely impacted by failure to secure known lesser long-nosed bat sites.

Security fence. This closure option has been successfully used on one lesser long-nosed bat maternity colony at the Bluebird Mine, Cabeza Prieta National Wildlife Refuge. With proper design to avoid altering flight patterns to and from the portal, adverse impacts are not expected to the maternity colony. The security fence is not expected to provide as much protection from human trespass into the colony as a properly constructed gate.

Gate. A gate structure has never been used on a lesser long-nosed bat maternity site, and impacts to a major maternity site cannot be known with any certainty. Observations of lesser long-nosed bats folding their wings and diving between the cables of a 6- by 6-inch cable net at the State of Texas Mine notwithstanding, concerns with the use of a gate structure relate to the flying ability of this species. Lesser long-nosed bats, particularly pregnant females, are not as maneuverable as other bat species, and the restriction in flight space could interfere with staging as bats attempt to enter and exit the portal of the mine. Of additional concern would be mothers attempting to relocate young or inexperienced juveniles attempting to traverse the gate while they are perfecting their flying abilities. Some incidental mortality of adult and young lesser long-nosed bats from collision with gate structures is expected. Staging impacts are expected to be greater at roosts with larger numbers of individuals, which could result in a reduction in colony size.

Folded gate. Impacts are expected to be similar to the effects of a gate without the fold, except that the folded gate design would mitigate some of the concerns with regard to staging effects by providing a greater flight space. The folded gate design has never been tested on a lesser long-nosed bat maternity colony.

Chute gate. This gate could alter the preferred flight path on exit from an adit. However, it provides greater open space than either the standard or folded gate design. This is probably the best gate option for a large colony. The chute gate design has never been tested on a lesser long-nosed bat maternity colony. The risk of human access is greater with a chute gate design, which is more easily breached than a standard or folded gate design. This risk is anticipated to be similar to the risk at a well-constructed security fence.

Cupola gate. Cupola gates are suitable for shaft features where bats would be circling and climbing to exit. These structures reduce flight space and, in turn, are expected to have adverse impacts to staging for entry or exit from the mine feature. This gate could interfere with the critical phase of staging as bats prepare to exit from the shaft. The cupola gate design has never been tested on a lesser long-nosed bat maternity colony. Too much restriction with regard to flight space and staging area could cause abandonment or reduction in numbers of bats using a particular feature.

Closure Option Effects to Satellite Maternity Roost

No action. The No Action alternative would allow continued unauthorized entry with potential adverse impacts to bats. This risk will vary from site to site within and between Parks. Population-level effects, if any, from inaction would be less than those of a major maternity site and would depend on the size of the satellite maternity roost.

Security fence. The effects of security fencing would be similar to those that would result from fencing a major maternity roost.

Gate. The effects of installing a gate would be similar to those that would result from gating a major maternity roost, except that the staging effects would be less because of the reduced numbers of bats. Population level effects, if any, would be less than those of a major maternity site and would depend on the size of the satellite maternity roost.

Folded gate. The effects of installing a folded gate would be similar to those that would result from gating a major maternity roost, except that the staging effects would be less because of the reduced numbers of bats. Population level effects, if any, would be less than those of a major maternity site and would depend on the size of the satellite maternity roost.

Chute gate. The effects of installing a chute gate would be similar to those that would result from gating a major maternity roost, except that the staging effects would be less because of the reduced numbers of bats. Population level effects, if any, would be less than those of a major maternity site and would depend on the size of the satellite maternity roost.

Cupola gate. The effects of installing a cupola gate would be similar to those that would result from gating a major maternity roost, except that the staging effects would be less because of the reduced numbers of bats. Population level effects, if any, would be less than those of a major maternity site and would depend on the size of the satellite maternity roost.

Closure Option Effects to Major Post-Maternity Dispersal Roost

No action. The No Action alternative would allow continued unauthorized entry with potential adverse impacts to bats. This risk will vary from site to site within and between Parks.

Security fence. Security fencing is likely to have the least impact of the closure options. Fencing has been successfully used on one major lesser long-nosed bat post-maternity dispersal colony, at Pyeatt Cave, Fort Huachuca, although it took several years for the colonysize to increase in response to the removal of a poorly constructed gate and the construction of a security fence.

Gate. The impacts of installing a gate are unknown, but could cause a reduction in the numbers of bats using a particular feature because of interference with staging as bats attempt to exit through altered flight space. The State of Texas Mine uses a folded gate design concept. A traditional gate has never been tested on a major lesser long-nosed bat post-maternity dispersal colony. Lesser long-nosed bats abandoned Cave of the Bells after gate installation, but they did not have an adverse reaction to a temporary gate put up prior to the construction of the permanent gate. As described previously, other factors may have caused abandonment. Results at the State of Texas Mine after the installation of the cable net and current experiments with bat-friendly closures indicate acceptance of post-maternity lesser long-nosed bat to closure structures. Some mortality from collision with a gate structure is expected. If the structure results in unacceptable staging impacts, then reductions in the numbers of bats that are using a given feature would be expected.

Folded gate. The State of Texas Mine uses a gate design most similar to the folded gate. Bat numbers at the mine showed some decline in the first year after the installation of the temporary structure. However, this colony was originally established after the construction of a cable net with apparently greater levels of restriction. Provided that the gate does not alter microhabitat, the site should continue to be used. Some mortality from collision with a folded gate structure is expected. If the structure results in unacceptable staging impacts, then reductions in the numbers of bats that are using a given feature would be expected.

Chute gate. The impacts of installing a chute gate are unknown, but could cause abandonment or a major reduction in numbers. It could also alter the preferred flight path on exit from the adit. The chute gate provides greater open space than either the standard or folded gate. This type of gate has never been tested on a lesser long-nosed bat post-maternity dispersal colony. The risk of human access is greater with a chute design, which is more easily breached than a standard or folded gate design. This risk is probably similar to the risk at a well-constructed security fence.

Cupola gate. The impacts of installing a cupola gate are uncertain. The cupola design on the secondary entrance at the State of Texas Mine is used by a minor proportion of bats. This gate structure at the mine caps a very narrow passage between the main roost site and the shaft that the cupola covers. Its use requires negotiating a series of sharp turns to get to the shaft cupola from the main roost, increasing the energy costs of staging and exit from the site. In other words, it is harder to use. In general, post-maternity bats have been demonstrated to use a cupola closure. This closure is expected to have greater staging impacts than a traditional gate or a folded gate design. However, the cupola gate structure is only proposed for those instances when closure protection is needed for a vertical shaft where other gate structures would not be appropriate. Increased staging requirements from the cupola design could reduce

the number of lesser long-nosed bats that utilize a particular vertical feature, and occasional collision and mortality would be expected.

Closure Option Effects to Minor Dispersal Roost

No action. The No Action alternative would allow continued unauthorized entry with potential adverse impacts to bats. Large population level effects are not anticipated.

Security fence. Installation of a security fence is likely to have the least impact. Fencing has been successfully used on the major post-maternity dispersal colony at Pyeatt Cave, Fort Huachuca.

Gate. The impacts of gate installation are unknown, but could be adverse. If adverse impacts result and the site is not used, population level effects are not expected to be as significant as with a major post-maternity dispersal roost site. Bats abandoned Cave of the Bells after gate installation, although other factors may have caused this abandonment. Some incidental mortality of adult and dispersing young lesser long-nosed bats from collision with gate structures is expected.

Folded gate. Adverse effects from staging with the folded gate are not as likely because of the reduced number of bats that utilize minor dispersal roost sites. Occasional mortality from collision could be expected, but reduced numbers of bats should make staging more efficient and reduce the probability of collisions with the gate structure. Population level effects are not expected to be as significant as with a major post-maternity dispersal roost site. The folded gate design has never been tested on a minor lesser long-nosed bat post-maternity dispersal colony. However, results of the gate at the State of Texas Mine indicate that there is a good probability of acceptance.

Chute gate. Adverse effects from staging with the chute gate are not as likely because of the reduced number of bats that utilize minor dispersal roost sites. Occasional mortality from collision could be expected, but reduced numbers of bats should make staging more efficient and reduce the probability of collisions with the gate structure. Population level effects are not expected to be as significant as with a major post-maternity dispersal roost site. The chute gate design has never been tested on a minor lesser long-nosed bat post-maternity dispersal colony. However, results of the gate at the State of Texas Mine indicate that there is a good probability of acceptance.

Cupola gate. Impacts of the installation of a cupola gate are uncertain. The cupola on the secondary entrance at the State of Texas Mine is used by a very small number (less than 1 percent) of bats. Adverse effects from staging with the cupola gate are not as likely because of the reduced number of bats that utilize minor dispersal roost sites. Occasional mortality from collision could be expected, but reduced numbers of bats should make staging more efficient and reduce the probability of collisions with the gate structure.

Closure Option Effects to Temporary Night Roost

No action. The No Action alternative would allow continued unauthorized entry with potential adverse impacts to individual bats or small groups of bats. This alternative is not expected to result in population level effects to this species.

Security fence. Security fencing is unlikely to have an adverse impact.

Gate. The impacts of installing a gate are unknown, but small numbers of bats could be diverted to alternative night roost sites, if available. Gating has never been tested on a lesser long-nosed bat night roost. However, the results of a gate at the State of Texas Mine indicate some willingness of post-maternity lesser long-nosed bat to accept gate structures provided that the gate does not appreciably alter microhabitat. Some mortality from collision with the gate structure is possible, but given the low level of use at these sites, any mortality incidental to the presence of the gate is not expected to result in population level effects to this species.

Folded gate. The impacts of installing a folded gate are unknown, but small numbers of bats could be diverted to alternative night roost sites, if available. A folded gate has never been tested on a lesser long-nosed bat night roost. However, the results of a gate at the State of Texas Mine indicate some willingness of post-maternity lesser long-nosed bat to accept gate structures provided that the gate does not appreciably alter microhabitat. Some mortality from collision with the gate structure is possible, but given the low level of use at these sites, this mortality is not expected to result in population level effects.

Chute gate. The impacts of installing a chute gate are unknown, but small numbers of bats could be diverted to alternative night roost sites, if available. A chute gate has never been tested on a lesser long-nosed bat night roost. However, the results of a gate at the State of Texas Mine indicate some willingness of post-maternity lesser long-nosed bat to accept gate structures provided that the gate does not appreciably alter microhabitat. Some mortality from collision with the gate structure is possible, but given the low level of use at these sites, this mortality is not expected to result in population level effects to this species.

Cupola gate. The impacts of installing a cupola gate are unknown, but small numbers of bats could be diverted to alternative night roost sites, if available. Some mortality from collision with the gate structure is possible, but given the low level of use at these sites, this mortality is not expected to result in population level effects to this species.

Monitoring

There will be increased monitoring at the lesser long-nosed bat roost sites included in this project. The increase activity associated with monitoring may result in impacts to occupancy and behavior of the lesser long-nosed bats in these roosts. Because this increase in monitoring would not have occurred but for the implementation of the proposed AML closure

project, this is considered an effect of an interrelated action. NPS will include measures in the monitoring protocol to reduce the effects of monitoring on lesser long-nosed bat roosts. We do not anticipate any interdependent effects from this project.

Long-term Beneficial Effects

As described above, the proposed action is anticipated to have direct and indirect adverse effects to lesser long-nosed bat. However, we anticipate that the long-term effects of the AML closure project will be beneficial. Development of AML closure designs and methods that are effective in protecting lesser long-nosed bat roosts should result in overall, long-term protection of the populations within the action area. Increased monitoring associated with this project will provide important data for the assessment and management of lesser long-nosed bat populations.

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. A general estimate of the number of bats occurring in the action area for this project is approximately 216,000, including the Pinacate Roost in Sonora, Mexico. This number is likely an overestimate because some of the bats found at post-maternity or transition roosts are likely the same bats found at maternity roosts. 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 within the actual NPS part units. These lesser long-nosed bats represent about 27% of all individuals in the action area, and an even lesser percentage of the overall bat population. Therefore, though the initial aspects of the proposed action will 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. However, in the context of known lesser long-nosed bat roosts, the roosts within the action area significantly contribute to the overall viability of lesser long-nosed bat populations. If disturbance at these roosts causes females to abandon their young before they are capable of flight or if pregnant females abandon the roost and cannot find a suitable alternative maternity roost, complete reproductive failure for the year could occur at a roost. These impacts can be avoided however if this project is successful in protecting lesser long-nosed bat roosts from disturbance. Furthermore, the implementation of conservation measures and the monitoring and adaptive management during this project will help to ensure these impacts do not significantly affect the reproduction, numbers, and distribution of lesser long-nosed bats 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 BO. 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.

The majority of lands within the action area are managed by Federal agencies; thus, most activities that could potentially affect lesser long-nosed 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, while difficult to predict and quantify, 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.

Conclusion

After reviewing the current status of the lesser long-nosed bat; the environmental baseline for the action area; the effects of the proposed activities, including (1) pre- and post-construction monitoring and (2) closure activities at various AML sites within the four Park units; 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. Some death and injury of lesser long-nosed bats is expected as a result of collisions with structures used for mine closure, but this number is small in comparison to the known numbers of lesser long-nosed bats throughout the action area and their range. Some reduction of numbers, or potentially abandonment, at certain roost sites may occur as a result of the closure methods or monitoring activities, but this is not anticipated to be a common occurrence based on the results of ongoing research. Populations of lesser long-nosed bats appear to be increasing or stable at many roost sites in Arizona and Mexico.

2. All bat gate or cupola designs to be used on this project have been successfully installed at roosts occupied by various bat species in Arizona and throughout the west. Input into the design of closure structures used for this project has been provided by bat and bat-gate experts. Recent research at the State of Texas roost with regard to gate configurations and their effects on lesser long-nosed bats indicates that it is unlikely that lesser long-nosed bats will completely abandon roosts fitted with bat gates or other bat-friendly closure structures. There are alternative roost locations throughout the action area that may reduce the effects of any roost abandonment that may result from the proposed action.

3. Monitoring and adaptive management will be applied to sites that are occupied, or are likely to be occupied, by lesser long-nosed bats. The objective of the monitoring and adaptive management is to ensure that mine closure structures and activities have the lowest degree of impact on lesser long-nosed bat roost sites. The adaptive management plan calls for the immediate removal of any closure structure that has been determined to have effects beyond those anticipated in the BA and this BO.

4. All sites will be surveyed prior to closure to ensure that no lesser long-nosed bats are sealed inside of the sites during backfill or grating.

5. Direct effects to lesser long-nosed bats from construction activities will be avoided or minimized by closure activities being conducted outside the time period when lesser long-nosed bats occupy the AML sites. Pre- and post-construction monitoring will occur when bats are present at the site, but NPS will implement measures to reduce the impacts of monitoring on roost sites. We do not anticipate roost abandonment due to monitoring of any of the major lesser long-nosed bat roosts. However, abandonment is a possibility at the smaller satellite roosts in ORPI because monitoring has not occurred previously at these sites. However, alternative roost sites are available within ORPI and, while significant, abandonment of one of these smaller roosts will not jeopardize the population.

6. Because of the increasing presence of illegal border activity, and the associated interdiction actions by law enforcement, this project is expected to have long-term beneficial effects on lesser long-nosed bats by protecting important roost sites from entry and disturbance by individuals involved in illegal border activities. Data gathered during the monitoring and adaptive management implemented during this project will contribute to improved management and conservation of the lesser long-nosed bat.

The conclusions of this BO are based on full implementation of the project as described in the "Description of the Proposed Action" section of this document, including any conservation measures that were incorporated into the project design.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act 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

We anticipate incidental take of lesser long-nosed bats as a result of this proposed action in the form of direct mortality or injury as a result of collision with structures used to close AML sites. Take make also occur in the form of harm or harass due to the effects of human disturbance or presence at roosts during monitoring activities and by forcing lesser long-nosed bats at AML closure sites to reduce their occupancy or abandon those sites and move to alternate roost sites in the area.

Specifically, incidental take by Park unit for the currently-proposed closure actions is anticipated as follows:

GRCA – No incidental take of lesser long-nosed bats is anticipated at GRCA because this Park unit occurs outside of the known range of the species.

SAGU – No incidental take of lesser long-nosed bats is anticipated at SAGU. No lesser long-nosed bat occupancy has been confirmed at any of the sites proposed for closure at this time. Monitoring and adaptive management will ensure that any lesser long-nosed bats encountered as part of this project will be addressed appropriately as outlined in the BA and this BO. Any future sites proposed for closure will be surveyed and monitored according to the adaptive management process that is outlined in the BA and this BO and will avoid or minimize any effects on lesser long-nosed bats. While the level of monitoring at potential lesser long-nosed bat roost sites will increase as a result of this project, we do not anticipate any incidental take at SAGU as a result of this monitoring.

CORO – The primary lesser long-nosed bat roost on CORO is the State of Texas Mine. This roost has been the subject of research, covered under a separate consultation and BO, investigating the appropriate design of a closure structure for this site. This research will continue under this AML closure project and the FWS anticipates up to 10 lesser long-nosed bats will be taken as a result of this project. The incidental take is expected to be in the form of "kill", due to potential collisions with the gate panels or support structures. We do not anticipate any take in the form of harm or harassment that we might typically associate with decreased use or abandonment of the mine due to the gate project. Numbers of lesser long-nosed bats within the State of Texas mine naturally fluctuate on an almost daily basis due to roost switching and migration. It would be very difficult, if not impossible, to tie a decrease in numbers to the effects of the bat gate, unless it was the result of total abandonment. We do not anticipate abandonment of this roost, or even a significant decrease in numbers, because of the conservation measures that will be implemented and because of the results of the ongoing research. We do not anticipate incidental take at any of the other AML closure sites on CORO due to the fact that occupancy by lesser long-nosed bats has not been confirmed at these sites and conservation measures will be implemented to avoid or reduce effects on lesser long-nosed bats. Monitoring of the State of Texas mine will occur at relatively high levels. However, increased monitoring has already occurred at this site as a result of ongoing research and no effects to the population have been observed. We do not anticipate any incidental take of lesser long-nosed bats as a result of monitoring at CORO.

ORPI – The major lesser long-nosed bat maternity roost at Copper Mountain will not be immediately closed as part of this project. Because bat-gates have not been used at lesser long-nosed bat maternity roosts, nor at roosts containing the number of bats found at Copper Mountain, closure of this site will be informed by the adaptive management approach to closure activities proposed for ORPI. This will avoid incidental take at Copper Mountain until and if closure activities are implemented at this site. Because closure of Copper Mountain will benefit from adaptive management, we believe that any incidental take at this site will be reduced once closure activities are implemented. Some degree of natural mortality occurs within Copper Mountain on an annual basis, primarily the mortality of young-of-the-year, which is documented by an end-of-the-season investigation of the roost. We do anticipate some incidental take at Copper Mountain as a result of the closure activities associated with this project above the annual natural mortality. We anticipate the incidental take of 20 lesser long-nosed bats in the form of "kill" as a result of collisions with the closure structures at the roost.

Four smaller lesser long-nosed bat roost sites at ORPI will be closed as part of the adaptive management process at ORPI. These four sites will be closed using different mine closure structures and will be monitored to determine the effect of these structures on lesser long-nosed bat roosts. If effects are noted that exceed the take anticipated in this BO, the structures will be removed and NPS and FWS will confer to determine the best course of future actions at these sites. We do anticipate some incidental take at these four sites as a result of the adaptive management process. We anticipate the incidental take of 10 lesser long-nosed bats at each of these four sites in the form of "kill" as a result of collisions with the mine closure structures.

Other sites occupied by lesser long-nosed bats at ORPI may be fenced to provide some level of protection while the adaptive management process is implemented. We do not anticipate incidental take of lesser long-nosed bats as a result of the fencing. No mortality or impacts to roost populations have been observed at other sites where fencing has been used at occupied lesser long-nosed bat roosts, including Pyeatt Cave and Bluebird Mine.

Incidental take for future actions covered under the programmatic nature of the BA and this BO are anticipated to be as follows for each type of lesser long-nosed bat roost affected:

Major Maternity Roost – 20 lesser long-nosed bats in the form of "kill" as a result of collisions with the closure structure(s).

Satellite Maternity Roost – 10 lesser long-nosed bats in the form of "kill" as a result of collisions with the closure structure(s).

Major Post-Maternity/Dispersal Roost - 10 lesser long-nosed bats in the form of "kill" as a result of collisions with the closure structure(s).

Minor Dispersal Roost - 10 lesser long-nosed bats in the form of "kill" as a result of collisions with the closure structure(s).

Temporary Night Roost - 5 lesser long-nosed bats in the form of "kill" as a result of collisions with the closure structure(s).

No take in the form roost abandonment related to "harm" or "harass" due to monitoring or closure structures is anticipated for future actions. The adaptive management process outlined in the BA and this BO should allow for adjustments that will prevent such take based on the results of previous closure actions and associated monitoring.

Increased monitoring will occur as a result of the adaptive management approach being implemented at ORPI. Monitoring of the Copper Mountain roost has historically occurred at relatively high levels and we do not anticipate any incidental take at Copper Mountain as a result of the propose monitoring. However, little or no monitoring has occurred historically at the other sites on ORPI that are occupied by lesser long-nosed bats. It is possible that the increased monitoring at these sites, in conjunction with the placement of mine closure structures, could result in the reduction in the numbers of bats or abandonment of the roost. We anticipate that some incidental take will occur in the form of "harm" or "harass" at these sites that have not experience ongoing monitoring. It will be very difficult to determine if incidental take of this nature has occurred. Lesser long-nosed bat roosts typically fluctuate on a seasonal and annual basis. In addition, we have no baseline data for these sites, so we cannot compare observed numbers and behavior to the pre-project condition. Roost abandonment is more easily observed and documented than a reduction in numbers. Therefore, we anticipate take of one of the four sites at ORPI being closed as part of the adaptive management process in the form of roost abandonment.

Effect of the Take

In this BO, 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

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

1. The NPS shall report incidental take resulting from the proposed action to the FWS. The NPS shall report the results of the monitoring and adaptive management activities implemented annually to the FWS.
2. The NPS shall report the results of the monitoring and adaptive management activities implemented annually to the FWS.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the NPS 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.

1. The following terms and conditions implement reasonable and prudent measure #1 for the lesser long-nosed bat:

    a. In addition to the reporting requirements already specified as part of the proposed action, NPS, or their agents shall report to FWS:

        1) All lesser long-nosed bat mortality or injury associated with the mine closure structures detected at any time throughout the duration of the NPS AML Closure Project. This report shall be made via electronic mail and phone call within 72 hours of detecting the dead or injured bat. The electronic mail will include the following details: (a) a description of the location (e.g., Park Unit and roost description) where the dead or injured bat was found; (b) the date and time when the bat was found; (c) a photograph of the bat, if possible; (d) if known, a description of how the bat died or was injured; and (e) any other pertinent details. Information can be provided to Scott Richardson – phone: 520-670-6150 x 242; fax: 520-670-6155; email: scott_richardson@fws.gov. This Term and Condition does not require additional monitoring above and beyond that outlined in the BA and this BO.

        2) Any observable decline in the numbers of lesser long-nosed bats or abandonment of roost sites being monitored for this project. This report shall be made via electronic mail and phone call within 72 hours of detecting the dead or injured bat. The electronic mail will include the following details: (a) a description of the location (e.g., Park Unit and roost description) where decline or abandonment was observed: (b) the date and time when the observation was made; (c) previous monitoring results at that site for that year; and (d) any other pertinent details. Information can be provided to Scott Richardson – phone: 520-670-6150 x 242; fax: 520-670-6155; email:scott_richardson@fws.gov.

2. The following term and condition implements reasonable and prudent measure #2 for the lesser long-nosed bat:

    a. In addition to the reporting requirements already specified as part of the proposed action, NPS, or their agents shall report to FWS:

        1) The monitoring and adaptive management process outlined in the BA and this BO is key to reducing take of lesser long-nosed bats resulting from the implementation of this project. Therefore, NPS shall report to the FWS the results of all monitoring and adaptive management actions undertaken as a result of this project. By February 1 of each year, NPS shall provide a report to FWS that includes a) any new lesser long-nosed bat roosts documented as a result of monitoring, b) monitoring

data for all roost sites occupied by lesser long-nosed bats including dates and numbers of lesser long-nosed bats counted, c) classification of each lesser long-nose bat roost monitored with regard to season of use and whether or not it is a maternity roost, d) any documented negative effects of the closure measures implemented including the type of closure structure and observed effects, e) any recommendations to remove or alter the mine closure structure or monitoring protocol, and f) any other pertinent information related to monitoring and adaptive management under this project.

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. The NPS must immediately provide an explanation of the causes of the taking and review with the FWS the need for possible modification of the reasonable and prudent measures.

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 Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. We recommend that NPS participate in the development of a revised long-term monitoring protocol for the lesser long-nosed bat as outlined in the recently completed 5-year review.

2. We recommend that NPS participate in the development of a range-wide agave monitoring program with a standardized monitoring protocol.

3. We encourage NPS to initiate or participate in additional lesser long-nosed bat research related to the foraging patterns, roost occupancy patterns, and seasonal behavior of lesser long-nosed bats in southern Arizona. .

4. We encourage NPS to work with Border Patrol and the Department of Homeland Security to assess and minimize the impacts of border fences and other facilities on the lesser long-nosed bat.

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

REINITIATION NOTICE

This concludes formal consultation on the actions outlined in your 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.

The FWS appreciates the NPS's efforts to identify and minimize effects to listed species from this project. For further information please contact Scott Richardson (520) 670-6150 (x242) or Sherry Barrett (520) 670-6150 (x223). Please refer to the consultation number, 22410-F-2009-0452 in future correspondence concerning this project.

FCR Steven L. Spangle

cc (hard copy):

Field Supervisor, Fish and Wildlife Service, Phoenix, AZ (2)
Assistant Field Supervisor, Fish and Wildlife Service, Tucson, AZ
Assistant Field Supervisor, Fish and Wildlife Service, Flagstaff, AZ
Superintendent, Organ Pipe Cactus National Monument, Ajo, AZ
Superintendent, Coronado National Memorial, Hereford, AZ
Superintendent, Saguaro National Park, Tucson, AZ
Superintendent, Grand Canyon National Park, Grand Canyon, AZ

cc (electronic copy):

Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ
Regional Supervisor, Arizona Game and Fish Department, Tucson, AZ
Regional Supervisor, Arizona Game and Fish Department, Yuma, AZ
Regional Supervisor, Arizona Game and Fish Department, Flagstaff, AZ
Westland Resources, Tucson, AZ (Attn: Jim Tress)

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Appendix 1 - Tables and Figures

Figure 1. Four Arizona NPS Units where project will occur

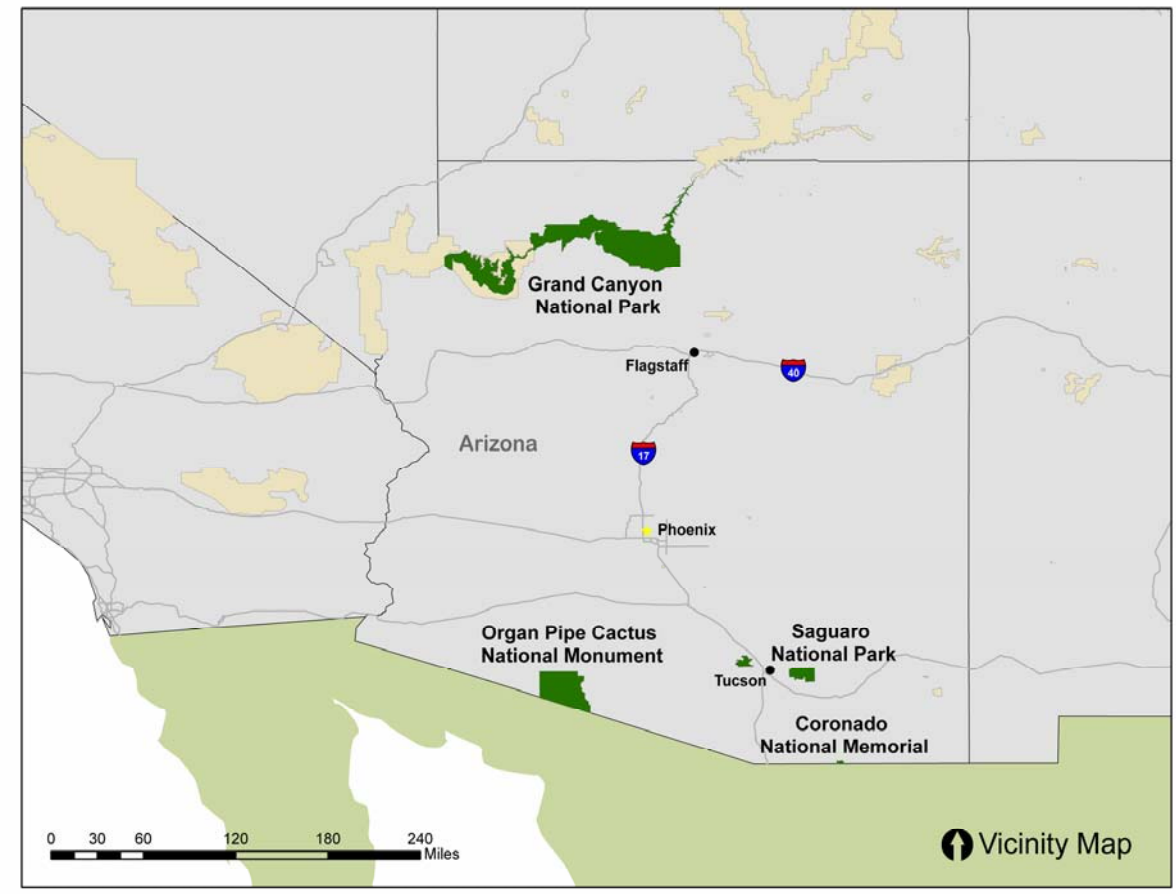

Table 1. Summary of Closure Actions by Park

Park	Bat Gates	Cupolas	Grates	PUF* / Backfill Closures	Backfills	No Action**	Other	TOTAL
CORO	17	11	2	21	1 light	13 (6 already closed, rest are low-visitation/low-hazard shallow pits or small adits)		65
ORPI	4	5	0	21	31 partial	20 (16 already backfilled or fenced; rest are minimum-risk shallow pits), plus 300 small shallow pits to be filled later	Temp. fence: 6 (future gates or cupolas under adaptive manage-ment)	87 (one action listed for partial backfill of all 300 prospect pits)
SAGU	13	4	2	4 (may increase if PUF is done instead of some partial backfills)	3 heavy 45 light or partial	63 (require further monitoring or resource surveys–may take future action)	9 under CERCLA action at Old Yuma	143
GRCA	10	1	0	2	1 (partial)	30 (8 are closed; 17 are low hazard; 5 require more surveys)		44
Total	**44**	**21**	**4**	**48**	**81**	**126**	**15**	**339**

* The polyurethane foam (PUF) closure technique is a variation of traditional backfill techniques and utilizes PUF to plug openings.

** No action indicates where no further action is proposed because the features have already been closed in some manner or there is a low hazard, but also those sites requiring additional information/surveys before an action is selected (mainly at SAGU).

Table 3. Summary of Known Lesser Long-nosed Bats at Organ Pipe Cactus National Monument

Site Name	**Lesser Long-nosed Bat Use**
Lost Cabin 13	Likely a summer lesser long-nosed bat day roost and possible maternity roost. This feature is larger and more complex than Lost Cabin 14 and had a heavy concentration of red and yellow fecal splatter. A heavy concentration of insectivorous bat guano and 30 to 40 California leaf-nosed bats were observed using this feature in October 2009.
Lost Cabin 14	Temporary night roost for foraging lesser long-nosed bat. A relatively short (~40 feet) declining adit without a dark zone; low concentration of red fecal splatter.
Baker No. 1	Heavily used lesser long-nosed bat night roost or satellite lesser long-nosed bat maternity colony. Good coating of red and yellow fecal spatter present during October 2009 visit.
Baker No. 2	Baker No. 2 is a shaft that intersects Baker No. 1.
Victoria No. 2	Possible lesser long-nosed bat satellite maternity roost or night roost. Heavy concentration of red and yellow fecal spatter on floor and walls but not as much as Lost Cabin 13.
Victoria No. 21	Possible small satellite maternity colony. Short declining adit with short drift at bottom. Red and yellow fecal splatter was found under overhang at bottom of decline.
Kuakatch No. 1	Possible satellite maternity colony. A short shaft that becomes a declining adit about 40 feet long. The walls and floors have a heavy concentration of red and yellow fecal splatter.
Senita Basin No. 3	Probable night roost or small maternity roost. A shallow pit leading to a small room with a total length of about 26 feet.
Copper Mtn.	Major maternity roost of about 40,000 lesser long-nosed bats. Tunnel has a north and south entrance with a short shaft that intersects the tunnel near the north entrance; large number of dead juvenile lesser long-nosed bats concentrated in a small area near the north entrance.

Appendix 2: Concurrences

Lesser Long-nosed Bat (*Leptonycteris curasoae yerbabuenae*) – SAGU Only

Environmental Baseline

This species is known from grasslands, arid scrublands, and oak woodlands below 5,500 ft in elevation. In Arizona, they arrive in mid- April, roosting in caves, abandoned mine shafts and tunnels. Young are typically born in maternity colonies in mid-May. Females and young remain in maternity roosts and forage on primarily saguaros below about 3500 ft until approximately mid-July. At this time the range expands and bats are found up to about 5500 ft in areas of semi-desert grassland and lower oak woodland, foraging primarily on agaves. These bats typically leave southern Arizona by late September to early October. There are a number of small caves and mines on SAGU. However, only Box Canyon Crevice is the only documented lesser long-nosed bat roost on SAGU. None of the features identified within the proposed action have been documented to support lesser long-nosed bats.

Lesser long-nosed bats are known to forage on SAGU, using species of agave and columnar cacti, as well as hummingbird feeders. Saguaro cacti and Palmer's agave occur throughout SAGU and are important lesser long-nosed bat forage species.

Although lesser long-nosed bats are not known to be present at any of the features with proposed gating actions, the location of SAGU within the range of this species and the foraging resources present in SAGU suggest that there is the potential for them to occur at some time in the future. An adaptive management strategy will be implemented for the features proposed for closure at SAGU to minimize the risk of adverse impacts from gating activities to lesser long-nosed bat. Implementation of this strategy will require both pre- and post-construction monitoring and review and evaluation of the data obtained during monitoring by SAGU staff, the FWS, and other NPS experts to determine if modification of the proposed closure plans is warranted and if so, how best to proceed to achieve the desired outcomes. Potential modification of the closure plans in response to monitoring efforts can include closure structure modification, removal, and/or selection of new design concepts for structures not yet built.

Conclusion

The Service concurs with the NPS's determination that the action may affect, but is not likely to adversely affect lesser long-nosed bat on SAGU, based upon the following:

- None of the features within the proposed action are occupied by lesser long-nosed bats. Therefore, effects to lesser long-nosed bats are discountable.

- Because of the lack of records for lesser long-nosed bat at the abandoned mine features at SAGU considered in this BA, adaptive management of mine features in relation to lesser long-nosed bat use at SAGU will be implemented. During the spring and early summer of 2010, all sites will be surveyed for the presence of bats using the low-intensity

Monitoring Method 1. If any lesser long-nosed bat are encountered or if the characteristic guano evidence is observed in any feature, the higher intensity Monitoring Method 2 should be implemented. Assuming no lesser long-nosed bats are encountered, closure activities would commence during the fall and winter of 2010–2011.

- During the spring and early summer of 2011, post-construction monitoring surveys would be conducted at each of the gated features using Monitoring Method 1 and pre-construction monitoring would be completed at the remaining features proposed for closure. As in 2010, if lesser long-nosed bats are encountered, the survey intensity shall be increased to Monitoring Method 2. Closure activities would continue in the fall of 2011 and the winter of 2012. This schedule of pre- and post-construction monitoring will continue until funded closure activities have been completed. Post-construction monitoring of gated features will continue for at least 3 years following the gating action.

- Implementation of conservation actions outlined in the Project Description will reduce effects of implementing the AML closures to insignificant levels.

Mexican Spotted Owl (*Strix occidentalis lucida*)

Environmental Baseline

The Mexican spotted owl was listed as threatened in 1993 (58 FR 14248) and critical habitat was designated in 2004 (69 FR 53182). We appointed the Mexican Spotted Owl Recovery Team in 1993, which produced the Recovery Plan for the Mexican Spotted Owl (Recovery Plan) in 1995 (FWS 1995).

CORO - Mexican spotted owls are known to be present in the Huachuca Mountains and within CORO. Most of this mountain range, with the exception of Fort Huachuca at the northern end of the range, has been designated as critical habitat for the Mexican spotted owl (Unit BR-W-15) (69 FR 53182, August 31, 2004). This area includes all of CORO, as well as adjacent lands of the Coronado National Forest.

A pair of spotted owls was first found in CORO in 1997. Park staff monitored the status of the owls from 1997 to 2001 using methods described in the recovery plan (FWS 1995a) for this species. The pair bred and successfully fledged young in 1997 and 1999 using the same nest site both times. The owls were not detected in 2000 or 2001. Surveys were not conducted in 2002. Owls were not detected from 2003 to 2005. No surveys were conducted in 2006. In 2007, during a spring survey, one male owl was heard one night and a male and female were heard another night. Day visits were conducted following these detections. Surveys were completed in 2008 and 2009 on CORO and no owls were detected (D. Foster pers. comm. 2010).

The upper part of Montezuma Canyon, on the east side of Montezuma Pass, is mapped as a Mexican spotted owl Protected Activity Center (PAC). The approximate boundaries of this PAC generally follow the high ridge from Montezuma Peak northwest to the Crest Trail, south to Coronado Peak, southeast along the ridge to an unnamed high point, then northeast

across the canyon to Montezuma Peak. The abandoned mine features in the Clark-Smith Group, the Crest Trail Group, the Montezuma Peak Group, and the State of Texas Mine are within or very close to this PAC. The Clark-Smith Group is within or very close to the core area and nest location.

Any construction activities in or close to the core area within the PAC will be scheduled to avoid the breeding season. This restriction will apply only to some features of the Clark-Smith Group (93-032, 93-033, 93-044, 93-045, 93-046 and 93-052). The proposed project action site at the State of Texas Mine (93-003, 93-004, and 93-005) is approximately 250 yards from the edge of the PAC and 950 yards from the 1997/1999 nest site. The project area around the State of Texas Mine does not exhibit attributes described by the FWS as primary constituent elements essential to the conservation of spotted owls. High-use roosting and high-use foraging sites had more large logs, higher canopy closure, and greater densities and basal areas of both trees and snags than random sites (FWS 1995a). Because of the lack of suitable nesting habitat, higher energy costs to reach the area, and relatively open forest, it is unlikely that spotted owls use the proposed project area near the State of Texas Mine. The proposed actions at these features will be scheduled for the late spring and early summer of 2010.

The limitations of the construction restrictions to the identified Core Nest Area at CORO has been based upon 2008 and 2009 survey data from the monument that failed to detect Mexican spotted owls and NPS review of studies of noise effects to Mexican spotted owls (Delany *et al*., 1999 and studies conducted by the USFS and FWS; BA pgs 104 and 105).

GRCA - Mexican spotted owls are known to be present in numerous remote side canyons below both the North and South rims of GRCA (Corman and Wise-Gervais 2005). The recovery plan for the Mexican spotted owl makes virtually no mention of owls in GRCA, and their distribution map shows no records for that region (FWS 1995a). However, virtually all the area below the rims within GRCA has been designated as critical habitat (Unit CP-10), as well as the forested areas of the Kaibab Plateau, much of which is in the Kaibab National Forest (69 FR 53182, August 31, 2004).

Based on the available plant communities and elevations, it is unlikely that these owls could be found in the vicinity of the Pinto and Tanner-McCormick Mines. Bat gates are proposed in both these areas. Suitable forested or steep canyon habitat is available in the vicinity of the Hermit Road Prospects, Rowe Well Claims, South Rim Prospects, and Yavapai Adit, but no action is proposed in any of these areas. However, a bat gate is proposed for South Rim Mine Adit, which is near the Bright Angel PAC. Suitable habitat is also available on the slopes and side canyons above the Grandview/Horseshoe Mesa area. Three adits on Horseshoe Mesa are already gated, but PUF and/or backfill is proposed in three other features, with helicopter support for transporting materials. Mitigation related to season of construction and helicopter use as outlined in the BA will be applied at sites in or near PACs and within suitable habitat.

In addition to the sites that were visited, 16 other sites were considered for possible action under this project. Of these sites, only the Point Sublime Prospect Pit on the Kaibab Plateau is in the vicinity of potential owl habitat in the Petran Montane Conifer Forest, but no action is proposed for this feature. The remaining 15 sites are in Mohave Desertscrub or Great Basin Desertscrub, and it is highly unlikely that there would be suitable owl habitat in the vicinity of these sites. Havasu Adit, Marble Canyon Dam Exploration Adits, and Bass Copper Mine have been recommended for construction of bat gates.

Ultimately, NPS is proposing only 14 features at GRCA as the proposed action and these 14 are the subject of this consultation (see Table A-4, Appendix A of the BA).

The proposed gating actions at the Pinto and Tanner-McCormick Mines will have no direct impact on the Mexican spotted owl because of the lack of suitable habitat in the vicinity of these features. Similarly, the proposed actions at Havasu Adit, Marble Canyon Dam Exploration Adits, and Bass Copper Mine will have no direct impact on the Mexican spotted owl because of a lack of suitable habitat. No actions are proposed for the features in the best potential habitat for Mexican spotted owl, including Hermit Road Prospects, Rowe Well Claims, South Rim Prospects, and Yavapai Adit.

The mine features at South Rim Adit, South Rim Prospects, Yavapai Adit, Hermit Rest Prospects, Boucher Mine, and Grapevine /Horseshoe Mesa are located near mapped PACs. South Rim Adit is within about 200 yards of the Bright Angel PAC; The Hermit Road Prospects are about 0.5 miles southwest of the Bright Angel PAC; Yavapai.Adit is about 0.5 miles east of the Bright Angel PAC; Boucher Mine is about 0.4 miles north of the Boucher PAC and about 0.4 miles northwest of the Travertine PAC; The Grandview/Horseshoe Mesa features are about 0.5 miles north of the Grandview PAC; and The South Rim Prospect pits are about 0.4 miles south of the Papago PAC. All features included in the proposed action are outside of PACs.

None of the other GRCA features listed in Appendix A of the BA are within 0.5 miles of any PAC mapped by Bowden *et al*. (2009), and none of these features are within habitat that would be expected to support Mexican spotted owl. The Boucher, Travertine, Bright Angel, Papago, and Grandview PACs were all found to be occupied during the surveys conducted in 2008 (Bowden *et al*. 2009).

Very little of the area below the South Rim is mapped as predicted habitat for Mexican spotted owls in Bowden *et al*. (2009). The proposed action sites at Grandview/Horseshoe Mesa, Pinto, Tanner-McCormick, and South Rim Adit are within designated critical habitat, although only the South Rim Adit is in an area mapped as predicted habitat by Bowden *et al*. (2009). Actions at these sites will be limited to the construction of gates, with temporary stockpiling of construction materials.

Mexican spotted owls have been reported to use potholes and ledges on cliffs or in caves as nest sites (Ganey 1998), and it is conceivable that they could utilize an abandoned mine feature as a nest location. BISON-M (2009) also report that Mexican spotted owls use caves in New Mexico and Arizona. During a river survey of mine features in the Grand Canyon,

AGFD (2009) visited mine features accessible from the river. Of the sixteen mine features surveyed on this trip, no owls of any kind were reported using any of the mine features. Similarly, during the site visits conducted by Louis Berger Group (September 2009), no owls were reported using any of the mine features proposed for closure action. Based upon the best available information NPS does not believe that Mexican spotted owls are using any mine feature proposed for closure activity. Pre-construction survey and wildlife exclusion measures prior to closure activities are specifically intended to prevent wildlife from becoming trapped by the closure. Should Mexican spotted owls be found using one of these facilities at the time of proposed closure activities, the closure activities at that site will stopped and consultation reinitiated for that specific site. Other closure activities would continue in accordance with the requirements outlined in the BA and the EA.

Conclusion

After reviewing the status of the Mexican spotted owl, the environmental baseline for the action area, and the effects of the proposed action, we concur that the proposed action may affect, but is not likely to adversely affect, the Mexican spotted owl and designated critical habitat, based upon the following:

- Seasonal restrictions will be implemented to avoid the sensitive nesting period for Mexican spotted owls.
- Helicopter landing areas and flight paths will avoid sensitive nesting areas and PACs to the greatest extent possible.
- Based on distance to PACs and Core Nest Areas and on the noise studies discussed in the BA, it is unlikely that noise associated with the construction of mine closure features will disturb Mexican spotted owls in proximity to the proposed action.
- Conservation measures outlined in the proposed action and supplemental information provided by NPS indicate that direct disturbance of Mexican spotted owls as a result of the proposed action is discountable.
- Actions will be limited in extent/duration because the construction related noise and activity at each of the sites within critical habitat will occur for relatively short periods of time and will be temporary.
- These temporary effects will be further minimized by seasonal construction restrictions.

AML activities at both GRCA and CORO will occur within designated Mexican spotted owl critical habitat. Impacts to Mexican spotted owl critical habitat from the proposed AML closure activities at GRCA and CORO are insignificant and discountable because the proposed AML actions will:

- occur largely within areas previously disturbed by mining activities and these areas are largely devoid of the primary constituent elements of Mexican spotted owl critical habitat;
- require at most minor vegetation clearing for maintenance of helicopter sling load delivery areas at each site and at the helispot staging areas at GRCA and CORO; and

- require only minor trimming of vegetation that would interfere with the placement of closure structures at some AML sites.

Sonoran Pronghorn (*Antilocapra americana sonoriensis*)

Environmental Baseline

The Sonoran pronghorn was initially listed as endangered under the authority of the Endangered Species Protection Act of 1966 (32 FR 4001, March 11, 1967). An initial recovery plan was published in 1982 (FWS 1982), and a Revised Final Sonoran Pronghorn Recovery Plan was completed in 1998 (FWS 1998). A further supplement and addendum to this plan were published in 2002 (FWS 2002e). Critical habitat has not been designated for the Sonoran pronghorn.

At the present time, Sonoran pronghorn are found in the Cabeza Prieta National Wildlife Refuge, ORPI, and on the Luke Air Force Base Barry M. Goldwater Gunnery Range. It is possible that they could be present on the Tohono O'odham Indian Reservation (Tohono O'odham Nation; TON), although they are generally not found east of State Highway 85 in ORPI. In Mexico, they are believed to be confined to the northwest part of Sonora (AGFD 2002d). Historically, it is believed that they ranged from Hermosillo to Kino Bay, Mexico, to the south; Highway 15, Mexico, to the east; Altar Valley and the Tohono O'odham Indian Reservation to the north; and Imperial Valley, California, to the west (AGFD 2002d).

All Sonoran pronghorn populations are limited to Sonoran Desertscrub vegetation communities. Creosote and white bursage (*Ambrosia dumosa*) comprise the major vegetation in the Lower Colorado River Valley subdivision. Plant species along major watercourses include ironwood, blue palo verde (*P. florida*), and mesquite (*P. velutina* and *P. glandulosa*). Common species in the Arizona Upland subdivision include foothill palo verde, catclaw acacia (*A. greggii*), chain fruit cholla, teddy bear cholla (*Cylindropuntia bigelovii*), buckhorn cholla (*C. acanthocarpa*), and staghorn cholla (*C. versicolor*) (FWS 2002f).

The normal elevation range for this species is from 2,000 to 4,000 feet. The habitat of the pronghorn in the U.S. consists of surface volcanics and broad alluvial valleys separated by block-faulted mountains (FWS 2002f). These valleys are partially filled with clay, silt, and alluvium deposited from sheet erosion and ephemeral streams. The valleys are fairly level, with drainage to the north and west through a braided wash system at their centers. Mountain ranges generally run in a northwest to southeast direction (AGFD 2002d).

This desert habitat offers little protection from the excessive summer heat and provides little free water. The climate is characterized by winter rains, spring drought, summer rains, and fall drought. Almost one half of the normal yearly precipitation of about 5 inches falls from July to September in the form of intense localized thunderstorms. Winter storms from the Pacific Ocean usually produce the heaviest, most widespread and effective precipitation. During July through August, daily maximum temperatures often exceed 110° F, and temperatures of 120° F are not uncommon. Winter daytime temperatures range in the mid-60s to 70s, while nighttime temperatures remain above freezing (AGFD 2002d).

Food plants are common throughout most of the Sonoran pronghorn's habitat, but are often dormant and less desirable than the fresh growth after rainfall (AGFD 2002d). The Sonoran pronghorn diet typically consists of anywhere from 20 to 99 percent forbs in certain seasons (FWS 2002f). In addition, Sonoran pronghorn have been observed browsing on forbs, shrubs, and cacti. Forbs and cholla were browsed during the summer and fall, while shrubs, cholla, and ocotillo were browsed the remainder of the year (AGFD 2002d). Chain-fruit cholla constitutes nearly 50 percent of the diet during the summer months, apparently to meet their water requirements (AGFD 2002d)

Pronghorn are polygamous, and females usually breed for the first time at 16 to 17 months of age. The gestation period is between 240 and 252 days (FWS 2002f). Fawning for Sonoran pronghorn takes place from February to May and may be as early as January for populations in Mexico. A spring drop of fawns is desirable to coincide with temperate weather and more abundant spring forage. Sonoran pronghorn fawns are nursed for 60 days (FWS 2002f).

Low-level helicopter traffic has the potential to disturb Sonoran pronghorns, as described in a BO on Army National Guard training activities (FWS 2003). Low-level flights (50 to 100 feet) resulted in elevated heart rates and avoidance behavior. The pronghorns showed no tendency to habituate to helicopter traffic. The conservation measures recommended in that BO were limited to a proposal by Army Reserve National Guard to fund a study on helicopter noise on pronghorns at the Camp Navajo site in northern Arizona and to fund implementation of key recovery actions identified by the Sonoran Pronghorn Recovery Team. It was believed that the likelihood of adverse impacts to the Sonoran pronghorn was very low due to the extremely low number of animals in the U.S. population, estimated to be 21 at that time (USFWS 2003). The U.S. population has grown to estimated 80-90 free-ranging animals; therefore, the likelihood of adverse impacts occurring as a result of low-level helicopter traffic has likely increased.

Sonoran pronghorn regularly use suitable habitat in ORPI west of State Route 85. It is generally not observed or expected to be present in the vicinity of the mine features surveyed, although it could occasionally pass through these areas (T. Tibbitts, ORPI wildlife biologist, pers. comm. 2009). Sonoran pronghorn would most likely be found in the vicinities of the Golden Bell Mines and Growler Pass. Potential impacts may be mitigated by avoiding the fawning and nursing season (March 15 to July 31) and proceeding with construction during August through January. This construction season is compatible with the proposed construction season for the lesser long-nosed bat.

Conclusion

After reviewing the status of the Sonoran pronghorn, the environmental baseline for the action area, and the effects of the proposed action, we concur that the proposed action may affect, but is not likely to adversely affect, the Sonoran pronghorn based upon the following:

- Conservation measures outlined in the BA, including restrictions to helicopter flight paths, monitoring, and communication protocols, make it unlikely that helicopter activities will occur near Sonoran pronghorn.
- Though we do not anticipate project activities will occur near pronghorn, to minimize the effects of any project activity that could potentially disturb pronghorn, the proposed action will be implemented outside of the sensitive fawning season.

Southwestern Willow Flycatcher (*Empidonax traillii extimus*)

Environmental Baseline

The southwestern willow flycatcher was listed as endangered in 1995 (60 FR 10694, February 27, 1995). Critical habitat was initially designated in 1997 (62 FR 39129, July 22, 1997), with a correction in the same year (62 FR 44228, August 20, 1997). After the initial critical habitat designation was set aside by a court ruling in 2001, a new critical habitat designation was finalized in 2005 (70 FR 60886, October 19, 2005).
This small flycatcher is generally found in cottonwood/willow and tamarisk vegetation communities along rivers and streams, at elevations below 8,500 feet. It is a migratory riparian-obligate species that occupies breeding habitat from late April to September (FWS 2009a).

Within Arizona, this species breeds locally along the Colorado River in GRCA and downstream reaches (i.e. Topock Marsh); at the Little Colorado River headwaters near Greer and Eagar; on the Virgin River; in the Bill Williams River watershed; locally along the middle Gila, Salt, and Verde rivers; the middle to lower San Pedro River; and the upper San Francisco River near Alpine (AGFD 2002b). Critical habitat in Arizona includes portions of the Virgin River, Verde River, Salt River, Gila River, San Pedro River, Big Sandy River, Little Colorado River, and Tonto Creek (70 FR 60886, October 19, 2005). No critical habitat has been designated for any portion of the Colorado River, including GRCA.

Southwestern willow flycatchers are known to be present in the riparian zone along the Colorado River through GRCA. The greatest concentrations of records are from Nankoweap Creek to Tanner Canyon and from Spencer Canyon to the Grand Wash Cliffs (AGFD 2004c). Breeding has been confirmed in these areas (Corman and Wise-Gervais 2005).
This species may be present in the riparian vegetation along the Colorado River in the vicinity of the Tanner-McCormick Mine. Construction work at this site should avoid the willow flycatcher breeding season, a period that extends from early May until about the middle of September (FWS 2002d). Construction from mid-September through January should have no effect on this species, providing there are no significant impacts to riparian vegetation that could support breeding pairs.

Conclusion

We concur with the determination that the action may affect, but is not likely to adversely affect the southwest willow flycatcher and designated critical habitat, based upon the following:

- Seasonal restrictions (construction will only occur from mid-September through January) will be implemented to avoid disturbance during southwest willow flycatcher breeding and nesting season (mid-May through mid-September).
- No impacts to riparian vegetation providing habitat for southwest willow flycatchers will occur as a result of the proposed action.
- Implementation of the conservation measures outlined in the BA with regard to southwest willow flycatchers will reduce impacts to an insignificant level.

California Condor (*Gymnogyps californianus*)

Environmental Baseline

The California condor was listed as endangered (32 FR 4001, March 11, 1967) with critical habitat in California (41 FR 187, September 24, 1976). An experimental nonessential population designated for Southwest reintroduction (61 FR 54044, October 16, 1996). A Recovery Plan was completed in 1974 and revised in 1979, 1984, and 1996.

The California condor is one of the largest flying birds in the world. Adults weigh approximately 10 kg (22 lb) and have a wing span of up to 2.9 m (9.6 ft). Adults are black, with white underwing linings and edges. Head and neck are mostly naked gray skin in juveniles and red in adults. Five to six years are required for individuals to attain adult characteristics.

Nesting sites are in various rock formations, including caves, crevices, and potholes in isolated regions of the southwestern U.S. Foraging for carrion occurs over long distances, as a condor can travel 80-160 km (48-96 miles) per day in search of food. Flights follow routes over foothills and mountains. Roosting is usually on rock cliffs, snags, or in live conifer stands. These areas are important for resting, preening, and socializing.

Little information exists to document the precise causes of mortality to the condor, but they probably have been diverse. Former threats include shooting, egg and quill collection, and ceremonial use. Current threats include collisions with human-made structures, electrocution on powerlines, and poisoning from lead, DDT, cyanide, and anti-freeze.

The California Condor Recovery Program release site is located at the Vermillion Cliffs (Coconino County), with an experimental/non-essential area designated for most of northern Arizona and southern Utah. Condors are known from within a polygon formed by Highway 191, Interstate 40, and Highway 93, and extending north of the Arizona-Utah and Nevada borders (FWS 2009d). Many condors frequent GRCA, especially during the summer, coming from all four captive breeding locations, and some nest in caves in and around GRCA. There are five active nest caves in GRCA and Vermilion Cliffs.

California condors were observed flying overhead at several of the sites at GRCA. Condors have been exposed to occasionally heavy helicopter traffic within the Grand Canyon and elsewhere since reintroduction and have shown no indication of being disturbed by the presence of helicopters in their general vicinity (Chris Parish [the Peregrine Fund], pers. comm. to Thomas Lord [WestLand], 17 Dec. 2009). Standard condor mitigation measures regarding interactions, site clean-up, and nesting as outlined in the BA will be implemented as part of the proposed activities.

Conclusion

After reviewing the status of the California condor, the environmental baseline for the action area, and the effects of the proposed action, we concur that the proposed action may affect, but is not likely to adversely affect, the California condor based upon the following:

- Standard condor mitigation measures as outlined in the BA will be implemented as part of the proposed action.
- California condors within GRCA have generally not been adversely affected by helicopter flights.
- The likelihood of actually having to haze a California condor is discountable.
- Effects to California condors will be insignificant due to the implementation of the Conservation Measures outlined in the BA.