



U.S. Department of the Interior
Coronado National Memorial
Grand Canyon National Park
Organ Pipe Cactus National Monument
Saguaro National Park
Arizona

Environmental Assessment

Proposal to Close Abandoned Mine Lands within

Coronado National Memorial,
Grand Canyon National Park,
Organ Pipe Cactus National Monument, and
Saguaro National Park

February 2010



SUMMARY

The National Park Service (NPS) is preparing this Abandoned Mine Lands (AML) Closure Plan and Environmental Assessment (EA) to determine the appropriate methods to correct health and safety hazards at AMLs in four units of the national park system in the State of Arizona: Coronado National Memorial, Grand Canyon National Park, Organ Pipe Cactus National Monument, and Saguaro National Park. Various closure methods are proposed to reduce exposure of park staff and visitors to the hazards posed at these sites, while protecting bats and other wildlife, cultural resources, and other important park resources and values. Many of these closures would be performed under the *American Recovery and Reinvestment Act of 2009* (ARRA), passed on February 18, 2009, which invests in projects to rebuild the nation's infrastructure.

Hazards posed at AMLs include falling into vertical holes, unstable and falling rock, pooling water, and air unsuitable for breathing. A 2008 memorandum from the NPS Director underscored the need to address these hazards in response to an audit conducted by the Office of the Inspector General. There is also a need to protect the cultural resources, and bats or other wildlife, which may be present at these features from inappropriate public access.

Two alternatives are presented in this EA: "Alternative A, No Action," describes the current management of the mine sites. Under the no-action alternative, the mine features would remain in their present condition, subject to natural forces. Parks would continue routine monitoring to assess hazards and resource values. Closures that are currently in place would be checked, and warning signs would be maintained or added as needed. Periodic bat and wildlife surveys would be conducted as funding allows. Although park staff would continue to periodically monitor the mines, no correction of hazards would be undertaken. Under "Alternative B, Proposed Action," the NPS would use a variety of closure methods to eliminate human access to abandoned mine openings that pose health and safety hazards, while protecting bat and other wildlife habitat and cultural resources. Closures would include installing bat-accessible gates and cupolas, partial or full backfill, or a combination of a polyurethane foam plug and backfill. In some cases, the decision for a particular feature that is not a high risk would be to do nothing but continue to monitor that site. Taken altogether, the proposed actions for each feature constitute a comprehensive plan to address all AMLs in the four parks, including ARRA funded mine closures and treatment for all other mines identified in the parks for which information is adequate to make a decision. Alternative B is the environmentally preferred alternative and the agency's preferred alternative. The alternatives are described in Section 2, Alternatives.

This environmental assessment has been prepared in compliance with the *National Environmental Policy Act* (NEPA) to provide the decision-making framework that (1) explores a reasonable range of alternatives to meet project objectives; (2) evaluates potential issues and impacts to park resources and values; and (3) identifies mitigation measures to lessen the degree or extent of these impacts. Resource topics that have been addressed in this document because the resultant impacts could be measurable include cultural resources; bat and other wildlife including federally-listed species and species of management concern; visitor use and experience, including human health and safety; and wilderness. All other resource topics have been dismissed because the other resources did not exist within the project area, or the project would result in no or negligible effects to those resources, therefore a full analysis was not considered to be necessary. No major effects are anticipated as a result of this project. Public scoping was conducted to assist with the development of this document, and the majority of commenters were in support of the project. Commentors offered many suggestions regarding how to design appropriate closures to protect bat use.

Public Comment

This environmental assessment will be on public review and comment for 30 days. Before including your address, phone number, e- mail address, or other personal identifying information in your comment, you should be aware that your entire comment, including your personal identifying information, may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Comments may be submitted as follows:

- Online at <http://parkplanning.nps.gov/coro>
- Or by mail to

AML Closure EA Project
Office of Minerals/Oil and Gas Support
Intermountain Region
National Park Service
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TABLE OF CONTENTS

SECTION 1. PURPOSE AND NEED	I
Introduction.....	I
Purpose of and Need for Action	I
Park Background.....	4
Project Background	5
Objectives of Taking Action	6
Guiding Laws, Regulations, Policies, and Plans	6
Park Enabling Legislation	6
Federal Laws and Regulations	9
Cultural Resources.....	13
Director’s Memoranda and Orders.....	14
Approved Park Planning Documents.....	15
Scoping	16
Internal Scoping	16
External Scoping.....	19
Scoping Analysis.....	20
Issues and Impact Topics Evaluated.....	28
Issues and Impact Topics Eliminated from Further Analysis	29
Generating and Evaluating Alternatives.....	35
SECTION 2. ALTERNATIVES.....	37
Alternative A: No Action	37
Alternative B: Proposed Action (NPS Preferred Alternative)	37
Details of the Proposed Action	38
Closure Descriptions and Construction Process.....	127
Helicopter Use	133
Mitigation.....	135
Monitoring and Adaptive Management	141
Alternatives Considered but Dismissed	143

Environmentally Preferred Alternative.....	144
Alternatives Comparison Tables.....	145
Summary of Environmental Consequences	146
SECTION 3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES.....	149
Methods.....	150
Cumulative Impact Analysis Method.....	150
Historic Structures and Districts.....	151
Affected Environment.....	151
Environmental Consequences	156
Bats and Other Wildlife (including Federally Listed Species and Species of Management Concern) ...	160
Affected Environment.....	160
Environmental Consequences	170
Visitor Use and Experience including Human Health and Safety.....	182
Affected Environment.....	182
Environmental Consequences	186
Wilderness.....	190
NPS Management of Wilderness.....	190
Affected Environment.....	191
Environmental Consequences	193
SECTION 4. CONSULTATION AND COORDINATION	199
Individuals and Agencies Consulted.....	199
List of Document Recipients	201
Preparers.....	212
REFERENCES	217
GLOSSARY OF MINING TERMS	227
Appendix A: Mine Closure Types	
Appendix B: Minimum Requirements Analysis	
Appendix C: Consultation Letters	

LIST OF TABLES

Table 1. Scoping Analysis	20
Table 2. Issue Statements	29
Table 3. Coronado National Memorial List of Abandoned Mine Land Structures	46
Table 4. Organ Pipe Cactus National Monument List of Abandoned Mine Land Structures	66
Table 5. Saguaro National Park List of Abandoned Mine Land Structures	89
Table 6. Grand Canyon National Park List of Abandoned Mine Land Structures	116
Table 7. Summary of Closure Actions by Park	127
Table 8. Site Closures for which Helicopters Would Likely Be Needed	134
Table 9. Major Components of Alternatives A and B	145
Table 10. Analysis of How Alternatives Meet Objectives	146
Table 11. Environmental Impact Summary by Alternative	146
Table 12. Features with Wilderness Value by Park Unit	196
Table 13. Preparer's Names, Roles, and Affiliations	212

LIST OF FIGURES

Figure 1. Vicinity Map	3
Figure 2. Coronado National Memorial Abandoned Mine Lands	41
Figure 3. Organ Pipe Cactus National Monument Abandoned Mine Lands	42
Figure 4. Saguaro National Park – Rincon Mountain District Abandoned Mine Lands	43
Figure 5. Saguaro National Park – Tucson Mountain District Abandoned Mine Lands	44
Figure 6. Grand Canyon National Park Abandoned Mine Lands	45
Figure 7. Seasonal Restrictions for Federally Listed Species	137

SECTION I. PURPOSE AND NEED

Introduction

The National Park Service (NPS) has prepared this Abandoned Mine Lands (AML) Closure Plan and Environmental Assessment (EA) to mitigate human health and safety hazards at AMLs in four units of the national park system in the State of Arizona: Coronado National Memorial, Grand Canyon National Park, Organ Pipe Cactus National Monument, and Saguaro National Park (hereafter referred to collectively as “the parks”). Figure 1 is a vicinity map of the parks within the state of Arizona. Hereafter in this document, the parks are discussed as follows: the three southern Arizona parks (Coronado, Organ Pipe Cactus, and Saguaro) are listed together first (alphabetically), since they share common attributes, followed by discussions related to the Grand Canyon.

This EA has been prepared in accordance with the *National Environmental Policy Act* (NEPA) of 1969 and implementing regulations; Title 40 of the Code of Federal Regulations (CFR) 1500–1508; NPS Director’s Order 12 and Handbook, *Conservation Planning, Environmental Impact Analysis, and Decision-making*; and Section 106 of the *National Historic Preservation Act* of 1966 as amended (NHPA), and implementing regulations (36 CFR 800). The Section 106 process is being completed separate from but parallel to the NEPA process.

Terms specific to AML and mining that are used throughout the EA are defined in the glossary at the end of the document.

Purpose of and Need for Action

The purpose of this AML Closure Plan and EA is to determine the appropriate methods to correct health and safety hazards at AMLs to reduce exposure of park staff and visitors to the dangers posed at these sites, while protecting bat and wildlife habitat, cultural resources, and other important park resources and values.

The need for these closures at the parks stems from the presence of unsafe conditions at the various mine features located throughout the parks, which may include unsecured horizontal and vertical openings, unstable tailings and rubble, holes and prospect pits, unstable ground surfaces, collapsed walls and debris, radiation, pooling water, and bad air within the mine openings. There is also a need to protect the cultural resources and bats or other wildlife that may be present at these features from inappropriate public access.

The Department of the Interior’s Office of the Inspector General (OIG) conducted an audit of abandoned mine lands and released a report in 2008 that focused on human health and safety issues at AML sites on Bureau of Land Management (BLM) and NPS lands. The report concluded that NPS has mitigated many of its high- risk, easily accessible features with temporary or permanent closures, but a substantial workload remains in parks to address hazards and reclamation issues. The OIG recommended that the NPS request adequate funding to support program goals and mitigate sites, and in a memorandum to the OIG, dated July 11,

2008, the Director of the NPS accepted these findings and recommendations and committed to do the following (NPS 2008):

- Alert all parks with outstanding AML sites to the findings of the OIG report;
- Underscore the importance of addressing those high- risk hazards that are likely to pose a threat to visitor safety; and
- Outline specific areas of funding that may be available for this important land management issue.

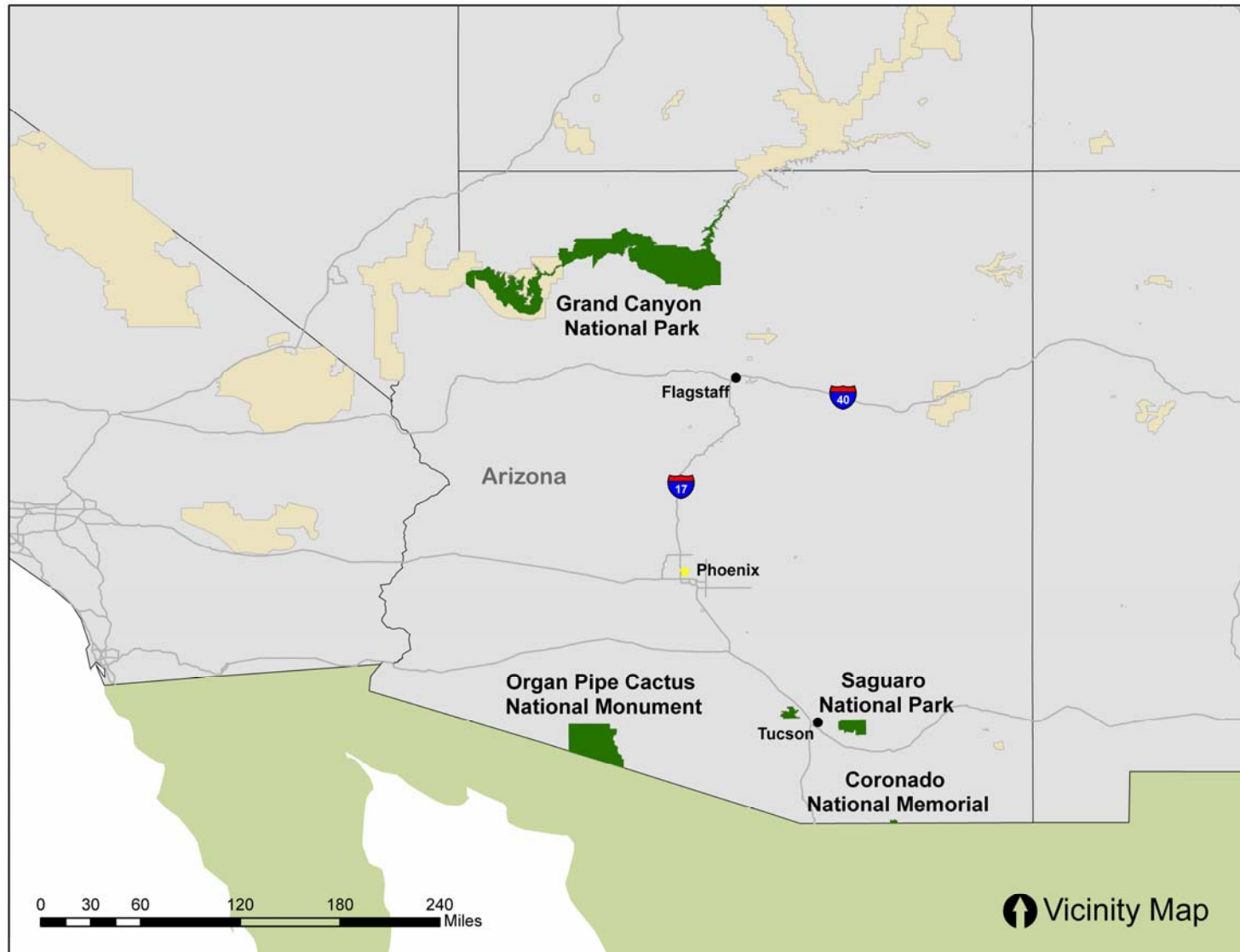
Congress passed the American Recovery and Reinvestment Act of 2009 (ARRA) on February 13, 2009. This project represents 11 of the nearly 800 projects in the NPS designed to stimulate the economy. ARRA projects in the NPS will preserve and protect national icons and historic landscapes, improve energy efficiency and renewable energy use, remediate abandoned mine lands, and provide grants to protect and restore buildings at historically black colleges and universities (U.S. Department of Interior 2009).

The NPS is using a parkwide approach to AML management to make decisions about how to mitigate health and safety hazards at AMLs, based on three primary factors: (1) the type of hazard posed to human health and safety; (2) use by bats and other wildlife; and (3) cultural resource protection. When considering whether abandoned mines have cultural resources eligible for listing in the National Register of Historic Places, the NPS follows the agency's National Register Bulletin 42, Guidelines for Identifying, Evaluating, and Registering Historic Mining Properties.

Determinations of Eligibility take into consideration the historic context for the mining property delineated by a time period and a geographic area. Similarly, when making closure design decisions to protect bats and other wildlife uses, the NPS considers the contextual landscape for bats and other wildlife that use mines as habitat. Finally, in analyzing potential effects, the NPS follows Council on Environmental Quality (CEQ) regulations and agency guidelines in applying NEPA by analyzing the proposed action in addition to similar, connected, and cumulative actions. Therefore, this EA presents a plan to address abandoned mines parkwide rather than individual mine features so that a more meaningful, efficient, and successful management approach is defined rather than a less effective ad hoc approach.

Closures and other methods to mitigate hazards at each mine feature are described in Section 2, Alternatives, with information provided on funding availability and hazard rating. The highest priority for closure work is at those AMLs where ARRA funding has been provided. Hazardous mine features that are not included in ARRA funding and/or that may require additional surveys prior to closure would be closed or mitigated in the future as NPS obtains funding.

Figure 1. Vicinity Map



Park Background

Coronado National Memorial, established in 1952, is located in southeast Arizona 21 miles south of Sierra Vista and 26 miles west of Bisbee on the United States–Mexico border. The memorial is a cultural area in a natural setting composed of semi- desert grasslands and oak woodlands in Montezuma Canyon at the southern end of the Huachuca Mountain Range. Coronado National Memorial shares approximately 3.3 miles of international border with Mexico. The park’s mission is “to commemorate and interpret the significance of Francisco Vásquez de Coronado’s expedition and the resulting cultural influences of 16th century Spanish colonial exploration in the Americas. The memorial preserves and interprets the natural and human history of the area for the benefit and enjoyment of present and future generations.” The memorial is approximately 4,750 acres, with no designated or proposed wilderness.

Organ Pipe Cactus National Monument, established in 1937, is located in southern Arizona, on the United States–Mexico border. The monument shares 30 miles of international border with Mexico, and is bordered on the east by the Tohono O’odham Nation, on the west/northwest by the Cabeza Prieta National Wildlife Refuge, and on the north by private lands and federal lands managed by the BLM. The national monument protects the life and landscape of the Sonoran Desert. Within the monument is a vast collection of Sonoran Desert plants. The monument is a designated Biosphere Reserve within the UNESCO framework and is a culturally significant area for the O’odham. About 94% of the 330,000 total acres of the monument was designated as Wilderness Area in 1978.

Saguaro National Park is located in Pima County, Arizona and consists of two distinct districts, separated by the city of Tucson: the Rincon Mountain District (RMD), located east of the Tucson metro area and the Tucson Mountain District (TMD), located west of the Tucson metro area. It was established in 1933 as Saguaro National Monument. The park’s primary purpose is to preserve and protect “the exceptional growth thereon of various species of cacti including the so- called giant cactus.” In 1961, lands in the Tucson Mountains were added to the monument because “they contain a remarkable display of relatively undisturbed lower Sonoran Desert vegetation, including a saguaro stand which equals or surpasses saguaro stands elsewhere in the nation.” Subsequent legislation signed into law enlarged the boundaries of both districts. In 1994, the monument was redesignated as Saguaro National Park. Today the park totals in 91,440 acres with 78% designated as Wilderness Area.

Grand Canyon National Park, established in 1919, is located near the northwest corner of the state. It is a globally significant natural resource containing scenic vistas known throughout the world. In recognition of its significant values, the park was designated as a World Heritage Site on October 26, 1979. A 277- mile stretch of the Colorado River runs through the park with thousands of miles of tributary side- canyons included within its boundaries. The exposed geologic strata are composed of the basement rock Vishnu schist to the capping Kaibab limestone. The walls of the canyon rise over a mile above the river, representing one of the most complete records of geologic history present in the world. The park’s primary mission is “to preserve and protect its natural and cultural resources and ecological processes, as well as its scenic, aesthetic, and scientific values” and to “provide opportunities for visitors to experience and understand the environmental interrelationships, resources, and values of the Grand Canyon without impairing the resources.” Today the park encompasses approximately 1,218,375

acres of public land on the southern end of the Colorado Plateau, and over 90% of the park is managed as wilderness.

Project Background

Like other regions in the American West, during the mid- to late- 19th century, Arizona was prospected for gold, silver, copper, and lead ores. Mining districts were established, and innumerable prospect pits, adits, and shafts were opened to test or mine the marginal deposits. In the 20th century, important deposits of asbestos were located and opened in Grand Canyon; and from the late 1950s through the mid- 1980s, uranium was mined. Some mine features are located in areas that have wilderness character, some provide important wildlife habitat (particularly for bats), and some are listed or eligible for listing in the National Register of Historic Places.

The AMLs described in this AML Closure Plan and EA were included in the four parks when the parks were acquired. Two abandoned mine sites in the Grand Canyon are not addressed in this AML Closure Plan and EA: the Hance Asbestos Mine and Orphan Mine. Hance Asbestos Mine is located on 326 acres of patented mining claims, and as such the owners have valid existing mineral rights and fee simple title to the land. If the owners should attempt further mining development, the NPS would control all activities, including access, mining, and eventual reclamation under the NPS Mining and Mining Claims Regulations (36 CFR 9A). The Orphan Mine is not included in this planning process because assessment of this mine site is ongoing in association with an investigation under the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA). The CERCLA process will determine the principal party that would be responsible for reclamation. Similarly, the ongoing CERCLA action for the Old Yuma mine complex (nos. 147, 148, 149) in Saguaro, and the characterization of contamination or any potential remediation action deemed necessary at the Headquarters mine (nos. 25 and 26) in Coronado, are not addressed in this AML Closure Plan and EA.

Abandoned mines present many hazards to park visitors and staff, and to park wildlife. People often make the mistake of equating an abandoned mine to a natural cave. Caves are naturally formed features and are generally associated with long- term stability. Mines, on the other hand, are manmade and designed to last only long enough to extract the ore, at which time they are abandoned. They are often developed along faults, which are inherently unstable, and drilling and blasting further destabilize the rock. Timbers and rock bolts supporting dangerously unstable areas are left to rot and decay. Rock falls, by far, account for most accidents in active mining operations, and rock stability decreases after abandonment. The long- term action of temperature variations as well as air and groundwater on the rock causes it to become unstable, particularly at mine portals. Vertical shafts may be covered by rotten timber barely capable of supporting its own weight. Collars (the ground surrounding a shaft) are often composed of loose rock sloping into the opening, making it easy to slip and fall in. Shafts may also be flooded, presenting a potential for drowning. During their operation, mines are typically ventilated by mechanical means. Upon abandonment, fans and vent lines are disconnected and/or removed, leaving the potential for accumulative oxygen- deficient or contaminated air unsuitable for breathing. Undetonated explosives and hazardous substances have been found at many abandoned sites.

The main hazards associated with abandoned mines in the four parks include falling into shafts, loose rock falling from the roofs of adits, high radon concentrations, toxic metals, or inhaling asbestos. Falling into shafts could cause serious or fatal injuries. This hazard is exacerbated by the possibility of drowning in the shaft's flooded lower recesses after receiving otherwise nonfatal injuries from a fall.

Objectives of Taking Action

Objectives are “what must be achieved to a large degree for the action to be considered a success” (NPS 2001). Any action alternatives must resolve the purpose of and need for action and meet plan objectives to a large degree. The objectives of taking action are to

- Correct health and safety hazards at the abandoned mine sites to reduce exposure of park staff and visitors to the dangers posed at these sites, while preserving natural and cultural resource values.
- Avoid or minimize impacts on the park's natural and cultural resources and values, and visitor use and experience.
- Prevent impairment of the park's resources and values.

Guiding Laws, Regulations, Policies, and Plans

The following describes the laws, regulations, policies, and plans that guide decisions related to the resources and issues addressed in this EA.

Park Enabling Legislation

Congress established national park system units to fulfill specified purposes, based on a park's unique and significant resources. All proposed projects must be consistent with a park's purpose, thereby conserving resources while providing for the enjoyment of future generations. The enabling legislation for each park contains statements of park purpose and significance that guide actions in the parks. These are summarized below.

Coronado National Memorial (NPS 2004)

Park Purpose. The purpose of Coronado National Memorial is to commemorate the explorations of Francisco Vásquez de Coronado and to preserve and protect the cultural and natural resources within the memorial for public benefit and enjoyment.

Park Significance. The following statements describe aspects of the memorial that make it significant to the nation and to the world.

- Coronado National Memorial is the only unit in the national park system that commemorates the Francisco Vásquez de Coronado expedition of 1540 to 1542. When reporting to Congress in 1940 on the establishment of the memorial, the Committee on Public Lands and Surveys noted:

Coronado's expedition was one of the outstanding achievements of a period marked by notable explorations. His expedition was made known the vast extent and the nature of the country that lay

north of central Mexico, and from the time of Coronado, Spaniards never lost interest in the country. In no small measure their subsequent occupation of it was due to the curiosity so created.

- The creation of the memorial was not to protect any tangible artifacts related to the expedition. It was created to give visitors an opportunity to reflect upon the impact the Coronado Entrada had in shaping the history, culture, and environment of the southwestern United States and its lasting ties to Mexico and Spain.
- The location was chosen for the panoramic views of the United States–Mexico border and the San Pedro River Valley, the route believed to have been taken by Coronado. It was hoped that this proximity to the border would strengthen binational amity and the bonds, both geographic and cultural, that continue to link the two countries.
- The memorial, near the center of the Sky Island bioregion (the juncture of four major biogeographic provinces – Madrean, Sonoran, Chihuahuan, and Southern Rockies/Mogollon), preserves a rich biological and geological diversity. Visitors are able to enjoy recreational opportunities that foster a better understanding and appreciation of the area’s natural and human history.

Organ Pipe Cactus National Monument (NPS 1997a)

Park Purpose. The following statements describe the purpose and objectives for Organ Pipe Cactus National Monument.

- Perpetuate for future generations a representative sample of the natural and cultural resources and process of the Sonoran Desert and provide for public understanding, use, and enjoyment.
- Preserve for future use and enjoyment the character and values of the designated wilderness within the monument under the Wilderness Act.
- Serve as a natural outdoor laboratory for understanding and managing Sonoran Desert ecosystems.
- Serve as a baseline indicator against which environmental changes can be identified.
- Establish a mutually agreeable relationship with the Tohono O’odham Nation to ensure perpetuation of their participation in and with the monument, and to preserve and continue their important relationship with this ecosystem.

Park Significance. The following statements describe aspects of the monument that make it significant to the nation and to the world.

- Organ Pipe Cactus National Monument is globally significant Sonoran Desert ecosystem that has been continuously researched for over 50 years and has been designated a biosphere reserve under the International Man and the Biosphere program.
- It is the most biologically diverse protected area in the Sonoran Desert occurring within the United States.

- Organ Pipe Cactus National Monument has a protected ecosystem providing habitat for a highly diverse flora and fauna, including threatened, endangered, and sensitive plant and animal species.
- People who visit the monument experience a protected natural area with wilderness character that provides opportunities for solitude and primitive recreation, enjoying the nighttime sky, and spiritual replenishment in a Sonoran Desert setting.
- There are expansive vistas of Sonoran Desert landscapes, including such elements as dramatic mountains and valleys, eroding bajadas or slopes and alluvial fans, and magnificent specimens of columnar cacti.
- The monument is the site of cultural resources that reflect long, widespread, and diverse occupations by American Indian, Mexican, and Anglo groups.
- The monument is the site of the intersection of three cultures within the monument that is significant archeologically, geographically, and internationally.

Saguaro National Park (NPS 2007a)

Park Purpose. The following statements describe the purpose and objectives for Saguaro National Park.

- Preserve and protect the saguaro cactus and the diverse vegetation and wildlife habitat of the surrounding Sonoran Desert.
- Preserve and protect the mountain and riparian habitats associated with the Sonoran Desert in the Tucson and Rincon Mountains.
- Preserve and protect wilderness qualities such as solitude, natural quiet, scenic vistas, and natural conditions.
- Promote understanding and stewardship of Saguaro National Park's natural and cultural resources through appropriate scientific study.
- Provide opportunities to understand and enjoy Saguaro National Park in a manner that is compatible with the preservation of park resources and wilderness character.

Park Significance. The following statements describe aspects of the park that make it significant to the nation and to the world.

- The saguaro cactus biotic community in the park is a superb example of the Sonoran Desert ecosystem because of the density and many generations of the saguaro cactus.
- The saguaro is the tallest cactus in the United States, and its distinctive form is recognized worldwide as an icon in the American Southwest.
- The park contains abundant evidence of a wide range and long history of human interaction with the land and has enormous potential for teaching contemporary people about adapting to and thriving in an arid environment.
- The park contains the largest roadless "sky island" in the Sonoran Desert, encompassing a wide range of elevations, which supports extraordinary biodiversity within a small geographic area.

Grand Canyon National Park (NPS 1995)

Park Purpose. The following statements describe the purpose and objectives for Grand Canyon National Park.

- Preserve and protect its natural and cultural resources and ecological processes, as well as its scenic, aesthetic, and scientific values.
- Provide opportunities for visitors to experience and understand the environmental interrelationships, resources, and values of the Grand Canyon without impairing the resources.

Park Significance. The following statements describe aspects of the park that make it significant to the nation and to the world.

- The park is an ecological refuge; it contains a diversity of geological features, serves as a natural gene pool, contains an extensive archeological record, has rich tribal affiliations, offers exceptional scenic vistas, and provides one of the world's premier river experiences.

Federal Laws and Regulations

NPS Organic Act and General Authorities Act – Prevention of Impairment and Consideration of Unacceptable Impacts and Appropriate Use

The NPS *Organic Act of 1916* (16 USC 1) provides the fundamental management direction for all units of the national park system. Section 1 of the *Organic Act* (16 USC 1) states, in part, that the NPS shall:

...promote and regulate the use of the Federal areas known as national parks, monuments, and reservations...by such means and measures as conform to the fundamental purpose of said parks, monuments and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.

The national park system *General Authorities Act of 1970* (16 USC 1a- 1, et seq.) affirms that while all national park system units remain "distinct in character," they are "united through their interrelated purposes and resources into one national park system as cumulative expressions of a single national heritage." The Act makes it clear that the NPS *Organic Act* and other protective mandates apply equally to all units of the system. Subsequently, the 1978 *Redwood Act Amendments to the General Authorities Act* further clarified Congress' mandate to the NPS to protect park resources and values. The Amendments (16 USC 1a- 1) state, in part:

The authorization of activities shall be construed and the protection, management, and administration of these areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been

established, except as may have been or shall be directly and specifically provided by Congress.

Prevention of Impairment. Current laws and policies require the analysis of potential effects to determine whether actions would impair park resources. While Congress has given the NPS the managerial discretion to allow certain impacts within parks, that discretion is limited by the statutory requirement (enforceable by the federal courts) that the NPS must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise (*NPS Management Policies 2006*, NPS 2006, sec. 1.4).

The prohibited impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources and values. An impact to any park resource or value may constitute an impairment, but an impact would be more likely to constitute an impairment to the extent that it has a major or severe adverse effect upon a resource or value whose conservation is

1. necessary to fulfill a specific purpose identified in the establishing legislation or proclamation of the park;
2. key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
3. identified as a goal in the park's general management plan or other relevant NPS planning documents.

NPS Management Policies 2006 uses the terms “resources and values” to mean the full spectrum of tangible and intangible attributes for which the parks are established and are being managed, including fundamental purposes of the *Organic Act* (as supplemented), and any additional purposes as stated in a park's establishing legislation. Park resources and values that are subject to the no impairment standard include the biological and physical processes which created the park and that continue to act upon it; scenic features; natural visibility; natural soundscapes and smells; water and air resources; soils; geological resources; paleontological resources; archeological resources; cultural landscapes; ethnographic resources; historic and prehistoric sites, structures and objects; museum collections; and native plants and animals. The NPS also includes the park's role in contributing to the national dignity, the high public value and integrity, and the superlative environmental quality of the national park system, and the benefit and inspiration provided to the American people by the national park system, among the values that are subject to the no impairment standard.

Finally, unless the activity is required by statute, NPS cannot allow an activity in a park if it would involve or result in

1. inconsistency with the park's enabling legislation or proclamation, or derogation of the values or purposes for which the park was established;
2. unacceptable impacts on park resources or natural processes;
3. consumptive use of park resources;

4. unacceptable impacts on visitor enjoyment due to interference or conflict with other visitor use activities; or
5. unacceptable levels of danger to the welfare or safety of the public.

Unacceptable Impacts. Sections 1.4 and 1.5 of *NPS Management Policies 2006* direct that the NPS must ensure that park uses that are allowed would not cause impairment of, or unacceptable impacts on, park resources and values. A form of park use may be allowed within a park only after a determination has been made in the professional judgment of the park manager that it will not result in unacceptable impacts. The impact threshold at which impairment occurs is not always readily apparent. Therefore, the NPS applies a standard that offers greater assurance that impairment will not occur by avoiding unacceptable impacts. These are impacts that fall short of impairment, but are still not acceptable within a particular park's environment. Park managers must not allow uses that would cause unacceptable impacts; they must evaluate existing or proposed uses and determine whether the associated impacts on park resources and values are acceptable.

Virtually every form of human activity that takes place within a park has some degree of effect on park resources and values, but that does not mean the impact is unacceptable or that a particular use must be disallowed. Therefore, for the purposes of these policies, unacceptable impacts are impacts that, individually or cumulatively, would

- be inconsistent with a park's purposes or values; or
- impede the attainment of a park's desired future conditions for natural and cultural resources as identified through the park's planning process; or
- create an unsafe or unhealthful environment for visitors or employees; or
- diminish opportunities for current or future generations to enjoy, learn about, or be inspired by park resources or values; or
- unreasonably interfere with
 - park programs or activities; or
 - an appropriate use; or
 - the atmosphere of peace and tranquility, or the natural soundscape maintained in wilderness and natural, historic, or commemorative locations within the park; or
 - NPS concessioner or contractor operations or services.

A determination on unacceptable impacts and impairment is made in the "Conclusion" section under each alternative for each of the park resources and values carried forward in Section 3, Affected Environment and Environmental Consequences.

Appropriate Use. *NPS Management Policies 2006* also require the NPS to consider where a proposed use is suitable, proper, or fitting. Section 8.1.2 of *NPS Management Policies 2006*, Process for Determining Appropriate Uses, provides evaluation factors for determining appropriate uses. All proposals for park uses are evaluated for

- consistency with applicable laws, executive orders, regulations, and policies;

- consistency with existing plans for public use and resource management;
- actual and potential effects on park resources and values;
- total costs to the NPS; and
- whether the public interest will be served.

Mitigation of hazards is contemplated in the NPS *Management Policies 2006*. Section 8.2.5.1 states, “the Service will reduce or remove known hazards and apply other appropriate measures, including closures, guarding, signing...” Therefore mitigation of hazards is not unusual or an unexpected occurrence, and is an appropriate use of NPS funds. The NPS finds that mitigating health and safety hazards at AMLs is an acceptable use at these parks.

National Environmental Policy Act of 1969. NEPA is implemented through CEQ regulations (40 CFR 1500–1508). The NPS has in turn adopted procedures to comply with the Act and the CEQ regulations, as found in NPS Director’s Order 12, Conservation Planning, Environmental Impact Analysis, and Decision- making (NPS 2001), and its accompanying handbook, and the Department of the Interior regulations implementing NEPA (Department Manual 12).

National Park Service Omnibus Management Act of 1998. The National Park Service Omnibus Management Act (NPOMA) (16 USC 5901, et seq.) underscores NEPA in that both are fundamental to NPS park management decisions. Both acts provide direction for articulating and connecting the ultimate resource management decision to the analysis of impacts, using appropriate technical and scientific information. Both acts also recognize that such data may not be readily available, and they provide options for resource impact analysis should this be the case.

National Historic Preservation Act of 1966. Section 106 of the NHPA (36 CFR 800) requires federal agencies to consider the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation, State Historic Preservation Offices (SHPOs), and other consulting parties a reasonable opportunity to comment on such undertakings. Through this process, concerns associated with historic preservation are addressed at the early stages of project planning. Overall, the objective of consultation is to identify historic properties potentially affected by the undertaking, assess its effects and seek ways to avoid, minimize, or mitigate any adverse effects on historic properties.

Archaeological Resources Protection Act of 1979. ARPA was enacted in 1979. The Act prohibits unauthorized excavation on federal and Indian lands, establishes standards for permissible excavation, prescribes civil and criminal penalties, requires agencies to identify archeological sites, and encourages cooperation between federal agencies and private individuals.

Migratory Bird Treaty Act. Protection under the *Migratory Bird Treaty Act* makes it unlawful to pursue, hunt, kill, capture, possess, buy, sell, purchase, or barter any migratory bird, including the feathers or other parts, nests, eggs, or migratory bird products. In addition, this act serves to protect environmental conditions for migratory birds from pollution or other ecosystem degradations.

Endangered Species Act of 1973. The *Endangered Species Act* of 1973 requires examination of impacts on all federally- listed threatened, endangered, and candidate species. Section 7 of the *Endangered Species Act* requires all federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) (or designated representative) to ensure that any action authorized, funded, or carried out by the agency does not jeopardize the continued existence of listed species or critical habitats.

National Park Service Management Policies. This is the basic NPS- wide policy document, adherence to which is mandatory unless specifically waived or modified by the NPS Director or certain Departmental officials, including the Secretary. Several sections from the NPS *Management Policies 2006* (NPS 2006) are particularly relevant to topics discussed in this EA, as described below.

Cultural Resources

The NPS is the steward of many of America's most important cultural resources. These resources are categorized as archeological resources, cultural landscapes, ethnographic resources, historic and prehistoric structures, and museum collections. The NPS cultural resources management program involves the following:

- research to identify, evaluate, document, register, and establish basic information about cultural resources and traditional associated peoples;
- planning to ensure that management processes for making decisions and setting priorities integrate information about cultural resources and provide for consultation and collaboration with outside entities; and
- stewardship to ensure that cultural resources are preserved and protected, receive appropriate treatments (including maintenance) to achieve desired conditions, and are made available for public understanding and enjoyment.

Cultural resource management policies are derived from a suite of historic preservation, environmental, and other laws, proclamations, executive orders and regulations (NPS 2006, sec. 5).

Visitor Use

Enjoyment of park resources and values by the people of the United States is part of the fundamental purpose of all parks. The NPS is committed to providing appropriate, high- quality opportunities for visitors to enjoy the parks, and the NPS will maintain within the parks an atmosphere that is open, inviting, and accessible to every segment of American society (NPS 2006, sec. 8.2).

Safety

The saving of human life will take precedence over all other management actions because the NPS strives to protect human life and provide for injury- free visits. While recognizing that there are limitations on its capability to totally eliminate all hazards, the NPS and its concessioners, contractors, and cooperators will seek to provide a safe and healthful environment for visitors and employees. The NPS will work cooperatively with other federal, tribal, state, and local agencies; organizations; and individuals to carry out this responsibility (NPS 2006, sec. 8.2.5).

Section 8.2.5.1 specifically addresses visitor safety and reduction of known hazards and appropriate measures to ensure safety, including closures, guarding, signing, or other forms of education.

Wildlife and Biota

The NPS will maintain as parts of the natural ecosystems of parks all plants and animals native to park ecosystems by preserving and restoring the natural abundances, diversities, dynamics, distributions, habitats, and behaviors of native plant and animal populations and the communities and ecosystems in which they occur; restoring native plant and animal populations in parks when they have been extirpated by past human- caused actions; and minimizing human impacts on native plants, animals, populations, communities, and ecosystems, and the processes that sustain them (NPS 2006, sec. 4.4.1).

Species of Special Concern

The NPS is required to inventory, monitor, and manage state and locally listed species in a manner similar to its treatment of federally listed species to the greatest extent possible. The NPS is also required to inventory other native species that are of special management concern to parks (such as rare, declining, sensitive, or unique species and their habitats) and manage them to maintain their natural distribution and abundance (NPS 2006, sec. 4.4.2.3).

Director's Memoranda and Orders

Director's Memorandum - Mitigating High- Risk Abandoned Mine Land Features

On October 2, 2008, the Director of the NPS issued a memorandum addressing AML issues. To ensure that AML sites are secured for visitor safety, each region was directed to identify and implement quick response measures for high- risk AML features. Parks were directed to immediately identify those AML features that pose a high risk to visitor safety and to develop initial cost estimates for mitigation or safeguarding of those features. Parks were directed to fulfill needed compliance responsibilities and implement plans for quick response measures (e.g., fences and warning signs) on a prioritized basis, within funding and personnel constraints.

To assist in addressing AML issues, guidance was provided to lay out the initial actions to be implemented by parks, regions, and the Washington Office to address the high risk hazards at AML sites in parks.

Director's Order 28B, Archeology, and NPS- 28, Cultural Resource Management Guideline (NPS 1998). As custodian of the national park system, the NPS is steward of many of America's most important natural and cultural resources. The NPS is charged to preserve those resources unimpaired for the enjoyment of present and future generations. If they are degraded or lost, so is the park's reason for being. Almost every park in the system has cultural resources, the material evidence of past human activities. Finite and nonrenewable, these tangible resources begin to deteriorate almost from the moment of their creation. Once gone they cannot be recovered. In keeping with the NPS *Organic Act of 1916* and varied historic preservation laws, park management activities must reflect awareness of the irreplaceable nature of these material resources.

Approved Park Planning Documents

Existing plans must be examined to ensure that proposed actions are consistent with plan provisions. These include general management plans and other plans that address AML issues. The following information pertains to how the proposed actions are addressed in the planning documents that were identified by the parks as being relevant to the proposed actions.

General Management Plans

Coronado National Memorial 2004 General Management Plan/EIS. The Coronado National Memorial 2004 General Management Plan/EIS identifies abandoned mines in the memorial as important features because of the fauna that use them, as well as because of their historic use by humans. A number of abandoned mines in the memorial are remnants of previous copper mining. The plan notes that the NPS has installed bat- friendly gates at the entrances of two mines in order to protect human health and safety, as well as to protect the fauna that inhabit the mines. These gates are effective in restricting visitors from entering the mines while still allowing bats and other wildlife species to enter them.

Organ Pipe Cactus National Monument 1997 General Management Plan/EIS. The Organ Pipe Cactus 1997 General Management Plan/EIS does not mention bat or mine related topics/issues.

Saguaro National Park 2007 General Management Plan/EIS. The Saguaro National Park 2007 General Management Plan/EIS identifies evidence of intense mining activity in the TMD that is still visible throughout the area even though it was closed to mineral entry in 1929. The general management plan states that all open shafts have been fenced and posted to comply with Arizona Revised Statutes, but that the mining sites have not been evaluated in terms of National Register criteria.

Grand Canyon 1995 General Management Plan. The Grand Canyon 1995 General Management Plan makes note of hazardous materials at the Orphan Mine, but does not specifically address other AML sites within the park. The draft EIS for the plan did state, “The Park Service would actively seek assistance in removing hazardous materials and conditions at abandoned mine sites below the rim, including the Orphan Mine openings.”

Resource Management Plans

Resource management plans (or upcoming resource stewardship strategies) discuss natural resource management objectives for the parks. The following describes sections of existing Resource Management Plans that are related to and generally support the proposed AML actions:

Coronado National Memorial Resource Management Plan. The Coronado 1997 Resource Management Plan identifies the hazards of abandoned mines for humans and wildlife. Mitigation measures were put into place for a long- term plan/project involving cyclical maintenance. This long- term plan would prioritize closure of abandoned workings (based on the degree of hazard and critical wildlife habitat) and establish alternative solutions for closing mine openings.

Organ Pipe Cactus National Monument Resource Management Plan. The Organ Pipe Cactus 1994 Resource Management Plan contains several AML- related project statements: ORPI- N- 211, Evaluate Abandoned Mine Tailings (for contaminants); ORPI- I- 250, Comprehensive Monitoring and Maintenance of Abandoned Mine Safety Features; ORPI- I- 251, Conduct Study of Wildlife Use of Abandoned Mines; ORPI- I- 252, Develop Mine Hazards Safety Program; and ORPI- I- 253, Rehabilitate Selected Mines.

Saguaro National Park Resource Management Plan. The Saguaro 1995 Resource Management Plan includes three project statements about abandoned mine lands: SAGU- N- 43, Conduct Study of Wildlife Use of Abandoned Mine Shafts; SAGU- N- 46, Monitor and Maintain Safety Fencing around Abandoned Mines; and SAGU- N- 48, Close and Rehabilitate Abandoned Mines. As funding was available, the park made progress on the first two projects. Sufficient funding for studies and closures has not been available prior to passage of the ARRA.

Grand Canyon Resource Management Plan. The Grand Canyon 1997 Resource Management Plan makes note of abandoned mines and describes the five- step program to protect people and property from hazards related to abandoned mines, involving:

1. Hazard identification and documentation.
2. Monitoring threat levels.
3. Threats and hazards mitigation.
4. Research to identify previously unknown threats.
5. Interpretation to inform the public of threats and safety measures.

Scoping

The planning process for this AML Closure Plan and EA included formal and informal efforts to involve the public and local, state, and federal agencies. Since this was a multi- park project, both combined scoping efforts relevant to all parks, and park- specific scoping efforts were pursued. All applicable public participation has been documented and analyzed and is on file as part of the administrative record.

Internal Scoping

Internal scoping was conducted by an interdisciplinary team of professionals from each of the parks and the NPS Intermountain Regional Office. The four park units combined consultation efforts with the USFWS, Arizona Game and Fish Department, and the Arizona SHPO. In accordance with the Endangered Species Act, the NPS contacted the USFWS with regards to federally- listed and special status species; and, in accordance with NPS policy, contacted the Arizona Game and Fish Department for a current species list and any initial concerns. In accordance with Section 106 (and Section 110) of the NHPA, and the Advisory Council on Historic Preservation regulations 36 CFR 800, the NPS initiated consultation with the Arizona SHPO. The Arizona Game and Fish Department, USFWS, and Arizona SHPO responded and provided initial comments on the project relevant to all parks. Comments received from these agencies are captured on the following pages.

Native American Consultation

At the beginning of this project, each of the four park units contacted Native American tribes that would have potential interest in proposed activities at that park. The tribes were contacted to inform them of the planning process and issues that could affect lands and waters that may be culturally significant, and to determine if there were any resource issues with which the Tribes had ethnographic affiliation. The specific consultation efforts of each park and the responses received are described below.

Coronado National Memorial sent a letter on August 10, 2009, to the following 13 tribes:

- Ak Chin Indian Community
- Fort McDowell Yavapai Nation
- Fort Sill Apache Tribe of Oklahoma
- Mescalero Apache Tribe
- Pascua Yaqui Tribe
- Salt River Pima- Maricopa Indian Community
- San Carlos Apache Tribe
- The Hopi Tribe
- Tohono O'odham Nation
- Tonto Apache Tribe
- White Mountain Apache Tribe
- Yavapai- Apache Nation
- Pueblo of Zuni

The Hopi Tribe responded and affirmed cultural affiliation with the project area, supported identification and avoidance of prehistoric archeological sites and Traditional Cultural Properties, and appreciated the park's continuing solicitation of their input and efforts to address concerns. If any prehistoric archeological sites are identified that would be adversely affected by project activities, they requested the NPS provide the tribe with copies of the survey report and any proposed treatment plans for their review and comment.

Organ Pipe Cactus National Monument sent a letter on August 10, 2009, to the following 10 tribes:

- Ak- Chin Indian Community Council
- Cocopah Tribal Council
- Colorado River Tribal Council
- Fort Mojave Indian Tribe
- Fort Yuma- Quechan Tribe
- Gila River Indian Community

- Salt River Pima- Maricopa Indian Community
- The Hopi Tribe
- The Pueblo of Zuni
- Tohono O'odham Nation

Two of these tribes responded: the Hopi Tribe and the Fort Yuma- Quechan Indian Tribe. The Hopi Tribe responded and affirmed cultural affiliation with the project area, supported identification and avoidance of prehistoric archeological sites and Traditional Cultural Properties, and appreciated the park's continuing solicitation of their input and efforts to address concerns. If any prehistoric archeological sites are identified that would be adversely affected by project activities, they requested the NPS provide the tribe with copies of the survey report and any proposed treatment plans for their review and comment. The Fort Yuma-Quechan Indian Tribe affirmed ties to Organ Pipe Cactus National Monument and deferred to the Tribes located within the proposed closure areas. They will support whatever decisions the Tribes make.

Saguaro National Park sent a letter on August 17, 2009, to the following 8 tribes:

- Ak Chin Indian Community
- Fort McDowell Yavapai Nation
- Gila River Indian Community
- Pascua Yaqui Tribe
- Salt River Pima- Maricopa Indian Community
- The Hopi Tribe
- Tohono O'odham Nation
- Pueblo of Zuni

The Hopi Tribe responded and affirmed cultural affiliation with the project area, supported identification and avoidance of prehistoric archeological sites and Traditional Cultural Properties, and appreciated the park's continuing solicitation of their input and efforts to address concerns. If any prehistoric archeological sites are identified that would be adversely affected by project activities, they requested the NPS provide the tribe with copies of the survey report and any proposed treatment plans for their review and comment.

Grand Canyon National Park sent the scoping brochure on August 10, 2009, to the following 12 tribes:

- Kaibab Band of Paiute Indians
- Las Vegas Paiute Tribe
- Moapa Band of Paiute
- Paiute Indian Tribe of Utah
- San Juan Southern Paiute Tribe

- The Havasupai Tribe
- The Hopi Tribe
- The Hualapai Tribe
- The Navajo Nation
- The Pueblo of Zuni
- White Mountain Apache
- Yavapai- Apache Nation

The Navajo Nation responded and, after reviewing the consultation documents, concluded that the proposed undertaking would not impact any Navajo traditional cultural properties and therefore the Navajo Nation had no initial concerns. If the proposed project inadvertently discovers habitation sites, plant gathering areas, human remains and objects of cultural patrimony, the Navajo Nation Historic Preservation Department - Traditional Cultural Program requests notification in accordance with the Native American Graves Protection and Repatriation Act.

External Scoping

The public planning process was officially initiated through publication of a scoping brochure to inform the public about the proposal to prepare an AML Closure Plan and EA. The scoping brochure was posted to each park's Planning, Environment, and Public Comment website, and was open for comment for a 30- day period, extending from August 10, 2009, through September 8, 2009. In addition, the scoping brochure was mailed out to approximately 528 individuals, organizations, Native American Tribes, and government agencies. The scoping brochure identified goals and objectives, described resources and concerns for consideration in the EA, and identified preliminary alternatives. The NPS developed the preliminary planning framework to inform agencies and the public of what the NPS was considering, but more importantly, to provide them with enough information to bring other ideas, comments, suggestions, and management strategies to the decision- making process. In addition, a press release was distributed to local media sources for further outreach.

The following entities responded during the internal and external scoping for this AML Closure Plan and EA: USFWS, Arizona Game and Fish Department, Arizona State Historic Preservation Society, the Arizona Mining Reform Coalition, United States Section of the International Boundary and Water Commission, Arizona Department of Environmental Quality, the Hopi Tribe, the Fort Yuma- Quechan Indian Tribe, the Navajo Nation, Grand Canyon River Guides, and four individuals. In addition, three responses were received after the scoping period ended. One responder was concerned about the adequacy of the bat surveys to determine type of mine closure. The other two responders provided comments on the construction materials, placement, and design of bat gates. All substantive comments are captured in the Scoping Analysis below (table 1), except the responses from the Native American tribes which are included under Native American Consultation.

Scoping Analysis

The following table includes the issues and concerns received by the NPS during formal public scoping. The table is organized by issues and concerns common to all or multiple park units, and, specific issues and concerns relevant to each individual park unit.

Table 1. Scoping Analysis

Topics Common to All or Multiple Park Units
Issues, Concerns, and Opportunities
Since this may be a one-time only opportunity, please make sure that the cleanup effort is complete and comprehensive. – AZ Mining Reform Coalition
Add under water quality that some of the mines in the Coronado National Memorial and perhaps in Grand Canyon are experiencing acid mine drainage and give these sites priority and to remove both the current and future potential for acid mine drainage. –AZ Mining Reform Coalition
Cultural resource surveys should consider historic resources, pre-historic resources, and the potential to impact Native American cultural resources. –AZ Mining Reform Coalition
The eventual cleanup should be done in a way that would clearly return the sites to true Wilderness character and the methods of getting to the sites and conducting the cleanup should reflect the Wilderness ethic. –AZ Mining Reform Coalition
Urge that as much of the cleanup be done in a non-motorized fashion. However, use of motorized equipment and helicopters may be a better choice if access to the site by trail would cause more damage, or if quicker access would outweigh longer-term non-motorized methods. –AZ Mining Reform Coalition
Both Grand Canyon and Saguaro already have mule teams that could be used in the cleanup effort. –AZ Mining Reform Coalition
If any of the mines contain active claims, then the claims should be retired as part of the cleanup effort. If there are nearby active claims, please work to close those claims as part of this effort. –AZ Mining Reform Coalition
This would be a great opportunity to provide on the job training to volunteers and/or unemployed persons while accomplishing the cleanup goal. –AZ Mining Reform Coalition
Not all mines should be deemed hazardous purely because it is a human-made structure, and therefore, “No action” needs to remain an alternative for some sites. –AZ Game & Fish Department
Include maintenance measures in the EA. Some sites will undoubtedly require maintenance of the closure. The EA should address how this activity will be covered, including sites in a wilderness setting. –AZ Game & Fish Department
The EA should address adaptive management methods should a closure need to be modified (i.e., State of Texas Mine on the Coronado National Memorial or Stanton Cave in Grand Canyon National Park). –AZ Game & Fish Department
Recommend including a discussion of White-nosed syndrome and how management would address the disease should it appear in the West. Some agencies in the eastern U.S. are considering whether to seal sites where white-nose has been recorded. –AZ Game & Fish Department
The potential for effects to a given species will depend on the location, type of mine, type of survey or investigation, type of closure, and accessibility of the site. –U.S. Fish and Wildlife Service
If significant preparation of the site is needed prior to closure, runoff and sediments may affect species in the same drainage even though they are some distance from the project site. –U.S. Fish and Wildlife Service
Post-construction monitoring is essential. Mine closures that implement wildlife conservation measures are not useful unless follow-up monitoring is conducted to assess the success and effectiveness of the measure. It is imperative that we learn from this project so that similar efforts in the future are effective and appropriate. –U.S. Fish and Wildlife Service
Implement Best Management Practices to reduce the footprint of these projects on the landscape. These should include using the least disturbing access techniques and routes, noise reduction, runoff and sediment control, containment of contaminants, etc. –U.S. Fish and Wildlife Service
Some effects to species may occur if helicopters are used to implement the project, but these impacts may not be an issue if materials are backpacked in. –U.S. Fish and Wildlife Service

Topics Common to All or Multiple Park Units
Adopt standardized terminology when discussing mines, bat use, and bat gates; and include these terms and definitions in the EA. –Individual (4)
Decision-Making for Mine Closures
Use appropriate closure design that will accomplish the objectives of the project, while maintaining wildlife habitat values. – U.S. Fish and Wildlife Service
Consider not closing mines that show wildlife use if human health and safety can be maintained. –U.S. Fish and Wildlife Service
Each site is unique and will need to be evaluated prior to choosing a closure method. Each site would need to evaluate the species using the mine, seasonal uses, and availability of other sites for the species using the mine to determine the type of closure needed. –AZ Game & Fish Department
Evaluate all the methods that could be chosen to close a mine to ensure that a single closure method is not chosen as a blanket. –AZ Game & Fish Department
Recommend that unless a mine feature is used by wildlife (especially bats), that backfilling would be the preferred method of cleanup. In cases where wildlife is using the feature, a bat gate or other method of preventing human access while leaving access for wildlife is preferable. If backfilling is not possible, we prefer the use of a suitable plug (for example, expanding foam) covered by a suitable amount of native rock and/or soil. –AZ Mining Reform Coalition
The EA should address the “timing” or scheduling of closures, especially those closures that involve exclusion of bats. –AZ Game & Fish Department
The EA needs to analyze the effects of mine closures on a landscape basis. Since bats do not rely on single mines, but many mines in a landscape-scale habitat, making changes on a large scale could affect bat populations when a few localized closures would not. Species such as the lesser long-nosed bats migrate between northern Mexico, Organ Pipe Cactus National Monument and Coronado National Memorial in search of blooming cacti. The parks form a link in their annual migration route. Maternity roosts are found at Organ Pipe Cactus National Monument and post-maternity roosts at Coronado National Memorial, along this migratory route. Making changes at all the mine roosts at once runs the risk of impacting the population on a landscape scale. It would be safer to enter into the closures slowly, allowing the population to adjust to changes. This would also allow time to monitor bat use for changes, and make adjustments as warranted. – Individual (4)
If it is determined that a permanent closure will take place, it is important to assure that no animals are trapped inside. Wildlife exclusions must be conducted before the start of construction. –Individual (4)
Mine closures should be bat compatible whenever possible. Some mines due to their structure, instability, acid drainage, or toxic waste may require permanent closure. The majority of mines, however, can be closed with bat compatible structures. Permanent (hard) closures should be used only when no other alternative exists. –Individual (4)
When gates or cupolas are being designed, the designer tries to create the widest horizontal openings between vertical supports possible. This allows the widest and most usable flight space for bat passage. These openings can be as wide as 15-feet, though more commonly the vertical supports are 10-feet apart. In mine adits, the openings are often small, usually 5-feet wide and 7-feet high. Depending upon the number of bats using the site, either two vertical supports, or perimeter supports are used. –Individual (4)
When cupola gates, or grates are constructed, their tops should be raised a minimum of 24-inches above ground level to prevent vehicles from being driven onto the structures. For adequate bat passage, and space to install perimeter tortoise screening, they should be 5-feet high. –Individual (4)
Cupolas intended for bat access should have at least one side 5-feet high to provide unimpeded bat flight space. –Individual (4)
Shaft collars sometimes require reinforcement and stabilization. This is commonly done using corrugated metal pipe set vertically and anchored with PUF and backfilled near the surface. If this is indicated, the largest pipe that will fit into the opening should be used. This permits maximum flight space for bats. –Individual (4)
Adits sometimes require stabilization to be kept open for wildlife access. Corrugated metal pipe has long been used for this purpose, and with good success. The largest size that will fit into the portal should be used. Wall gates can be installed inside the culverts. Use concrete pipe when access permits. –Individual (4)
When a mine opens to the surface at multiple points, every effort should 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. –Individual (4)

Topics Common to All or Multiple Park Units
<p>When large numbers of bats are present at a roost site, gates can restrict bat passage. This is particularly true at maternity roosts. As the number of bats increases, their negative reaction to gates often increases as well. This usually manifests itself by repeated circling and congestion behind the gate before exiting between the bars. Colonies under these conditions often decline over time, as bats abandon the congested sites and seek other roosts. Through years of testing, window and chute gates have been refined. These designs work well with all species of microchiropteran bats they have been tested on, and are routinely specified when large colonies are encountered. This gate style must be custom designed to fit the location. –Individual (4)</p>
<p>When survey data indicates presence of bats at certain mine sites, this information needs to be considered in closure decisions. These decisions are best made in consultation between bat biologists and closure design specialists familiar with the affect of gates on bats. High bat use sites require special designs. A method needs to be developed in the EA for identification of critical sites, and triggering appropriate custom designs. At these locations, analysis of different gate designs may be necessary. –Individual (4)</p>
<p>Bat gates are always a compromise between preventing human access to abandoned mines and protecting and preserving habitat for bats dependent on subterranean roost sites. To minimize the chances of a gate being breached by people attempting to enter the mine, the gate should be as strong as possible. Bats, however, perceive a gate as an obstacle to free flight in and out of the roost. Bats prefer not having any gate. Therefore, gates are installed for the primary purpose of keeping people out of mines, and bats are secondary in design considerations. For most sites, an acceptable compromise can be reached if the gate is designed by those familiar with human and bat use of the site; the product will be a gate that does not negatively affect bats and is not breached by humans. –Individual (5)</p>
<p>To use a one-size-fits-all approach to gating mines for bats invites failure at an unknown percentage of closures, either from failing to meet the needs of the bats there, or from underestimating the type of vandalism at the site. –Individual (5)</p>
<p>Common sense would dictate the use of an individualized approach to meet the objectives of minimizing negative effects on the bats using a mine and maximizing security. –Individual (5)</p>
<p>There is one basic function of any cave or mine gating design: to protect the resources within. If a gate does not keep out people, then it fails that function. Fencing openings may be inexpensive and biologically friendly, but are not secure form human entry, and human disturbances can be extremely detrimental to roosting bats. Therefore, fences are poor choices, when used at all. And if a poorly designed or placed gate is built, it can change the airflow (and thus internal microclimate) of the roost, or impede the ingress and egress to the roost, causing the bats to abandon the site. There are numerous real-world examples of all these types of “protection” failures. We must be sure to heed the lessons of the past and not make the same mistakes, but rather utilize the state-of-the art designs and knowledge based on the hundreds of successful bat gates. –Individual (6)</p>
Bat Gate Design Features
<p>Not all bat gates are equivalent. It is important that correct gates be selected for the intended purpose. Standards of material, durability, longevity, functionality and cost need to be analyzed and adopted. Gate designs with a proven history of use and acceptance by bats should be favored over experimental models. – Individual (4)</p>
<p>Durability and longevity of bat closures are important to their long-term success. Gates that are easy to violate provide inadequate protection over the long term. Robust gates built of heavy-gauge steel provide this protection. There is no cost saving in installing light-weight gates, since they invite breaching, and often require repair or replacement. Most of the cost in gate construction is in transport of material, equipment, labor, and contracting cost. An attempt to save money by using light weight material is false economy. –Individual (4)</p>
<p>Exotic gate materials, such as stainless steel, should be used only when conditions warrant, such as mines with acid drainage, or corrosive atmospheres. Stainless steel is expensive and difficult to cut and form on site. Cutting requires a band saw, though welding techniques are not much different than those used on mild steel. Stainless steel cannot be cut with an acetylene torch. Most mines do not require the use of stainless steel. –Individual (4)</p>
<p>Round and square bar gates are susceptible to damage by jacking bars apart. To prevent the possibility of damage, vertical supports need to be kept close together. This can interfere with bat passage at certain locations, particularly when tunnel walls are close together. Most gate designers dislike using round or square material for this reason. –Individual (4)</p>

Topics Common to All or Multiple Park Units
<p>Round bar gates are constructed of 1-inch diameter round bar, 12-14% manganese steel alloy. The gates are constructed using 4" x ½" flat bar for vertical supports. These are bored with 1 1/8" diameter holes through which the horizontal bars are inserted and welded to form a jail-cell like grid. Due to the low bending moment of the round bar, vertical supports are required every 24". Gate assembly is time consuming, requiring field cutting of special pieces and careful insertion and support of bars through vertical supports. Because the bars are captured in the pre-bored holes, the gate must often be mostly assembled and tipped into position before welding commences. Some of the vertical and perimeter supports can be pre-manufactured in a machine shop rather than field cutting. The drawbacks of the gate design are its complexity, excessive vertical supports, high material/manufacturing cost, and long assembly time. This gate style is not recommended for use on mines with bats. –Individual (4)</p>
<p>The filling of tubing with cement has been experimented with as a means of increasing the bending moment of square or rectangular tubing, permitting longer spans. The cement doesn't add strength, but does prevent the tube from collapsing when placed under load, such as when bars are forced apart with a jack. Filling tubes with cement is time consuming and requires at least a full day to set before the bars can be welded in place. A dangerous situation is created if heat from welding converts residual water in the cement to steam. This can either vent harmlessly or explosively. For these reasons, filling tubes with cement is not recommended; some contractors will refuse to do this due to safety concerns. –Individual (4)</p>
<p>Square bars with thick walls (3/8 inch) or more are very stiff and offer great strength. Because the bars are manufactured by bending, welding, and grinding, the material cost is very high. Bars with wall thickness less than 3/8 inch are not recommended. –Individual (4)</p>
<p>Angle iron bars with stiffeners. This is the longest-used and most time-tested material used for gate bars. The bars are formed from 4" x 4" x 3/8" mild steel angle. Stiffeners are added by welding two pieces of 1 ½" x 1 ½" x ¼" angle inside the bar, forming roughly an "A" shape in cross-section. Gate designers like this bar style because of its stiffness and durability. Vertical support posts can be spaced up to 15-feet apart, and bar ends cantilevered up to 4-feet from the nearest support post and a wall. The overall mass of steel makes it difficult to cut, or deform, resulting in infrequent attempts at breaching. Mild steel angle is less expensive than tubing, or an alloy such as manganol steel. Angle iron is a durable and proven product and should be used whenever possible for excellent long-term performance and economy. –Individual (4)</p>
<p>The factors that proper design should take into consideration are: the type of vandalism attempts expected, the species of bat using the site, the number of bats, and the colony type of that species. –Individual (5)</p>
<p>The first widespread design for bat gates was the use of 4-inch angle iron at caves in the eastern U.S. Stiffeners added to the bars allowed spans of up to about 20 ft. before vertical supports were needed, which is desirable for large cave entrances. The ACCA endorsed design has evolved from these gates and although it has been used successfully for years at many sites, it also has been successfully vandalized, and is not appropriate for all species or colonies. –Individual (5)</p>
<p>In the last 30 years, gate builders have experimented with different bar types and different gate designs, and knowledge is gradually, albeit slowly, accumulating on how bats respond to gates. –Individual (5)</p>
<p>Presently there are three common bar types used in bat gates: 1- inch round steel bar (Manganal ®) (e.g., Amodt and Mesch 2002, Dalton 2002), 2- inch or 3- inch square tube (e.g., Dalton 2002, Kretzmann 2002, Langdon 2002, Vittetoe 2002) and 4- inch angle iron (e.g., Dalton 2002, Powers 2002). Compared to the number of gates constructed, the actual number of studies conducted to determine the effects of gates on bats at a particular site are few (Sherwin et al. 2002). Even fewer are sites where, in addition to monitoring the abundance of bats, the behavior of bats at a gate is studied. –Individual (5)</p>
<p>The first step in designing a gate at a particular site is determining the type of vandalism expected. This will be a combination of how attractive the site is, and how accessible the site is. The material and gate design should be resistant to a hacksaw than 3- inch square tube, which is equal to angle iron in resistance. Angle iron with stiffeners is the most resistant, but is not hacksaw proof. Manganal ® (hereafter round bar) is hacksaw proof, as is hardfaced square tube and angle iron. Angle iron with stiffeners is more resistant to torch cutting than are round or square bars, but square tube filled with quartz-aggregate concrete is torch proof. Square tube filled with concrete is more resistant to a cut-off saw than any other bar being discussed. Using security as the only criterion, the best option for a gate would be 3- inch square tube filled with reinforced concrete, hardfaced for good measure. –Individual (5)</p>

Topics Common to All or Multiple Park Units
<p>Considering only security issues, there are several attributes of the ACCA gate design we think are problematic, in addition to angle iron being less vandal resistant than square tube filled with concrete. The design calls for pinning only the vertical bars into rock. Vandals with a hacksaw need only cut through the pin or pin-mounting bracket to bend the gate enough to gain access. Vandals can also mine around the gate on the sides (ribs) of the mine if the rock hasn't been properly scaled back to competent substrate, as happened with a round bar gate (Amodt and Mesch 2002). The placement of the McGard lock on the outside of the bar leaves it vulnerable to bludgeoning. Although it is unlikely that the vandal would gain access, the bolt could be damaged and make authorized access impossible. The placement also permits dirt to easily enter. – Individual (5)</p>
<p>Considering the effect of the ACCA gate design on bats, the use of 4- inch angle iron and vertical support placement will obstruct an increasing percentage of total flight space as the size of the mine opening decreases. For a small number of bats inhabiting a typical 6 ft. by 6 ft. adit, the design is successful, but as colony size increases and portal size decreases, the risk of negative effects to bats increases. The disadvantages of the design are easily corrected, and result in a more secure, and more bat-friendly (increasing flight space), design. Rock on the ribs of the mine is scaled and vertical supports are built along the ribs and pinned to the rock between every other bar. This design prevents vandals from digging around the side of the gate, increases total flight space, and avoids the additional obstacle of vertical supports to navigating bats. Constructing vertical supports against the ribs rather than out into the entrance is a design feature used by us, as well as by nationally-recognized experts on bats and mines such as Dr. Scott Altenbach and Dr. Richard Sherwin. An additional detail, recessing the McGard lock underneath a bar keeps dirt from falling in the lock, makes it less visible, and makes it harder to vandalize. –Individual (5)</p>
<p>Dr. Sherwin has developed management recommendations for over 10,000 individual abandoned mines, and has conducted follow up research at over 500 gated sites throughout the western U.S. He has seen no evidence to support the supposition that angle-iron gates are more effective for the long-term conservation of western species of bats than round or square bars, and uses square tube exclusively (Sherwin, pers. comm.). In the western U.S., square tube and angle iron are now being used about equally (Sherwin, pers. comm.). For example, square tube is used in New Mexico in bat cupolas (Kretzmann 2002), in culvert gates in Idaho (Langdon 2002), and by the Forest Service in Nevada and Idaho (Sherwin, pers. comm.). For example, in 2007, we used 3- inch square tube to gate a mine on county park land which receives frequent visitation. In spring 2009, we used 3- inch square tube filled with reinforced concrete to gate a mine with vehicle access on BLM land. At both sites, numbers of California leaf-nosed bats are equal to or higher than (depending on season) pre-gate numbers. –Individual (5)</p>
<p>Square tube is used because it is easier to work with and more versatile than angle iron. It is easier to cut at an angle for fitting into irregular places. Square tube can be filled with reinforced concrete or greased cold-rolled steel rod for increased security. It can be set on vertical wall gage plates (coupons), which are part of the vertical support; coupons for square tube are easier to make than for angle iron. When mine entrances are small, 2- inch tube (hardfaced) can be used to minimize obstructed flight space. –Individual (5)</p>
<p>It is important that a bat gate not change the microclimate of the mine. Hibernating bats are especially sensitive to warming as they seek appropriate temperatures in mines or caves to hibernate in. Although maternity colonies can create their own appropriate microclimate (Dalton and Dalton 1994, Sherwin et al. 2009) and therefore may not be as sensitive to ambient changes, it is widely-accepted criterion that bat-friendly closures should not affect air flow, temperature, or humidity. –Individual (5)</p>
<p>An often-cited paper (Roebuck 2002) concluded that “a correctly designed cave gate for slow speed air flows will have an average air flow speed of less than 10 ft/sec and will not block more than 45% of the passage cross-sectional area.” In other words, in mines with air flow speeds of less than 7 miles/hour (10 ft/sec), the type of bar does not matter; what matters is that total obstructed space is not more than 45%. All of the mines at Saguaro National Park and Coronado National Memorial (and probably most mines) have air flow less than this threshold. Roebuck's paper has been erroneously used to argue that square tube bars should not be used in bat gates because they have a higher drag coefficient than either round or angle-iron bars. Roebuck gave an air speed of 50 ft/sec or more as the threshold where the type of bar is important, so square bars should be avoided where air speed is 35 miles/hour (50 ft/sec) or greater. Clearly, this is not an issue with abandoned mines in the project area, and the argument for or against a particular bar material based on its effects on air flow is simply invalid. –Individual (5)</p>
<p>The most successful gate will be designed by those who are familiar with the behavior and colony attributes of the bat species at the site, who have a clear understanding of the types of expected attempts to breach the gate, who have experience and knowledge of different gate designs and construction materials, and who are willing to take the time and make the effort to design a gate that is best suited for that particular site. To avoid costly repairs or modifications to gates not designed to withstand expected vandalism attacks, and to minimize the change of negative effects on bats, all the tools in the tool box must be available and used appropriately. –Individual (5)</p>

Topics Common to All or Multiple Park Units
<p>Design and placement of the gate (or gates) is critical. There are many factors which MUST be considered for a gate to be successful. First is the biology, including the microclimate, of the cave or mine itself. When closing a cave or mine with a bat-friendly gate of any kind, we do not want to do more harm than good. By this I mean the gate should have no noticeable negative effects on the resource it is intended to protect. Too many times well-meaning people place gates that inadvertently restrict movement of bats, or negatively alter the temperatures inside the cave or mine, thereby rendering the site undesirable to bats, and likely other animals as well. This is particularly the case when the entrance is enlarged (often through erosion) or restricted (such as by placing a culvert and backfill in the opening), but can also be through poor gate design or placement, restricting airflow and thereby altering internal temperatures of the mine or cave. –Individual (6)</p>
<p>Gates should NEVER be placed in a small cross-sectional area of the passage, but rather in the largest possible. In areas where the passage dimensions are already restricted, such as by erosional deposition or collapse, then the material should be removed if such removal will not negatively affect current microclimates, or the gate design itself must be modified to compensate for the restricted area available, such as by using a modified cupola gate or “folded” gate. –Individual (6)</p>
<p>The use of the mine by bats is another important factor to be considered. Many bats use mines and other features as temporary roosts in low numbers, and those roosts need no special protection. But when larger numbers of bats concentrate in certain areas because those roosts have more suitable characteristics (safety from predators, human disturbance, and thermal fluctuations, as well as proximity to food and water resources), then they need more active protection, since those roosts are in shorter supply across the landscape. As the colony size and/or species diversity increases, particularly when T&E species are involved, then the protection of those roosts becomes paramount. Smaller colonies of bats, even in the summer months when they are emerging from the roost nightly to forage, can adapt to almost any type of gate design or materials. But when colony sizes become larger, usually over 100 bats or so (depending on species), then more care must be taken in the design and placement of the gate itself. And when the colony size is very large, approximately 5000 bats or more, then only specialized gate designs (such as a Flyover Gate or Window Gate or Chute Gate) will work. The actual type of gate is also very dependent on the size, stability, and orientation of the opening. Large entrances (“truck sized”) are needed for Flyover and Window gates. Chute gates, or combination gates of a Bay Window with Chute or Cupola with Chute, are used when entrances are smaller, steeper, or more constricted. –Individual (6)</p>
<p>As for materials, there are many choices, but all come down to security, cost, and biological friendliness. Gates can (and have been) built of stainless steel, but the difficulty of working with the material (which translates to higher construction costs) and the expense of the material itself relegate it to situations solely where no other materials are adequate, such as caustic environments. Even so, the gate (like all gates) has a fixed lifespan, and should be monitored regularly for competency. –Individual (6)</p>
<p>Another choice, rarely used, is Manganal, a high manganese content steel, specified for its hardness. Unfortunately, it is also expensive, and the most common use in cave and mine gates is with round bars. Although Manganal bars are more resistant to cutting, round bars are extremely easy to bend, necessitating closely spaced vertical supports for strength. Bats do not negotiate vertical elements of gates well, and the current industry-standard designs provide maximum strength with the fewest vertical bars as possible, but round-bar Manganal gates are the antithesis of those designs. In small bat colonies, as discussed before, closely-spaced vertical bars may not be a problem. But if the colony is small, why go to the expense of building a gate with Manganal? –Individual (6)</p>
<p>Another, slightly more popular material in bat gate construction is rectangular tube steel, usually 2”x2”, 3”x3”, 3”x4”, or 4”x4”. While this material is easy to work with, it is also more than 75% heavier per foot than an equivalent length of angle iron of the same dimensions and thickness. This weight becomes a factor in materials transportation, particularly when foot or helicopter transport is needed into remote wilderness areas. The worst problem with rectangular bar gates, however, is that more net passage cross-section is blocked by rectangular bars than by angle-iron bars of equivalent dimensions. This translates to reduced flight space available for bats. –Individual (6)</p>
<p>Angle iron, especially 4”x4”x¼” angle, is by far the most popular choice for bat gate construction, due to its workability, cost, and (coupled with two 1½”x1½”x3/16” stiffeners) strength. Vertical column spacing can be maximized without sacrificing strength. And all modern gate designs maximize strength while minimizing construction speed. –Individual (6)</p>
<p>Angle-iron gates and their many variations have been used successfully on many hundreds of mines and caves across the United States, and are the de facto “industry standard” widely adopted by the USFWS, USFS, BLM, NPS, many state land and wildlife management agencies, and NGOs such as The Nature Conservancy and the National Speleological Society. –Individual (6)</p>
<p>All gates are a series of compromises, but to compromise strength and biological viability, or to use more expensive materials and designs when they are not necessary, is not good management. –Individual (6)</p>
Wildlife Surveys
<p>Survey mines proposed for closure for use by listed species and other wildlife. –U.S. Fish and Wildlife Service</p>

Topics Common to All or Multiple Park Units
Based on surveys or, if surveys are lacking, the potential for species occurrence, implement seasonal construction limitations to avoid sensitive seasons such as nesting, breeding, migration, and seasonal occupancy of areas. –U.S. Fish and Wildlife Service
A bat survey protocol needs to be adopted to determine the presence or absence of bat use at mines proposed for closure. Standard survey protocol requires at least three site visits over the span of a seasonal cycle (year) to determine use by bats. Since bats use roost sites differently at different seasons, a single survey is inadequate to determine presence or absence of bats, or their use of the sites. Experienced bat biologists understand these seasonal use variations such as maternity roosts, swarming and breeding sites, night roosts, hibernacula, underground water sources, and bachelor roosts, etc. None of these uses can be disregarded as each is an important component of bat ecology. Some uses create obvious signs, while others leave no evidence at all. Large quantities of guano are found at maternity roosts, while virtually none is found at hibernation roosts. Bat emergence is also influenced by temperature, stormy weather, and moon phases (temperature and light levels). For bat surveys to be adequate, roost sites must be visited during the correct time of year, and under optimal conditions. –Individual (4)
In working with bats, it is important to remember that “lack of evidence is NOT evidence of absence.” If bat surveys do not reveal bats, they are not definitive proof that bats do not use a site. This is why single visits to mines to look for bats is inadequate. –Individual (4)
Lack of survey data makes it difficult if not impossible to predict the impact to bats and other species. The type of closure to be selected depends on the adequacy of survey data. This is nowhere more important than with permanent closures, or gating at maternity roost sites. If decisions are to be made using incomplete data, this needs to be disclosed in the EA, and effects discussed. –Individual (4)
Before closures are specified, a full season of bat surveys needs to be completed. This should include three visits to each mine site. Visits should match critical periods known for bat species found in the local area. At potential hibernation sites, at least one of the three visits needs to be made during the hibernation season. Other agencies have adopted specific protocols for this purpose. –Individual (4)
Construct bat compatible gates or cupolas during non-critical periods for bats (i.e., no closures at maternity sites during maternity period. No work during hibernation period at hibernation sites). Timing also needs to take into account other wildlife that could be affected, such as nesting birds disrupted by helicopter transport of equipment and supplies. –Individual (4)
Bat gates at hibernation roosts are less critical than at maternity roosts. Large colonies of hibernating bats will tolerate wall gates. This tolerance is thought to stem from the slow arrival and departure of bats from the roost site. –Individual (4)
In desert tortoise habitat, shaft closures, particularly cupola gates, should be screened around their lower perimeter to prevent tortoises from passing under the closure and falling into shafts. –Individual (4)
Adit gates should provide an access window for desert tortoises to pass beneath the gate and enter the tunnel for protection. –Individual (4)
Adit gates should generally be placed 8-10 feet in from the portal to provide protection for larger mammals. Javelina in particular will use portals for thermal regulation. –Individual (4)
Comments Specific to Coronado National Memorial
Several of the mine sites under consideration are experiencing acid mine drainage. We urge the complete cleanup of these sites to permanently eliminate the problem. In the long-term, disturb these sites only once and clean them up completely. –AZ Mining Reform Coalition
Wildlife surveys with an emphasis on bats should be conducted to make decisions on closures (also considering barn owls, desert tortoise, etc.), recognizing that only multiple surveys yield the most accurate information about the importance of a site to bats. The survey information should be used to decide on a case-by-case basis how mines would be closed (backfill, barbed wire, bat gate). –AZ Game and Fish Department
When sites are backfilled, appropriate steps should be taken to ensure wildlife do not become trapped underground (i.e., exclusion). The Department has recommendations we can provide for exclusion treatments. In addition, the Department has an experienced crew that can be contracted to conduct mine surveys for wildlife. –AZ Game and Fish Department
Comments Specific to Organ Pipe Cactus National Monument
<i>All substantive comments are captured under Issues and Concerns Common to All or Multiple Park Units.</i>

Comments Specific to Saguaro National Park
We understand that Old Yuma Mine would be part of the cleanup effort. This would probably be one of the larger cleanup efforts considered and because of the presence of arsenic and lead contamination this could be a CERCLA action. If so, we urge that CERCLA methods and resources be used in the cleanup process, but that the CERCLA process not slow down the entire effort. –AZ Mining Reform Coalition
Some of the mine sites being considered are within Wilderness Areas and we urge the use of as much non-motorized methods as feasible. –AZ Mining Reform Coalition
Wildlife surveys with an emphasis on bats should be conducted to make decisions on closures (also considering barn owls, desert tortoise, etc.), recognizing that only multiple surveys yield the most accurate information about the importance of a site to bats. The survey information should be used to decide on a case-by-case basis how mines would be closed (backfill, barbed wire, bat gate). –AZ Game and Fish Department
When sites are backfilled, appropriate steps should be taken to ensure wildlife do not become trapped underground (i.e., exclusion). The Department has recommendations we can provide for exclusion treatments. In addition, the Department has an experienced crew that can be contracted to conduct mine surveys for wildlife. –AZ Game and Fish Department
Comments Specific to Grand Canyon National Park
Several of the sites that are hopefully under consideration are old copper mines that emit a high amount of radiation. These are near heavily used trails and storm events probably wash radioactive tailings into the Colorado River through its tributary, Cottonwood Creek. These should be cleaned up completely as a high priority. –AZ Mining Reform Coalition
If the old uranium mines near the south rim, for example the Orphan Mine, have not already been cleaned up, they should certainly be high on the list. –AZ Mining Reform Coalition
<p>We encourage you to consider that many sites have specific meaning or relevance to Colorado River running history. These could include, for example, historic boring holes for dam sites, mining sites in close proximity to the river, etc. If this should be the case, we respectfully request that you:</p> <ul style="list-style-type: none"> – Consult with Grand Canyon River Guides and other river stakeholders so that we can provide you with our unique perspective on our “traditional cultural properties.” – Expand your analysis to include potential impacts to the preservation and interpretation of river running history in Grand Canyon. –Grand Canyon River Guides
Wildlife surveys with an emphasis on bats should be conducted to make decisions on closures (also considering barn owls, desert tortoise, etc.), recognizing that only multiple surveys yield the most accurate information about the importance of a site to bats. The survey information should be used to decide on a case-by-case basis how mines would be closed (backfill, barbed wire, bat gate). –AZ Game and Fish Department
When sites are backfilled, appropriate steps should be taken to ensure wildlife do not become trapped underground (i.e., exclusion). The Department has recommendations we can provide for exclusion treatments. In addition, the Department has an experienced crew that can be contracted to conduct mine surveys for wildlife. –AZ Game and Fish Department
The Arizona Department of Environmental Quality Water Quality Division conducts ambient water quality monitoring through the state, so we may have data to contribute as more specific locations are defined. Also, as the state agency responsible for protection of both surface water and groundwater, permits may be required, depending on the proposed action to correct health and safety hazards at abandoned mine lands. –AZ Department of Environmental Quality
I strongly support Alternative 2, especially the intent to construct bat-accessible gates wherever feasible. –Individual (1)

Comments Specific to Grand Canyon National Park
<p>Although I understand the safety concern with the abandoned mines, I am most concerned about the impact of the closures on wildlife, wilderness character, and cost.</p> <p><i>Wildlife</i></p> <ul style="list-style-type: none"> – The scoping letter states that surveys are and will be done to determine if bats or other wildlife are using the mine features. The EA should consider the disruption of wildlife from the closure activity itself (e.g., construction activity impacts on bat colonies.) – Is there any documentation that bats will actually use closures, such as metal grates, to access the caves? <p><i>Wilderness Character</i></p> <ul style="list-style-type: none"> – The scoping letter states that a minimum requirement analysis (MRA) will be done to determine the appropriate methods to transport materials and equipment. An MRA should also be done to determine the appropriate materials for closure as well as the equipment being used for the closures. Also, timing of the construction activities, such as the time of day and season, should be examined. – I am concerned that a decision of transport (i.e., helicopters as noted under Soundscapes) has already been predetermined and that the MRA will simply comply with this decision. Moreover, that under the Air Quality concern the suggestion that welding gases and dust may be an issue, assumes that metal materials will be used. Carbon emissions should also be considered. The Wilderness Act specifically prohibits a permanent structure, such as metal grates or sealants. –Individual (2)
<p>I understand that signage and pre-trip orientation for backcountry and river users is already in place to warn visitors of the hazards of approaching abandoned mine sites. I believe that this is adequate protection for the public and that anyone who is foolish enough to proceed into these sites does so at his or her own peril. We cannot protect the public from every hazard, as you well know. –Individual (2)</p>
<p>This strikes me as a very expensive project. Will the EA include an economic analysis? Are there other less intrusive and less expensive alternatives? –Individual (2)</p>
<p>Concerned over existing and potential water contamination. –Individual (3)</p>
<p>Screen off vertical shafts so that small, terrestrial mammals and reptiles don't fall in. Shafts keep on killing animals, even if four-strand barb wire fences or chain-link is erected around the site to keep humans and other large mammals out. Chain-link or barb wire won't achieve benefits for reptiles and the like. Small mesh enclosures at the edge of the shaft are needed, along with maintenance of same, to prevent these "pitfall" traps from killing ad infinitum. –Individual (3)</p>

Issues and Impact Topics Evaluated

The CEQ regulations at 40 CFR 1501.7(a)(2) require the NPS to “Determine the scope and the significant issues to be analyzed in depth in the environmental impact statement,” and (3) “Identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review, narrowing the discussion of these issues in the statement to a brief presentation of why they will not have a significant effect on the human environment or providing a reference to their coverage elsewhere.”

During the scoping process, the planning team identified the following resources and concerns that could be affected by the AML closures. These impact topics are carried through the EA for detailed analysis in Section 3, Affected Environment and Environmental Consequences:

- Cultural Resources (Historic Structures/Districts)
- Bats and Other Wildlife including Federally- Listed Species and Species of Management Concern
- Visitor Use and Experience including Human Health and Safety
- Wilderness (where present)

For each of the resources and concerns listed above, the interdisciplinary team developed issue statements to define problems (or benefits) pertaining to the AML Closure Plan (table 2). Issue statements describe a cause and effect relationship between an activity and a resource.

Table 2. Issue Statements

Impact Topic	Issue Statement
Cultural Resources	<p>Ground disturbing activities during reclamation and construction of closures at AMLs could alter the condition of prehistoric/historic resources.</p> <p>Long-term closures that are irreversible, such as backfills, would adversely affect the historical integrity of the sites that are listed in or eligible for listing in the National Register of Historic Places. Reversible closures, such as polyurethane foam plugs in combination with backfilling, bat-gating, partial backfill, and shaft grating, would be conducted in a manner to protect the historic fabric and integrity of AML features.</p>
Bats and Other Wildlife including Federally-Listed Species and Species of Management Concern	<p>AML closure work, including construction of closures and gaining access to sites with required equipment, could directly harm or kill wildlife; and disrupt wildlife feeding, denning, nesting, and reproduction if precautions are not taken. These activities could also result in avoidance of the area by wildlife due to increased noise and human presence. The closures themselves could have impacts on the biological use of the features, preventing or deterring access to mines that are currently used as habitat. However, reclamation of disturbed areas could re-establish native vegetation communities that support wildlife populations, and the construction of bat-accessible steel gates would protect bat habitat from inappropriate public access.</p>
Visitor Use and Experience, including Human health and safety	<p>AMLs can pose serious health and safety hazards including falling into shafts, loose rock falling from the roofs of adits, and exposure to high radon concentrations, toxic metals, or toxic gases.</p> <p>AML closure work could adversely affect visitor experience by adversely affecting air quality and increasing background sound levels over the short-term that closure work is occurring; however, AML closures would provide for a safer visitor experience by restricting human access into AMLs.</p> <p>Reclamation of sites could provide benefits to visitor use and experience, by removal of the visual intrusion of manmade development in areas that are filled and reclaimed; and gating could provide a different visitor learning experience about bats and bat protection.</p>
Wilderness	<p>Some of the AMLs are located in designated or proposed wilderness. The use of mechanized equipment including helicopters to transport closure materials and equipment could adversely affect wilderness values. Some closure structures (e.g., cupolas) could cause long-term impacts on wilderness viewsheds.</p> <p>Reclamation of some sites could provide benefits to visitor use and experience in wilderness, by removal of the visual intrusion of manmade development, or could add to the intrusion if the closure structure is visible and apparent.</p>

Issues and Impact Topics Eliminated from Further Analysis

Issues that are not relevant to this AML Closure Plan and EA (such as those related to resources that do not occur in the park, or would not be affected by proposed actions) were eliminated from further consideration by the planning team. In addition, for some issues or resource areas, the anticipated impacts were not measureable (meaning impacts would have minor or less effects), or these topics were included within the analysis for another topic (such as noise, which is considered within the wildlife or visitor use and experience topics). These issues were therefore dismissed from further analysis, for the reasons discussed below.

Air Quality

Section 4.7.1 of *NPS Management Policies 2006* (NPS 2006) states that the NPS has a responsibility to protect air quality under both the *NPS Organic Act of 1916* (Organic Act) and the *Clean Air Act*. The management policies also note that the NPS actively promotes and pursues measures to protect air- quality related values from the adverse impacts of air pollution, and seeks to protect integral vistas (those views perceived from within certain national parks of a specific landmark or panorama located outside the park), through cooperative means.

The proposed construction of mine closures would result in some impacts on air quality. Increased emissions of particulate matter would result from combustion of gasoline and diesel-powered helicopters or vehicles used to transport equipment and supplies to AMLs, gases would be released from welding equipment used to fabricate bat- gates and other closures, and particulate matter emissions would occur from earth- moving activities associated with backfilling or site reclamation. These sources could affect air quality, including visibility in the general vicinity of AMLs. However, the impacts would be temporary and localized, and minor or less in intensity, lasting only a few days per site. Therefore, this topic was dismissed for all four parks.

Topography, Geology, and Soils

Section 4.8 of *NPS Management Policies 2006* addresses geologic resource management, including geologic features and processes. This policy states that the NPS “will (1) assess the impacts of natural processes and human activities on geologic resources; (2) maintain and restore the integrity of existing geologic resources; (3) integrate geologic resource management into Service operations and planning; and (4) interpret geologic resources for park visitors” (NPS 2006).

Several of the actions related to mine closures would affect topography, soils, and geology. Off-road vehicle use could increase surface runoff; increase soil erosion, rutting and compaction and affect the permeability of soils (and other soil characteristics). Soils compacted by foot or vehicle use could reduce soil permeability, change surface drainage patterns, and hinder the penetration of plant roots. The release of hydrocarbons or other contaminating and hazardous substances from vehicles and equipment used in the operations could alter the soil’s chemical and physical properties. However, it is not expected that releases would occur in any substantial amounts and lay down areas and construction staging areas would already be disturbed, as are the mines themselves. The proposed construction of the closures would be located in areas of the parks that do not contain significant topographic or geologic features. Given that there are no significant topographic or geological features in the project area, and that the areas to be closed have been previously disturbed, and off –road access would cause only localized and minor impacts, the proposed actions would result in negligible to minor, temporary adverse effects to topography, geology, and soils. Because these effects are minor or less in intensity, this topic was dismissed from further analysis in this document.

Water Resources

NPS policies require protection of water quality consistent with the Clean Water Act. The purpose of the Clean Water Act is to “restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.”

Water resources at the parks could possibly be impacted adversely by various closure actions, off- road vehicle use; removal or modification of vegetation; and surface disturbance associated with the construction of AML closures could increase soil erosion and sedimentation in surface waters, if there are any nearby or downstream of the area. These activities could also alter surface and subsurface drainage patterns in the vicinity of operations which could change the overall amount and timing of stream flows if there are water courses in the vicinity of the mining feature. The release of hydrocarbons, or other contaminating and hazardous substances from vehicles and equipment used for accessing and closing AMLs could also affect water quality. Although reclamation of AMLs could adversely affect water quality and quantity over the short-term, in many cases, long- term benefits could occur if native vegetation communities and associated surface runoff patterns are re- established.

In general, the impacts to water resources that would be expected from any of the closures would be minor or less in degree and short- term. At sites where earthmoving would be more extensive (e.g., backfills) or where drainages lead away from the site to be affected, mitigation would include sediment and erosion control barriers, silt fencing, or other measures as needed. With the exception of the Grand Canyon sites, very few of the sites are located near surface water features, and ground water is not expected to be affected by any closure actions. If any sites are found to have water pollution or hazardous waste issues requiring remediation beyond the scope of the EA, those would be dealt with in separate actions by the NPS Hazardous Waste Division (e.g., Old Yuma mine at Saguaro). For these reasons, water resources was dismissed from further analysis in this document.

Wetlands and Floodplains

Under Section 4.6.4 the NPS is required to protect, preserve, and restore the natural resources and functions of floodplains: avoid long- term and short- term environmental effects associated with the occupancy and modification of floodplains; and avoid the direct and indirect support of floodplain development and actions that could adversely affect the natural resources and functions of floodplains or increase flood risks (NPS 2006).

Under Section 4.6.5 the NPS is required to (1) provide leadership and take action to prevent the destruction, loss or degradation of wetlands; (2) preserve and enhance the natural and beneficial values of wetlands; and (3) avoid direct and indirect support of new construction in wetlands unless there are no practicable measures to minimize harm to wetlands (NPS 2006).

No wetlands were identified at the sites from field surveys and no sites are located within floodplains. As a result, closure of mines and mine features would not result in the development of or adverse effects on wetlands or floodplains, and this impact topic was eliminated from further analysis.

Vegetation

Most of the mine sites are sparsely vegetated and no sensitive plant species were identified during field surveys of the mine closure locations. Also, impacts to vegetation during construction would be confined to the immediate vicinity of the work site and would be of short duration. No roads or trails would be constructed, and helicopter staging areas selected by the parks would be in previously disturbed areas. Areas disturbed during closure and construction would be rehabilitated. As a possible benefit, reclamation of AMLs could re- establish native

vegetation communities and surface and subsurface drainage patterns. Disturbances in the project area are expected to result in negligible to minor impacts to vegetation. Because any adverse effects would be minor or less in degree and very localized, this topic was dismissed from further analysis.

Soundscapes

Section 4.9 of the NPS *Management Policies 2006* states that the NPS will preserve, to the greatest extent possible, the natural soundscapes of the park, both biological and physical. Natural sounds are intrinsic elements of the environment that are vital to the functioning of ecosystems and can be used to determine the diversity and interactions of species within communities. Natural soundscapes are often associated with parks and are considered important components of the visitor experience as well as the natural wildlife interactions.

Existing natural soundscapes in the parks are relatively unaffected by human development, with the exception of routine park operations such as mowing along roads, prescribed fire, and other facility management activities throughout the parks that are concentrated at or near park facilities and visitor use developments. Helicopter transport of materials and supplies used in AML closures, and fabrication of closures could introduce noise that could affect the quality of the natural soundscape in the general vicinity of AMLs. Because these effects would be temporary, and the impacts of noise are taken into consideration in the visitor use, wildlife, and wilderness topics, soundscapes was not retained as a stand- alone impact topic.

Park Management and Operations

Under the proposed plan, park operations would be affected by demands on staff resources during the implementation of the closures as well as the future monitoring of post- construction conditions. Construction of closures would occur over a limited period of time and would be handled under contract. Monitoring would be scheduled as part of the periodic monitoring workload for park staff or be contracted. Because impacts to park management and operations would be mostly short- term and minor, this impact topic was dismissed.

Visual Quality/Aesthetics

The existing viewshed in the parks is relatively natural. The presence of AMLs introduces human- made developments that may be incompatible with the natural scene and the closures proposed in this plan may also have visual impacts. These effects are taken into consideration under the visitor use, cultural resources, and wilderness topics, so visual quality was not retained as a separate impact topic.

Socially or Economically Disadvantaged Populations (Environmental Justice)

Executive Order 12898, “General Actions to Address Environmental Justice in Minority Populations and Low- Income Populations,” requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minority and low- income populations and communities. The alternatives contemplated in this AML Closure Plan and EA would not have disproportionate health or environmental effects on minority or low- income populations or communities as defined in the CEQ Environmental

Justice Guidance (CEQ 1997). Therefore, environmental justice was dismissed as an impact topic.

Local/Regional Socioeconomics

The implementation of ARRA- funded projects, which is a primary component of this EA, would result in a short- term benefit related mostly to employment and demand for local goods and services during the one to three years that the mines are being closed. Work crews would be contractors and may come from outside the immediate area. It is expected that fabrication of the hard rock closures would result in, at most, a short- term, negligible to minor benefit to the overall local or regional economy, so this topic was not carried forward for detailed analysis.

Prime and Unique Agricultural Lands

As a result of a substantial decrease in the amount of open farmland, Congress enacted the *Farmland Protection Policy Act* (Public Law 97- 98). In August 1980, the CEQ directed that federal agencies must assess the effects of their actions on prime or unique farmland soils classified by the U.S. Department of Agriculture Natural Resources Conservation Service. Prime or unique farmland is defined as a soil that particularly produces general crops such as common foods, forage, fiber, and oil seed; unique farmland is defined as soil that produces specialty crops such as fruits, vegetables and nuts. Prime and unique farmland soils are those that are actively being developed and could be converted from existing agricultural uses to nonagricultural purposes, as described above. Urban or built- up land, public land, and water areas cannot be considered prime farmland. Soils in the four parks cannot be considered prime and unique farmland soils because they are public lands unavailable for food or fiber production. Because there are no prime and unique farmland soils in the park, this impact topic was dismissed from further analysis.

Energy Requirements and Conservation Potential

This AML Closure Plan and EA is not concerned with construction and maintenance of dwellings or structures for public use; therefore, this topic was not evaluated.

Archeological Resources

Section 5.3.5.1 of the NPS *Management Policies 2006* states that archeological resources will be managed in situ, unless the removal of artifacts or physical disturbance is justified by research, consultation, preservation, protection, or interpretive requirements. Mitigation measures, such as monitoring by archeologists during ground disturbance, would be implemented during closure activities. Because mine closures would not remove or disturb significant archeological resources within the project area, this topic was dismissed from further analysis.

Cultural Landscapes

Section 5.3.5.2 of the NPS *Management Policies 2006* defines cultural landscapes as settings that humans have created in the natural world. There are no designated cultural landscapes within the proposed mine and mine feature closure areas, and impacts to the historical structures and features of the mines that contribute to the overall cultural context of the sites are addressed in the historic structures and districts topic. Therefore, cultural landscapes was dismissed as an impact topic.

Ethnographic Resources

Under Section 5.3.5.3 of the NPS *Management Policies 2006*, ethnographic resources are defined as the cultural and natural features of a park that are of traditional significance to traditionally associated peoples. These peoples are the contemporary park neighbors and ethnic or occupational communities that have been associated with a park for two or more generations, and whose interests in the park's resources began before the park's establishment. Based on consultation with tribal entities with potential interest in the NPS- managed lands, there are no ethnographic resources present within the proposed closure construction areas; therefore, ethnographic resources was dismissed as an impact topic.

Indian Trust Resources

Secretarial Order 3175 requires that any anticipated impacts to Indian trust resources from a proposed project or action by the Department of the Interior agencies be explicitly addressed in environmental documents. The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights, and it represents a duty to carry out the mandates of federal law with respect to American Indian and Alaska Native tribes.

There are no Indian trust resources at the four parks. The lands comprising the parks are not held in trust by the Secretary of the Interior for the benefit of Indians due to their status as Indians. Because there are no Indian trust resources, this topic was dismissed from further analysis in this AML Closure Plan and EA.

Museum Collections

According to Director's Order 24, *Museum Collections*, the NPS requires the consideration of impacts on museum collections (historic artifacts, natural specimens, and archival and manuscript material), and provides further policy guidance, standards, and requirements for preserving, protecting, documenting, and providing access to, and use of, NPS museum collections. In the event that artifacts or specimens are collected through the AML closure work contemplated in this AML Closure Plan and EA, the NPS would properly catalog and transport to a NPS repository that meets NPS standards. Therefore, this topic was dismissed from further analysis.

Climate Change

Ongoing scientific research has identified the potential impacts of climate changing pollutants on global climate. These pollutants are commonly called "greenhouse gases" and include carbon dioxide (CO₂), methane; nitrous oxide; water vapor; and several trace gas emissions. Through complex interactions on a regional and global scale, these emissions cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the Earth back into space. Although climate changing pollutant levels have varied for millennia (along with corresponding variations in climatic conditions), recent industrialization and burning of fossil carbon sources have caused CO₂ concentrations to increase dramatically, and are likely to contribute to overall climatic changes, typically referred to as global warming. The Intergovernmental Panel on Climate Change (IPCC) recently completed a comprehensive report assessing the current state of knowledge on climate change, its potential impacts, and

options for adaptation and mitigation (<http://www.ipcc.ch/>). The IPCC has suggested that the average global surface temperature could rise 1 to 4.5 degrees Fahrenheit (°F) in the next 50 years, with significant regional variation. The National Academy of Sciences (2006) has confirmed these findings, but also indicated that there are uncertainties regarding how climate change may affect different regions.

NPS recognizes the importance of climate change and the potential effects it may have on the natural environment. Cumulatively, park operations and recreational activities that involve the use of combustion engines would also generate CO₂ and methane. Other activities may help sequester carbon, such as managing vegetation to favor perennial grasses and increase vegetative cover, which may help build organic carbon in soils and function as “carbon sinks.” Activities associated with mine opening closures would involve the use of vehicles and helicopters with internal combustion engines, and the use of gasoline- or diesel- powered engines generators and earth- moving equipment at backfills, and emissions from welding to fabricate bat gates. However, these activities would occur only over short periods of time (hours to days) over a period of several months at each park. Because of the low level of greenhouse gas emissions anticipated from these short- term uses, there would be an incremental but negligible effect on climate change at the regional or global levels. Therefore, climate change was not included as an impact topic.

Generating and Evaluating Alternatives

The scoping process, issue statements, and planning direction were used in developing and evaluating alternatives.

Two alternatives are presented in this AML Closure Plan and EA. Alternative A, No Action, describes the current management of the AML features, which would continue if no action were taken to close hazardous features. Alternative B, Proposed Action, describes the action proposed for each abandoned mine feature in the park, which could include various types of closures or taking no further action if a feature represents minimal risk. Alternative B is the environmentally preferred alternative and the agency’s preferred alternative. The alternatives are described in Section 2, Alternatives.

Section 3 includes a description of the affected environment for the impact topics carried forward for analysis, and also includes the analysis of environmental consequences anticipated from the alternatives described in Section 2.

SECTION 2. ALTERNATIVES

NEPA requires that federal agencies develop a range of reasonable alternatives and provide an analysis of what impacts the alternatives could have on the human environment (the natural and physical environment and the relationship of people with that environment). The alternatives under consideration must include a “no- action” alternative as prescribed by 40 CFR 1502.14.

This section describes the actions that would occur under the two alternatives analyzed in this EA: Alternative A, No Action (continue current management), and Alternative B (implement closure decision for each mining feature identified in the parks). Under both alternatives, NPS staff would continue to perform regular patrols of the area to prevent vandalism and monitor human activity. In addition, resource management staff would continue to complete visual surveys for bats on a recurring basis when bats are present. If the lesser long- nosed bat (the only federally listed species) is observed using the features surveyed, the USFWS would be consulted immediately.

Alternative A: No Action

Under the no- action alternative, the mine features listed in the tables of this section would maintain current management status and remain in their present condition, subject to natural forces. Some mine openings would probably collapse over time, eliminating an existing hazard. This could also result in the loss of suitable bat habitat. However, this could take many years and some openings not susceptible to natural closure would continue to present health and safety hazards.

- The remaining open mine features would remain open, allowing park staff, visitors, and undocumented aliens (southern Arizona parks) to enter mine openings, with potential for injury or mortality.
- Prospect pits with sheer walls and shafts would continue to be wildlife traps.
- Warning signs would continue to be posted at some mine openings, and new and replacement signs would be posted as needed.
- Current minimal maintenance, involving routine monitoring and inspection of each mine feature to assess the condition of hazards and the status of closures that are currently in place would continue; however, no correction of hazards would be taken.
- Bat species known to use the mine features would continue to be disturbed by park visitors entering the mine openings during periods when the bats are in the mines.
- Periodic bat and wildlife surveys would be conducted as funding allows.

Alternative B: Proposed Action (NPS Preferred Alternative)

The proposed action is to eliminate human access to abandoned mine openings with moderate to high health and safety risks and/or high level of bat and other wildlife use, while minimizing impacts on bats and other wildlife and significant cultural resources. This would be done by

using a variety of closure methods depending on site- specific conditions. 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 continue to monitor that site. For most openings of substantial depth however, the proposed action for each consists of some type of gate, fencing, backfill, or other closure method. Taken altogether, the proposed actions for each feature at the Arizona parks would constitute a comprehensive plan to address all AMLs in the Arizona parks, including ARRA funded mine closures and all other mines identified in the parks for which information is adequate to make a decision.

Details of the Proposed Action

This EA evaluates the potential impacts of mitigating human health and safety hazards at specific mine features in the four units of the national park system using the following process to determine the appropriate closure design:

Step 1. Perform mine assessments to rank (1) human health and safety hazards; (2) ease of access; (3) natural and cultural resource importance; and (4) resource impacts;

Step 2. Perform biological surveys to determine whether mine features are being used by bats and other wildlife, or could be suitable habitat;

Step 3. Perform cultural surveys to determine whether the mine opening and associated features are eligible for listing in the National Register of Historic Places;

Step 4. Determine appropriate closure type, design, location and timing for installation of closures to mitigate human health and safety hazards while avoiding or minimizing adverse impacts on bats and other wildlife, cultural resources, and other park resources and values.

Tables 3 through 6 list all mine features included in this analysis. For the mine features for which closures are proposed, the NPS has adequate data upon which to base the closure design. For other mine features not already closed, the NPS may in the future determine that closure is needed and would develop the appropriate closure design following the above process. The potential impacts for future closure of abandoned mine features would be similar to those described in this EA. The NPS would prepare a separate compliance review to document the closure decision at that time.

For each feature in tables 3 through 6, a closure action selected by the park is summarized, along with supporting information about the features that was used in the selection of the closure. Much of the supporting information regarding cultural and biological conditions was obtained during field reviews conducted from September to November 2009; however, some information was obtained from data supplied by the parks based on past surveys. The biological (bat/wildlife) information was obtained from both on- site surveys of those sites seen during field surveys (WestLand Resources, Inc. 2009 and JBR Environmental 2009; data on file at the parks), and from wildlife and bat surveys conducted by the parks and their contractors over the past years (see the “Affected Environment” section for sources). The cultural resource NRHP eligibility determination was based on either past Determinations of Eligibility completed by the NPS or Determinations of Eligibility completed in support of this EA based on field reviews and historic research (see the “Affected Environment” section for sources). The ranking listed on

the tables is a combination of ratings for hazard, access, resource, and impact was derived as follows:

Hazard rating: ____

- 0 No inherent hazards; no injury potential above normal condition
- 1 Minimal injuries could occur like tripping, bumping head, cutting oneself –Highwalls < 10 feet in area where such drop- offs are common naturally – Minimal injury possible
- 2 Highwalls > 10- foot drop- off apparent from above – Rubble around but rock is generally stable – Moderate injury could occur
- 3 Radiation potential – Large stopes overhead – seemingly stable – Highwalls > 10- foot drop- off not apparent from above – Serious injury could occur
- 4 Large unstable structures – Deep pools of water from which it would be difficult to climb out – Potential fatal injury could occur – Major collapse zones
- 5 Any coal mine – Vertical shafts, winzes, or underhand collapsed stopes > 6 feet – Irrespirable air – Instantaneous fatal injury could occur due to mine- related hazard
- 6 Mine with a ranking of 5, plus underground mine feature known to have over 500 feet of workings, or for multiple- level underground workings

For southern Arizona parks, in addition to the above, a point was added if there was a hazard related to the likely presence of undocumented aliens.

Access rating: ____

- 0 Hard hike > 5 miles; site not easily seen
- 1 > 1 mile from road/path; Moderate hike > 5 miles or hard hike < 5 miles
- 2 Near a road/path (within 1 mile); Easy hike > 5 miles or moderate hike < 5 miles
- 3 Dirt road or path without specific destination; no car access; easy hiking access < 1 mile
- 4 Good dirt road, but mine is not specific destination
- 5 Good road with mine as the specific destination; car accessible

Resource Rating: ____

- 0 No species of concern present and site has minimal cultural value
- 2 Species of concern present or site has significant cultural values
- 4 Endangered species present or site is listed on national or local historic register

Impact rating: ____

- 0 Minimal contaminants or pH alteration in water/soils; minimal visual impact
- 2 Moderately elevated contaminants or pH alteration in water/soils; moderate visual impact
- 4 Highly elevated contaminants or greatly altered pH in water/soils; high visual impact

Rank Score (sum of rankings) _____

Note that the total ranking reflects the level of priority of action, not just level of risk. Those sites with the higher total rank scores are generally given the higher priorities for action.

Maps showing the location of the listed features by park are provided as figures 2 through 6 (Saguaro is shown in two figures covering the two separate districts of that park). These maps also show the major access roads and trails and the proposed helicopter staging areas/helipads.

Note that specific mine locations and specific information about sensitive bat and wildlife species, and cultural resources, is not included in the summary of the proposed action table or on the maps to avoid disclosing sensitive resource data that could result in risk of harm, theft, or destruction of resources (Sections 4.1.2 and 5.2.3 of *NPS Management Policies 2006*, and consistent with other applicable laws, i.e., ARPA (16 USC 470hh); the NPOMA (16 USC 5937); and NHPA (16 USC 470w- 3)).

Figure 2. Coronado National Memorial Abandoned Mine Lands

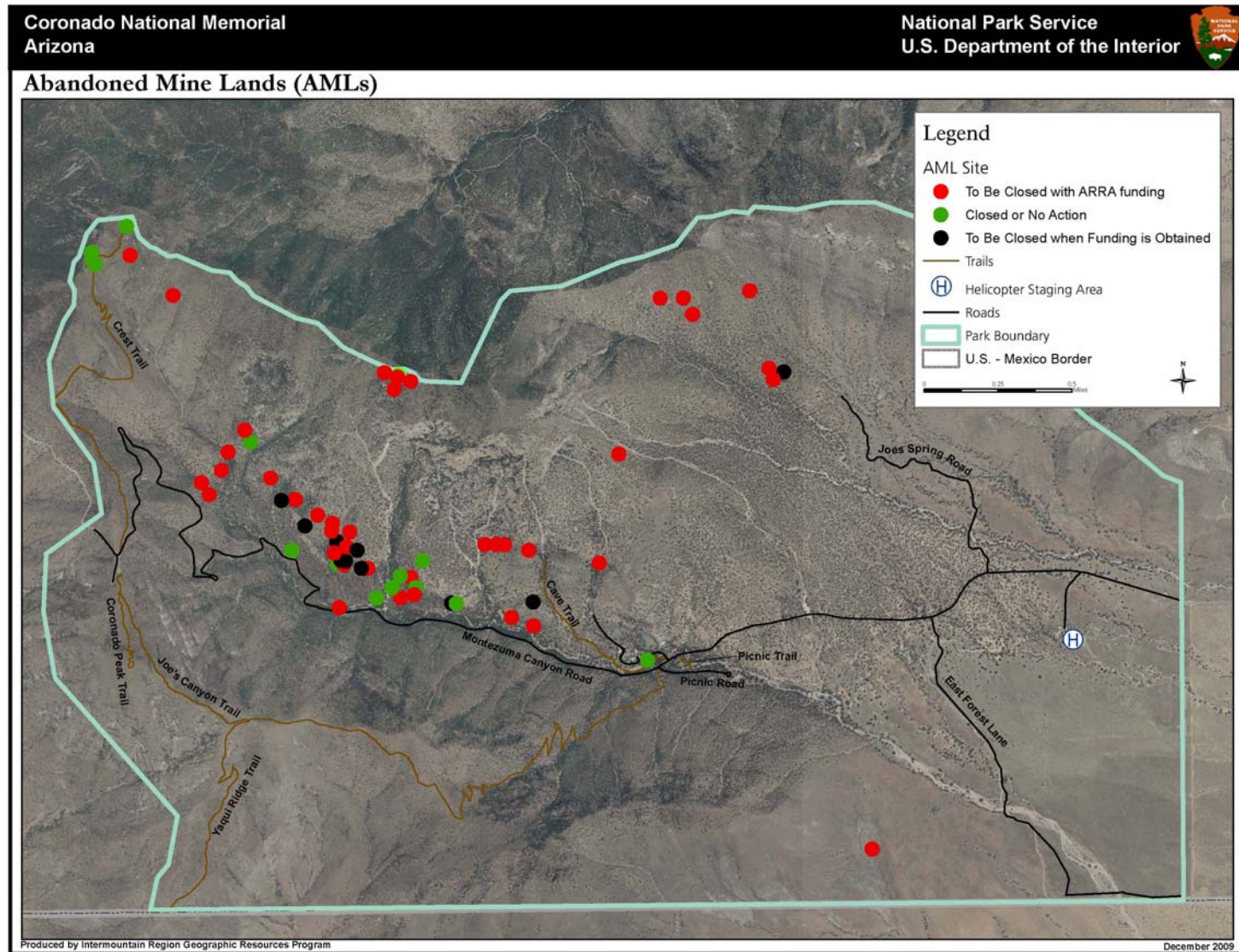


Figure 3. Organ Pipe Cactus National Monument Abandoned Mine Lands

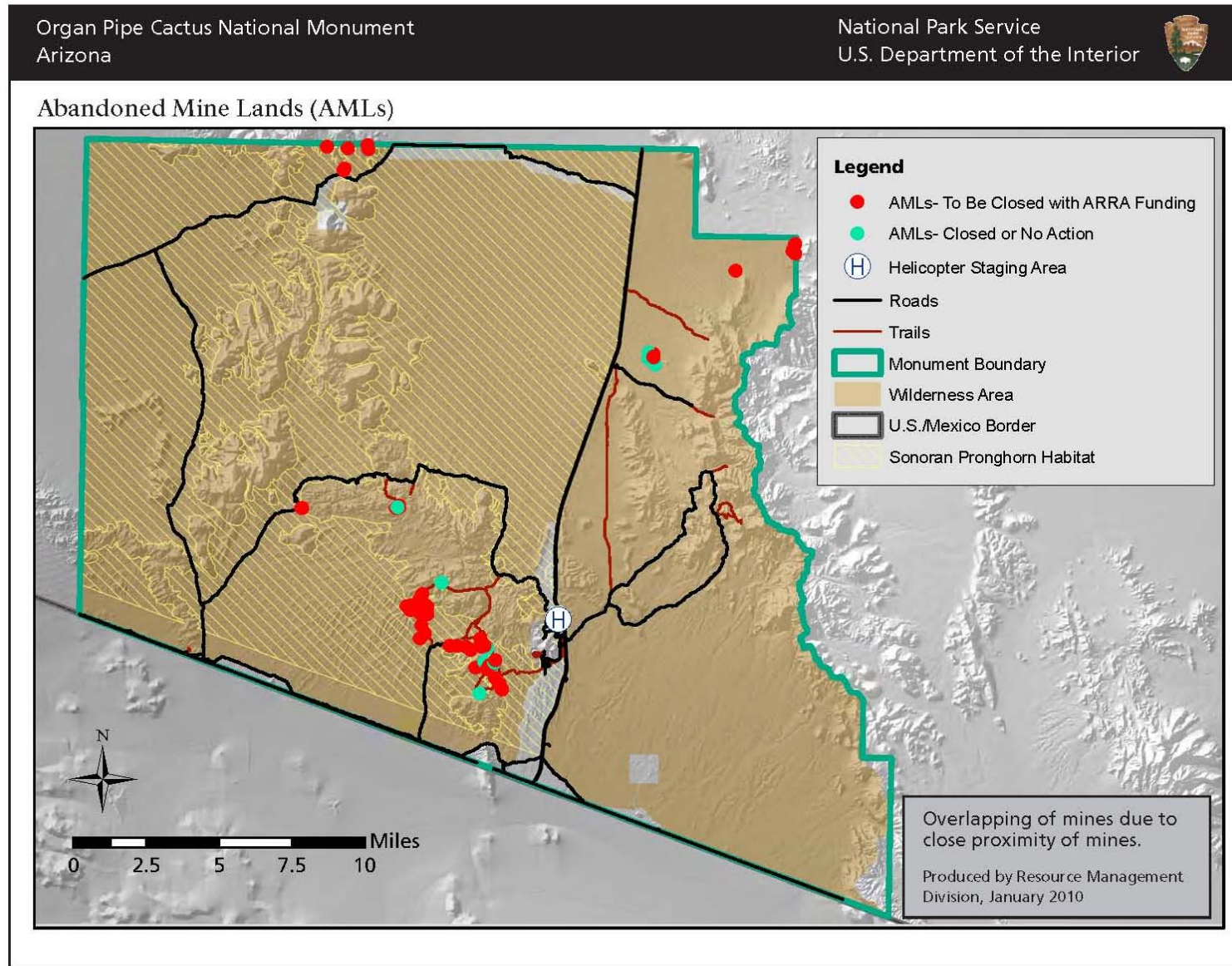


Figure 4. Saguaro National Park – Rincon Mountain District Abandoned Mine Lands

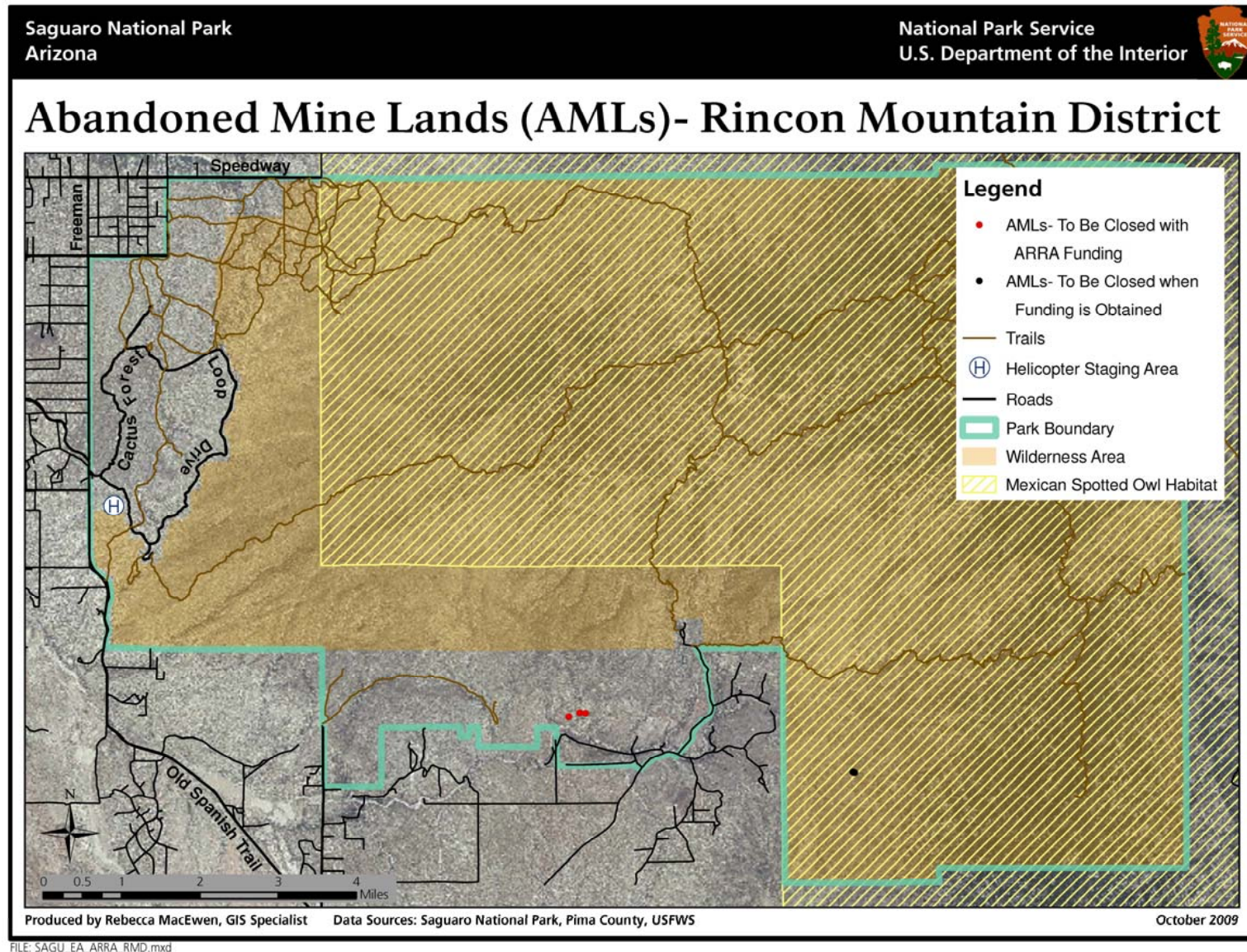


Figure 5. Saguaro National Park – Tucson Mountain District Abandoned Mine Lands

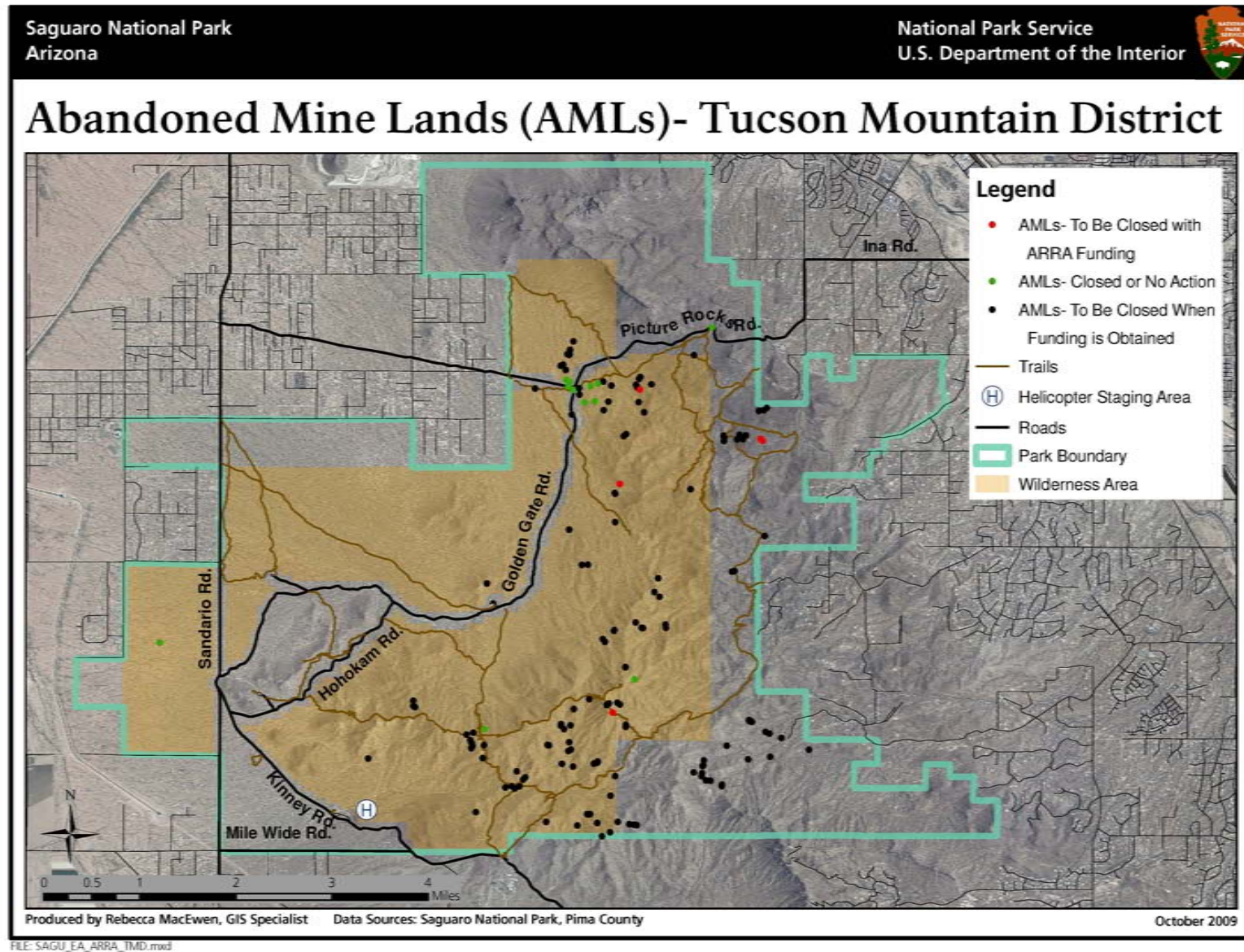


Figure 6. Grand Canyon National Park Abandoned Mine Lands

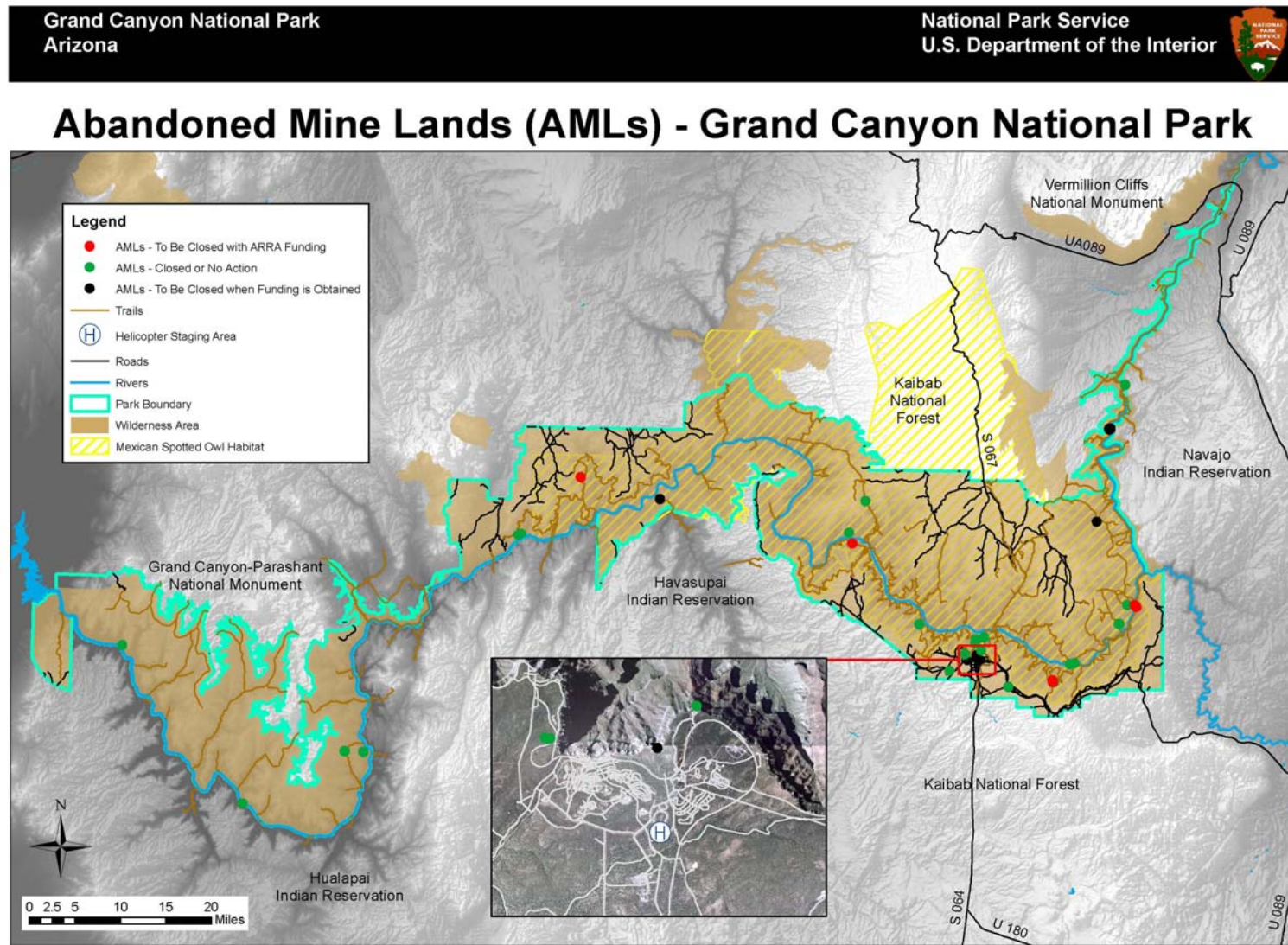


Table 3. Coronado National Memorial List of Abandoned Mine Land Structures

Features to be closed with ARRA funding are shaded

Coronado National Memorial List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
1.	State of Texas 93-001	Adit – bat-gated	6' x 4' x unknown	1	5	2	0	Bats No evidence of other wildlife use.	Not eligible *	N	No action – bat gate already constructed			
				8										
2.	State of Texas 93-002	Powder cache – warning sign	2.5' x 4.5' x 10'	6	2	2	0	Evidence of bat use. No evidence of other wildlife use.	Not eligible	N	Bat gate – 2" square tube	At portal	Helicopter	1. Bat gate mitigation - A – gates would be constructed to avoid the bat breeding and hibernating seasons for species present. Breeding – generally avoid May 15 - August 21. If bats are hibernating – avoid November 15 - March 15. Do post construction monitoring. 2. Mexican spotted owl (MSO) mitigation – avoid breeding season (avoid March through August) with heavy equipment use.
				10										

Coronado National Memorial List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
3.	State of Texas 93-003 NOTE – features 003, 004, 005, 006 are all interconnected and are treated together	Powder cache; no net, experimental cupola/gate structure	4.5' x 7' x 7.5'	5	2	2	0	Bats	Not eligible	N	Hybrid cupola/gate structure – 3" square tube	Outside portal	Helicopter	Bat gate mitigation - B – cupola/gate would be constructed to avoid post-maternity use for the species present: avoid July – October. Do post const. monitoring. MSO mitigation
				9										
4.	State of Texas 93-004	Stope; no net, experimental cupola/gate structure	6' x 5' x unknown	2	2	2	0							
				6										
5.	State of Texas 93-005	Stope; no net, experimental cupola/gate structure	4.7' x 11' x unknown	3	2	2	0							
				7										
6.	State of Texas 93-006	Prospect – cupola	4' x 6' x 5'	1	2	2	0	Bats	Not eligible	N	No action – cupola already constructed			
				5										
7.	State of Texas 93-007	Adit – netted; warning sign	6' x 6' x 87', with 22' long trench; adit connects to SOT #4-5, but passage is mostly collapsed	6	2	2	0	History of bat use – no bats seen during recent surveys.	Not eligible	N	Bat gate – 3" square tube		Helicopter	Same as above
				10										

Coronado National Memorial List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
8.	State of Texas 93-008	Shaft – netted; warning sign	7' x 10' x 20'	5	2	0	0	No evidence of bat or wildlife use.	Not eligible	N	PUF/backfill	In shaft	Helicopter or Foot	Backfill mitigation – check for wildlife presence before backfilling and use exclusion techniques to ensure wildlife do not become trapped when backfilling. MSO mitigation
				7										
				Wildlife trap; falling										
9.	State of Texas 93-009	Prospect Adit – warning sign	4' x 7' x 13'	5	2	0	0	No evidence of bat use observed, mine has history of bat use. No evidence of wildlife use.	Not eligible	N	PUF/backfill	In adit	Helicopter	Backfill mitigation MSO mitigation
				7										
10.	State of Texas 93-010	Shaft – warning sign	10' x 10' x 30' (originally 350' deep shaft – now filled to the surface but starting to subside)	6	2	0	0	No evidence of bat or wildlife use.	Not eligible	N	PUF/backfill	In shaft – Excavate and stabilize shaft before PUF and backfilling.	Helicopter	Backfill mitigation MSO mitigation
				8										

Coronado National Memorial List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
11.	State of Texas 93-011	Adit – netted; warning sign	8' x 7.5' x more than 50'	6	2	2	0	Bats History of barking frogs, many animals attracted to flooded adit.	Not eligible	N	Bat gate – 3" tube steel Install 3" HDPE pipe extending from inside to outside adit to provide wildlife continued access to water to a drinker in front of gate.	In portal	Helicopter	Bat gate mitigation MSO mitigation
12.	State of Texas 93-012	Prospect adit – warning sign	7' x 5' x 23'	6	1	2	0	Bats Ringtail	Not eligible	N	Bat gate – 3" square tube	5' from dripline	Helicopter	Bat gate mitigation - A MSO mitigation
				9										
13.	State of Texas 93-013	Shaft – netted; warning sign	8' x 8' x 21'	6	1	2	0	No evidence of bat or wildlife use.	Not eligible	N	Cupola	Over shaft 2' outside collar	Helicopter	Backfill mitigation MSO mitigation
				9										
14.	State of Texas 93-014	Inclined shaft – netted; warning sign	5' x 5' x 16' 93-014 and 93-015 are connected at the base of 93-015	2	2	0	0	No evidence of bat or wildlife use.	Not eligible	N	PUF/backfill using fill material on site	In shaft	Helicopter	Backfill mitigation MSO mitigation
				4										

Abandoned Mine Lands Closure Plan and EA

Coronado National Memorial List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h × w × d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
15.	State of Texas 93-015	Shaft – warning sign	15' × 8' × 10' May connect to 016	5	2	0	0	No evidence of bat or wildlife use.	Not eligible	N	PUF/backfill using fill material on site	In shaft	Helicopter	Backfill mitigation MSO mitigation
7														
16.	State of Texas 93-016	Shaft – net needs another anchor bolt; warning sign	7.5' × 7.5' × 50' No drifts – may connect to 015	6	2	2	0	No evidence of bat use. Ringtail	Not eligible	N	Cupola – special design Antlion collar	Over shaft 1.5' outside collar Excavate to get to more stable rock	Helicopter	Bat gate mitigation (if needed) MSO mitigation
10														
17.	State of Texas 93-017	Shaft – netted; warning sign	10' × 15' × 15'	5	2	0	0	No evidence of bat or wildlife use.	Not eligible	N	PUF/backfill using fill material on site	In shaft	Helicopter	Backfill mitigation MSO mitigation
7														
18.	State of Texas 93-035	Trench into adit – warning sign	1' × 4' × 60'	2	2	0	0	History of bat use. Rattlesnake	Not eligible	N	PUF/backfill	Inside trench	Helicopter	Backfill mitigation MSO mitigation
4														

Coronado National Memorial List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
19.	State of Texas 93-038	Adit – warning sign	2.5' x 3' x 50'	6	2	2	0	History of bat use. Mice	Not eligible	N	Bat gate – 2" square tube Install 3" HDPE pipe extending from inside to outside adit to provide wildlife continued access to water to a drinker in front of gate.	No more than 5' from dripline.	Helicopter	Bat gate mitigation - A MSO mitigation
20.	State of Texas 93-039	Shaft – warning sign	6' x 12 x 9'	5	2	0	0	No evidence of bat or wildlife use.	Not eligible	N	PUF/backfill	Inside shaft	Helicopter	Backfill mitigation MSO mitigation
21.	State of Texas 93-040	Adit – warning sign	2.5' x 8' x 14'	6	1	0	0	No evidence of bat use. Ringtail	Not eligible	N	Backfill		Helicopter	Backfill mitigation MSO mitigation
22.	State of Texas 93-041	Shaft – warning sign	12' x 8' x 10'	5	1	0	0	No evidence of bat or wildlife use.	Not eligible	N	PUF/backfill	In shaft	Helicopter	Backfill mitigation MSO mitigation

Coronado National Memorial List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
23.	State of Texas 93-055	Adit – warning sign	3' x 5' x 32'	6	2	2	0	Bats Javelina Rattlesnake	Not eligible	N	Bat gate – 2" square tube	5' from dripline	Helicopter	Bat gate mitigation - A MSO mitigation
24.	State of Texas 03-056	Adit – warning sign		6	2	2	0	Bats Rattlesnake	Not eligible	N	No action			
				10										
25.	Bob Thompson 93-018	Shaft – warning sign	9' x 9' x 120'	6	2	2	0	No evidence of bat or wildlife use.	Not eligible	N	Cupola	Over shaft 2' outside collar	Helicopter	Bat gate mitigation (if needed) MSO mitigation
				10										
				120' deep shaft is hazardous but is currently fenced with danger signs posted. The shaft has a net over the opening. The ceiling is unstable.										

Coronado National Memorial List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
26.	Bob Thompson 93-019	Stope – netted; warning sign	8' x 4' x 30'	6	2	2	0	Bats	Not eligible	N	Cupola	Cupola – over shaft 2' outside collar	Helicopter	Bat gate mitigation - A and/or B MSO mitigation
				10				No evidence of other wildlife use.						
				Rock is unstable and weak. The cable netting is in place somewhat mitigating the hazard at the structure.										
27.	Bob Thompson 93-019	Adit	3' x 2' x 25'	6	2	2	0	See above	Not eligible	N	PUF/backfill – stabilize on both ends	Inside archway	Same as above	Backfill mitigation MSO mitigation
				10				The adit is partially collapsed between the shaft 93-018 and the stope 93-019 creating a subsidence trench on the ground surface.						
28.	Bob Thompson 93-020	Prospect adit – warning sign	4' x 4' x 12'	5	2	2	0	Possible history of bat use.	Not eligible	N	PUF/backfill	In adit	Helicopter	Backfill mitigation MSO mitigation
				9				Unidentified rodents						
				30' from a well and UDA trail										

Coronado National Memorial List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
29.	Bob Thompson 93-050	Adit – warning sign	Y-shaped adit. Left arm: 5' x 5.5' x 18' Right arm: 3' x 3' x 15'	6	2	2	0	Bats No evidence of other wildlife use.	Not eligible	N	Bat gate – 2" square tube	3' from dripline	Helicopter	Bat gate mitigation - A MSO mitigation
				10										
				Minimal hazard as adit is in stable rock. Danger of UDAs using adit for shelter and concealment.										
30.	Bob Thompson 93-051	Adit – warning sign	6' x 6' x 115'	6	2	2	0	Bats Javelina Coati Unspecified rodents	Not eligible	N	Bat gate – 3" square tube	3' from dripline	Helicopter	Bat gate mitigation - A MSO mitigation
				10										
				Can be used by UDAs for shelter or concealment.										
31.	Bob Thompson 93-057	Adit – warning sign	0.5' x 1.5' x 20+'	6	2	2	0	Bats Spiny lizard	Not eligible	N	No action			
				10										
				Adit is collapsing at portal and is unstable.										

Coronado National Memorial List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
32.	Bob Thompson 93-057	Open stope	16' x 10' x 25'	6	2	0	0	–	Not eligible	N	PUF/backfill		Helicopter	Backfill mitigation - A MSO mitigation
8														
The stope is dug into weathering granular quartzite which is sloughing down the edge. Underground passage is filling in and collapsing.														
33.	Bob Thompson 93-058	Adit – warning sign	6' x 5' x 70'	6	2	2	0	Bats Unidentified small mammal	Not eligible	N	Bat gate – 3" square tube; top 2 bars spaced 6", remaining bars spaced 5-3/4"	3' from dripline – just before major fracture	Helicopter	Bat gate mitigation MSO mitigation
10														
This adit could be used by UDAs for shelter and concealment.														
34.	Crest Trail 93-021	Adit – GATED	5' x 6' x 53'	2	1	0	0	No evidence of bats. Packrat and "mouse" habitat"	Not eligible	N	No action – already gated			
3														

Coronado National Memorial List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
35.	Crest Trail 93-022	Prospect adit – warning sign	8' x 10' x 18'	1	1	2	0	Bats Spiny lizard Packrat	Not eligible	N	No action – closing Jan. 2010- covered under EA completed in 2007			
				4										
				Adit has holes blasted in floor. UDAs could use it for shelter or concealment.										
36.	Crest Trail 93-023	Adit – GATED	4' x 5' x 120'	5	1	2	0	One bat observed. Spiny lizards Rodents Coyote Javelina	Not eligible	N	No action – already gated			
				8										
				Several very shallow pools inside adit.										
37.	Crest Trail 93-024	Adit – GATED	5' x 5' x 220'	5	1	2	0	Bats Spiny lizards Rodents Mountain lion	Not eligible	N	No action – already gated			
				8										
				Adit may flood due to season.										
38.	Crest Trail 93-048	Adit – warning sign	7' x 6' x 25'	6	1	2	0	No evidence of bats. Packrats	Not eligible	N	Bat gate – 3" square tube Collapse the thin arch of rock between the 2 portals.	5' from dripline of second portal Need to collapse the thin arch of rock between the 2 portals	Helicopter	Bat gate mitigation (if needed) MSO mitigation
				9										
				Slouching and soil creep in trench walls. UDAs could use adit for shelter or concealment.										

Coronado National Memorial List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h × w × d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
39.	Crest Trail 93-059	Trench into adit – warning sign	8' × 5' × 10'	6	1	0	0	No evidence of bats. Packrats	Not eligible	N	PUF/backfill	In adit	Helicopter	Backfill mitigation MSO mitigation
7														
UDAs														
40.	Headquarters 93-025	Inclined shaft – net breached; warning sign	6' × 8' × 25'	6	2	0	3	No evidence of bats. Deer Canyon wren	Not eligible	N	Grate (not bat or wildlife accessible)	At surface over shaft	Helicopter or Foot access – 0.2 miles	MSO mitigation
11														
Water at the bottom of the shaft could contain arsenic. The shaft has a strong sulfur smell. NPS addressing water quality issue at Headquarters 025/026 sites in separate action.														

Coronado National Memorial List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h × w × d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
41.	Headquarters 93-026	Prospect – warning sign	7.3' × 5.9' × 25'	6	2	0	3	One bat Rodent Medium sized mammal, possibly passerine	Not eligible	N	Grate (not bat or wildlife accessible)	At surface over opening	Helicopter	MSO mitigation
11														
Water at bottom of adit may contain arsenic (toxic) and other elements; people and animals should be kept away. Opening extends under old mine road; road is eroding and opening is beginning to collapse.														
42.	Headquarters 93-054	Adit – warning sign	Naturally closed	2	2	0	0	No evidence of bat or wildlife use.	Not eligible	N	No action Adit has naturally closed due to burial by drainage.			
4														

Coronado National Memorial List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h × w × d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
43.	Paring / Doredor 93-027	Prospect adit – warning sign	4' × 6' × 21'	6	1	2	0	One bat	Eligible **	N	PUF/backfill	In adit	Helicopter or Foot	Backfill mitigation MSO mitigation Cultural backfill mitigation – backfill with minimum disturbance to portal, features, and artifacts. Full recordation of features before PUF/backfill.
				9										
				Highly unstable opening – entrance is half collapsed.										
44.	Paring / Doredor 93-028	Shaft – warning sign	5' × 6' × 50'	5	1	4	0	No evidence of bat or wildlife use.	Eligible	N	Cupola	Over shaft 2' outside collar	Helicopter	Bat gate mitigation (if needed) MSO mitigation Cultural gate/cupola mitigation – ensure gate does not detract from historic setting and integrity of mine; non reflective materials; place any gate several feet back from dripline.
				10										

Coronado National Memorial List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
45.	Paring / Doredor 93-029	Shaft – warning sign	12' x 9' x 100'	5	1	4	0	No evidence of bat use – drifts uncertain.	Eligible	N	Cupola	Over shaft 2' outside collar	Helicopter	Bat gate mitigation (if needed) MSO mitigation Cultural gate/cupola mitigation
				10										
46.	Paring / Doredor 93-030	Adit – warning sign	7' x 6' x 406'	6	1	4	0	Bats History of wildlife use.	Eligible	N	Bat gate – 3" square tube	5' from dripline	Helicopter	Bat gate mitigation - A MSO mitigation Cultural gate/cupola mitigation
				11										
				Flooded winze with rotten and partially collapsed wood cover. Recent UDA use/evidence (tuna can and backpack).										
47.	Paring / Doredor 93-031	Shaft – warning sign	10' x 10' x 70'	5	1	4	0	No evidence of bat use, but did not survey shaft due to antlion collar.	Eligible	N	Cupola Antlion collar, current cable netting 8' down	Over shaft 2' outside collar	Helicopter	Bat gate mitigation (if needed) MSO mitigation Cultural gate/cupola mitigation
				10										

Coronado National Memorial List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
48.	Paring / Doredor 93-034	Adit – warning sign	6' x 5' x 19'	6	1	4	0	Bats No evidence of wildlife use.	Eligible	N	Bat gate - 2" square tubing	At dripline	Helicopter	Bat gate mitigation - A and/or B MSO mitigation Cultural gate/cupola mitigation
				11										
49.	Paring / Doredor 93-036	Adit – warning sign	1' x 3' x 16'	5	1	2	0	Bats Mouse	Eligible	N	No action			
				8										
50.	Paring / Doredor 93-042	Shaft – warning sign	4' x 4' x 8'	5	1	2	0	No evidence of bats.	Eligible	N	PUF/backfill	In shaft	Helicopter or Foot	Backfill mitigation MSO mitigation Cultural backfill mitigation
				8										
				Wildlife trap UDA evidence										
51.	Paring / Doredor 03-043	Trench into adit – warning sign	1' x 2' x 8'	5	1	2	0	History of bat use.	Eligible	N	No action			
				8										
52.	Paring / Doredor 93-047	Prospect pit – no sign or fence	6' x 12' x 7'	5	1	2	0	No evidence of bat or wildlife use.	Eligible	N	PUF/backfill	In pit	Helicopter or Foot	Backfill mitigation MSO mitigation Cultural backfill mitigation
				8										
				No sign or fence										

Coronado National Memorial List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
53.	Clark-Smith 93-032	Adit – warning sign	3' x 5.6' x 950'	6	2	2	0	History of bat use. Nearby tank used by bear, coati, and deer.	Not eligible	N	Bat gate – 2" square tube Install 3" HDPE pipe extending from inside to outside adit to provide wildlife continued access to water to a drinker in front of gate.	5' from dripline with water access feature.	Helicopter	Bat gate mitigation (if needed) MSO mitigation
				10										
				There is sloughing at the portal and ponding in the adit. Surface water present within feature and in nearby tank.										
54.	Clark-Smith 93-033	Adit – net breached; warning sign	3' x 6' x 30' with 30' long crosscut	6	2	2	0	Bats Packrats	Not eligible	N	Bat gate – 2" square tube)	Within 5 feet of dripline	Helicopter or Foot	Bat gate mitigation MSO mitigation
				10										
				Sloughing around the portal and a minor collapse 15' inside the portal; portal very unstable with crumbly rock and hillside around it eroding.										

Coronado National Memorial List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h × w × d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
55.	Clark-Smith 93-044	Shaft – warning sign	9' × 6' × 24'	6	2	2	0	Bats –night roost. No evidence of wildlife use.	Not eligible	N	PUF/backfill	In shaft	Helicopter	Backfill mitigation MSO mitigation
				10										
				The shaft is hidden by vegetation and is a hazard to animals and people.										
56.	Clark-Smith 93-045	Shaft – warning sign	6' × 5' × 12'	5	2	0	0	Bats – night roost. No evidence of wildlife use.	Not eligible	N	PUF/backfill	In shaft	Helicopter	Backfill mitigation MSO mitigation
				7										
				Open shaft is hazard to people and animals. Loose/unstable collar makes the site more hazardous.										
57.	Clark-Smith 03-046	Shaft, with adit above shaft – warning sign	Shaft: 11' × 15' × 60'	5	2	2	0	No bats observed, however possible guano. Packrats	Not eligible	N	Cupola - special design	Over shaft 2' outside collar	Helicopter	Bat gate mitigation MSO mitigation
				9										
				Shaft is open, making it dangerous to people and animals. UDA access is an issue.										

Coronado National Memorial List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
58.	Clark-Smith 93-049	Powder cache – warning sign	0.25' x 1.5' x 2'	2	1	0	0	No evidence of bats. Packrats	Not eligible	N	No action			
				3										
59.	Clark-Smith 93-052	Adit – warning sign	0.5' x 2.5' x 10'	5	1	0	0	No evidence of bat or wildlife use.	Not eligible	N	No action			
				6										
60.	Clark-Smith 93-064	Shaft	6' x 5' x 16'	5	2	0	0	No evidence of bat use.	Not eligible	N	PUF/backfill	In shaft	Helicopter	Backfill mitigation MSO mitigation
				7										
61.	Smuggler Ridge 93-037	Shaft – warning sign	12' x 7.6' x 20'	5	2	0	0	History of bat use; none currently observed. No evidence of wildlife use.	Not eligible	N	PUF/backfill	In shaft	Helicopter or Foot	Backfill mitigation MSO mitigation
				7										
62.	Montezuma Peak 93-060	Inclined adit – warning sign	10' x 11' x 25'	6	1	2	0	No evidence of bat use. Packrats	Not eligible	N	Bat gate – 3" square tube	2' from dripline	Helicopter	Bat gate mitigation (if needed) MSO mitigation
				9										
				Used by UDAs for shelter and concealment, occasional flooding.										

Coronado National Memorial List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
63.	Montezuma Peak 93-061	Inclined adit – warning sign	8' x 12' x 35'	6	1	2	0	No evidence of bat use. Spiny lizard Black bear	Not eligible	N	Bat gate – 3" square tube	At or near portal (UDAs)	Helicopter	Bat gate mitigation (if needed) MSO mitigation
				9										
				Water UDA evidence										
64.	Montezuma Peak 93-062	Prospect pit	4' x 5' x 7'	6	1	0	0	No evidence of bat use.	Not eligible	N	PUF/backfill	Dripline	Helicopter	Backfill mitigation MSO mitigation
				7										
65.	Montezuma Peak 93-063	Inclined adit – warning sign	6' x 6.6' x 15'	6	0	2	0	No evidence of bat use. Packrats	Not eligible	N	Bat gate – 3" square tube	2' from dripline	Helicopter	Bat gate mitigation (if needed) MSO mitigation
				8										
				Blast debris is present on floor of adit. UDAs could use as shelter or concealment.										

*All State of Texas mines are assumed not eligible per NPS DOE submittal.

**All features at Paring-Doredor Mine are assumed eligible based on DOE prepared by Coronado National Memorial, June 2006.

Table 4. Organ Pipe Cactus National Monument List of Abandoned Mine Land Structures

Features to be closed with ARRA funding are shaded

Organ Pipe Cactus National Monument List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h × w × d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction*
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
1.	Baker 1	Adit and waste rock – tangled wire barrier	6.5' × 5' × 82'	2	1	4	0	Bats – guano indicates June/July use.	Eligible	Y	Temporary fence may be added as part of longer term adaptive management approach ; possible future bat gate, pending adaptive management results.	Around feature – allow bat access to feature but keep humans out.	Vehicle or Foot	Bat fencing mitigation – Avoid breeding or hibernation periods of April to August; do post construction monitoring. Cultural fencing mitigation for eligible or contributing site – ensure fence is not a permanent feature – eventually replace with gate that meets cultural gate mitigation.
				7				Woodrat Gopher snake Ringtail Cougar Collared peccary Bighorn sheep						
				UDAs could use this adit for shelter or concealment. There is danger of sloughing and material falling.										

Organ Pipe Cactus National Monument List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction*
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
2.	Baker 2	Shaft and waste rock – connects with tunnel-fenced	8' x 4' x 33'	5	1	4	0	Bats observed Also woodrat, ringtail	Eligible	Y	Temporary fence may be added as part of longer term adaptive management approach ; possible future cupola, pending adaptive management results.	Around feature – allow bat access to feature but keep humans out.	Vehicle or Foot	Bat fencing mitigation Cultural fencing mitigation
				10										
3.	Baker 3	Prospect pit and waste rock	6.5' x 6.5' x 13'	1	1	0	0	No evidence of bat use. Woodrat	Eligible	Y	No action			
				2										

Organ Pipe Cactus National Monument List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction*
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
				Ranking Score Total										
4.	Copper Mtn. 10	Shaft and waste rock – barbed wire fence with signs	12' x 8' x 18.7'	5	2	2	0	No evidence of bat use. Woodrat Barn owl Desert tortoise Western diamond-back rattlesnake	Eligible	Y	PUF/backfill	Backfill in shaft	Vehicle or Foot	Backfill mitigation – Check for wildlife presence before backfilling and use exclusion techniques to ensure wildlife do not become trapped when backfilling. Cultural – PUF/backfill or partial backfill mitigation – minimum disturbance to portal, features, and artifacts. Full recordation of features before PUF/backfill.
				9										
				Fall hazard and wildlife trap; bottom may be just above ceiling of main horizontal tunnel.										
5.	Copper Mtn. 11	Shaft and waste rock – barbed wire fence with signs	10' x 6.5' x 33'	5	2	4	0	Bats Woodrat Barn owl	Eligible	Y	Temporary fence may be added as part of longer term adaptive management approach possible future cupola, pending adaptive management results.	Around feature – allow bat access to adit but keep humans out.	Vehicle or Foot	Bat and cultural fencing mitigation
				11										
				Fall hazard and wildlife trap										

Organ Pipe Cactus National Monument List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction*
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
6.	Copper Mtn. 12	North portal of tunnel and waste rock – barbed wire fence with signs	6.5' x 6.5' x 984'	5	2	4	0	Bats – numerous Woodrat Cactus mouse Kangaroo rat Western-spotted skunk barn owl Rattlesnake	Eligible	Y	Temporary fence may be added as part of longer term adaptive management approach ; possible future chute gate, pending adaptive management results.	Around feature – allow bat access to feature but keep humans out.	Vehicle or Foot	Bat and cultural fencing mitigation
				11										
				Some collapse at entrance. Africanized bees present.										
7.	Copper Mtn. 2	South portal of tunnel and waste rock – barbed wire fence with signs	5' x 6' x 984'	5	2	4	0	Bats	Eligible	Y	Temporary fence may be added as part of longer term adaptive management approach ; possible future chute gate, pending adaptive management results.	Same as above	Vehicle or Foot	See above
				11										
				Wooden supports at portal are collapsing.										
8.	Copper Mtn. 23	Prospect pit – backfilled in the 1990s							Eligible	Y	No Action			

Organ Pipe Cactus National Monument List of Abandoned Mine Land Structures															
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h × w × d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction*	
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating								
															Ranking Score Total
9.	Copper Mtn. 24	Prospect pit – backfilled in 1990s		<div><div></div><div></div><div></div><div></div></div>						Eligible	Y	No action			
				None											
10.	Copper Mtn. 29	Prospect pit – backfilled in 1990s		<div><div></div><div></div><div></div><div></div></div>						Eligible	Y	No action			
				None											
11.	Copper Mtn. 4	Prospect pit and waste rock – backfilled		<div><div></div><div></div><div></div><div></div></div>						Eligible	Y	No action			
				None											
12.	Copper Mtn. 49	Prospect pit – backfilled in 1990s		<div><div></div><div></div><div></div><div></div></div>						Eligible	Y	No action			
				None											
13.	Copper Mtn. 5	Prospect pit – backfilled		<div><div></div><div></div><div></div><div></div></div>						Eligible	Y	No action			
				None											

Organ Pipe Cactus National Monument List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction*
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
14.	Copper Mtn. 6	Adit and waste rock –chain link barrier	6' x 4' x 65'	5	2	4	0	No evidence of bat use. Woodrat Kangaroo rat Barn owl	Eligible	Y	Bat gate – 4-inch angle iron		Vehicle or Foot	Bat gate mitigation (if needed) Cultural gate mitigation for eligible or contributing site – ensure gate does not detract from historic setting and integrity of mine by placing gate several feet back from dripline.
11														
Adit and ventilation shaft presents fall hazard and possible sloughing in adit.														
15.	Copper Mtn. 6A	Shaft and waste rock –barbed wire fence	5' x 5' x 13'	5	2	2	0	No evidence of bat use.	Eligible	Y	PUF/backfill	PUF/backfill in shaft 10.5' thick	Helicopter	Backfill mitigation
9														
Ventilation shaft presents fall hazard and possible sloughing in adit.														
16.	Copper Mtn. 9	Shaft and waste rock – barbed fence with signs	7.11' x 7' x 7.6'	5	2	2	0	No evidence of bat use. Woodrat	Eligible	Y	Partial backfill	Backfill in shaft	Vehicle or Foot	Backfill mitigation
9														
Shaft is a fall hazard and animal trap.														

Organ Pipe Cactus National Monument List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction*
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
17.	Dripping Springs 1	Shaft and waste rock – barbed wire fence with signs	10' x 14' x 24'	5	2	2	0	No evidence of bat activity.	Eligible	Y	PUF/backfill	PUF/backfill in shaft 18' thick	Helicopter	Backfill mitigation
				9				Woodrat						
				Fall hazard and animal trap										
18.	Dripping Springs 3	Shaft and waste rock – barbed wire fence with sign	5' x 3.5' x 49'	5	2	2	0	Woodrat	Eligible	Y	PUF/backfill	PUF/backfill in shaft 9' thick	Helicopter	Backfill mitigation
				9				Woodrat						
				Fall hazard and animal trap										
19.	Dripping Springs 4	Adit and waste rock – barbed wire fence with signs	6' x 4' x 8'	5	2	2	0	Woodrat	Eligible	Y	Partial backfill	Backfill in adit	Vehicle or Foot	Backfill mitigation
				9				Woodrat						
20.	Dripping Springs 5	Prospect pit with waste rock – backfilled						None	Eligible	Y	No action			
								None						
				None										

Organ Pipe Cactus National Monument List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction*
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
				Ranking Score Total										
21.	Golden Bell Mine 1	Shaft with waste rock – grated and signed	6.5' x 6.5' x 13'	5	2	2	0	Mouse – unidentified	Eligible	N	PUF/backfill	PUF/backfill in shaft 7.5' thick	Vehicle or Foot	Backfill mitigation
				9										
				If the grate is removes this would be a falling hazard for people and animals (rating is based off of this assumption).										
22.	Golden Bell Mine 2	Shaft with waste rock – grated and signed	13' x 5' x 39'	5	2	2	0	Woodrat	Eligible	N	PUF/backfill	PUF/backfill in shaft 9' thick	Vehicle or Foot	Backfill mitigation
				9										
				If the grate is removed it would be a falling hazard for people and animals (rating is based off of this assumption).										
23.	Growler 1	Adit with waste rock – barbed wire fence with signs	18' x 3' x 33'	2	2	2	0	Bats? – strong smell of guano.	Eligible	Y	PUF/backfill	Backfill in adit	Vehicle or Foot	Backfill mitigation – pre-construction survey for bats
				6				Woodrat						

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				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
24.	Growler 2	Shaft with waste rock – chain link fence	10.7' x 11' x 7'	4	2	2	0	No evidence of bat use.	Eligible	Y	Partial backfill	Backfill in shaft	Vehicle or Foot	Backfill mitigation
				8				Woodrat						
				Caving in										
25.	Growler 4	Shaft with waste rock – barbed wire fence with signs	7.4' x 4.2' x 10.4'	5	2	2	0	No evidence of bat use.	Eligible	Y	Partial backfill	Backfill in shaft	Vehicle or Foot	Backfill mitigation
				9				Woodrat						
				Fall hazard and animal trap				Ringtail						
26.	Growler 6	Shaft with waste rock – barbed wire fence with signs	12.2' x 5.5' x 6.4'	5	2	2	0	No evidence of bat use.	Eligible	Y	Partial backfill	Backfill in shaft	Vehicle or Foot	Backfill mitigation
				9				Woodrat						
				Fall hazard and animal trap										
27.	Growler 7	Adit and Prospect pit with waste rock – barbed wire fence with signs	2' x 3' x 29'	4	2	2	0	No evidence of bat use.	Eligible	Y	PUF/backfill	Backfill in adit	Vehicle or Foot	Backfill mitigation
				8				Woodrat						
				Portal is collapsing and unstable										
28.	Growler 8	Shaft, structure, and waste rock – barbed wire fence with signs and metal cover	6.10' x 4.5' x 30'	5	2	2	0	No evidence of bat use.	Eligible	Y	PUF/backfill	PUF/backfill in shaft 10.5' thick	Vehicle or Foot	Backfill mitigation
				9				Woodrat						
				Fall hazard and animal trap										

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No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction*
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
29.	Kuakatch Mine 1	Shaft and waste rock –barbed wire fence with signs	4.9' x 6.4' x 67'	5	2	4	0	Bats – probable night roost; potential satellite maternity colony. Woodrat Deer mice Ringtail	Eligible	Y	Bat gate-4-inch angle iron Part of longer – term adaptive management experimental approach;	At portal	Vehicle or Foot – need to cross tribal lands.	Bat gate mitigation – plus pre and post monitoring and special design for gate.
				11										
				Shaft presents a fall hazard and animal trap. Decline adit presents a sloughing hazard.										
30.	Kuakatch Mine 10	Shaft and waste rock – barbed wire fence with signs (100 m west of park)	10' x 6.5' x 11.6'	5	2	2	0	No evidence of bat use. Woodrat	Eligible	Y	Partial backfill	Backfill in shaft	See above	Backfill mitigation
				9										
				This shaft is a fall hazard and animal trap.										
31.	Kuakatch Mine 3	Shaft and waste rock – barbed wire fence with signs	5.2' x 6.8' x 6.5'	5	2	2	0	No evidence of bat use. Woodrat	Eligible	Y	Partial backfill	Backfill in shaft	See above	Backfill mitigation
				9										
				This shaft is a fall hazard and animal trap.										

Organ Pipe Cactus National Monument List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction*
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
32.	Kuakatch Mine 4	Shaft and waste rock – barbed wire fence 2/signs	8.2' x 10' x 40'	5	2	4	0	Observed bat use. Woodrat Barn owl	Eligible	Y	Temporary fence may be added as part of longer term adaptive management approach ; possible future cupola, pending adaptive management results.	Around feature – allow bat access to feature but keep humans out.	See above	Bat and cultural fencing mitigation
				11										
				Fall hazard and animal trap										
33.	Kuakatch Mine 5	Shaft and waste rock – chain link	2' x 6.6' x 16.5'	4	2	2	0	Bats Woodrat	Eligible	Y	No action			
				8										
				Fall hazard and animal trap and danger of sloughing.										
34.	Kuakatch Mine 9	Shaft and waste rock – barbed wire fence with signs	8.2' x 5' x 8.10'	5	2	2	0	No evidence of bat use. Woodrat	Eligible	Y	Partial backfill	Backfill in shaft		Backfill mitigation
				9										
				Fall hazard and animal trap										

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No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction*
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
35.	Lost Cabin Mine 13	Adit and waste rock – with barbed wire fence with signs	3.4' x 6.5' x 122'	4	1	4	0	Bats – 40-50 of one and 30-40 of other species. Guano accumulation indicates use in June and July. Woodrat Gopher snake Coyote	Eligible	Y	"Standard" bat gate – 4-inch angle iron Part of longer term adaptive management experimental approach.	3' from dripline	Helicopter	Bat and cultural gate mitigation – plus pre and post monitoring and design for gate selected for adaptive management purposes.
9														
Sloughing hazard														
36.	Lost Cabin Mine 14	Adit and waste rock – barbed wire fence with signs	6.5' x 3.2' x 31'	4	1	2	0	Bats – day and night roost. Woodrat Ringtail Barn owl Collared peccary Vulture	Eligible	Y	No action – existing fence			
7														
Sloughing danger														
37.	Lost Cabin Mine 21	Tunnel – barbed wire fence with signs	9' x 3' x 20.3'	4	1	2	0	Bats Woodrat Collared peccary	Eligible	Y	No action – existing fence			
7														
Sloughing hazard														

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No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction*
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
38.	Lost Cabin Mine 22	Trench and waste rock	15' x 35' x 9.5'	5	1	2	0	No evidence of bat use. Woodrat	Eligible	Y	No action			
8														
Fall hazard and animal trap														
39.	Lost Cabin Mine 3	Shaft, prospect pit, waste rock and building – barbed wire fence	6' x 5.3' x 28'	4	1	2	0	Bats Woodrat.	Eligible	Y	PUF/backfill	PUF/backfill in shaft 9' thick	Helicopter	Backfill mitigation
7														
Sloughing hazard														
40.	Lost Cabin Mine 4	Shaft, waste rock and building – chain link fence around 2 holes with metal covers	6.5' x 6.5' x 98'	5	1	2	0	No evidence of bat or use. Woodrat	Eligible	Y	PUF/backfill	PUF/backfill in adit 9' thick	Helicopter	Backfill mitigation
8														
Grated. Fall hazard and animal trap if grates are removed.														
41	Lost Cabin Mine 5	Shaft, waste rock and building – chain link fence around 2 holes with metal covers	6.5' x 3.2' x 66'	5	1	2	0	No evidence of bat or use. Woodrat	Eligible	Y	PUF/Backfill	PUF/backfill in adit 9' thick	Helicopter	Backfill mitigation
8														
Grated. Fall hazard and animal trap if grates are removed.														

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No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction*
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
42.	Lost Cabin Mine 6	Trench and waste rock	6' x 6' x 6'	5	1	2	0	Bats Woodrat Barn owl	Eligible	Y	Partial backfill	Backfill back portion of trench that acts as adit		Backfill mitigation
				8										
				Danger of trench collapse and shaft is a fall hazard and animal trap.										
43.	Lost Cabin Mine 8 and 10	Prospect pit and waste rock – barbed wire fence	23' x 26' x 16'	2	1	2	0	Bats Woodrat Barn owl Ringtail Cougar Collared peccary	Eligible	Y	No action – existing fence			
				5										
44.	Martinez 2	Prospect pit and waste rock	6.5' x 9.8' x 6.5'						Eligible	Y	No action			
45.	Martinez 23	Shaft and waste rock – barbed wire fence	3' x 2.6' x 16'	3	2	2	0	No evidence of bat use. Woodrat Ringtail	Eligible	Y	Partial backfill	Backfill in shaft	Vehicle or Foot	Backfill mitigation
				7										
				Fall hazard and animal trap										
46.	Martinez 24	Shaft and waste rock – backfilled						No evidence of bat use. Woodrat	Eligible	Y	No action			

Abandoned Mine Lands Closure Plan and EA

Organ Pipe Cactus National Monument List of Abandoned Mine Land Structures														
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				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
47.	Martinez 3	Shaft and waste rock – barbed wire fence	13' x 8.2' x 29.5'	5	2	2	0	No evidence of bat use. Woodrat	Eligible	Y	PUF/backfill	PUF/backfill in shaft 18' thick	Helicopter	Backfill mitigation
				9										
48.	Martinez 33	Shaft and waste rock – barbed wire fence	3' x 7' x 8'	5	2	2	0	No evidence of bat or wildlife use.	Eligible	Y	Partial backfill	Backfill in shaft	Vehicle or Foot	Backfill mitigation
				9										
				Fall hazard and animal trap										
49.	Martinez 4	Shaft and waste rock – barbed wire fence	4.5' x 6.5' x 11.5'	5	2	2	0	No evidence of bat use. Woodrat	Eligible	Y	Partial backfill	Backfill in shaft	Vehicle or Foot	Backfill mitigation
				9										
				Fall hazard and animal trap										
50.	Martinez 5	Shaft and waste rock – barbed wire fence	5.5' x 5.5' x 19.10'	5	2	2	0	No evidence of bat use. Woodrat	Eligible	Y	PUF/backfill	Backfill in shaft	Vehicle or Foot	Backfill mitigation
				9										
				Fall hazard and animal trap										
51.	Martinez 6	Shaft and waste rock – barbed wire fence	4.3' x 6.5' x 13.1'	5	2	2	0	No evidence of bat use. Woodrat	Eligible	Y	Partial backfill	Backfill in shaft	Vehicle or Foot	Backfill mitigation
				9										
				Fall hazard and animal trap										

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				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
52.	Martinez 7	Shaft	8' x 10' x 35'	5	2	2	0	Bat use Woodrat Gray fox	Eligible	Y	PUF/backfill	PUF/backfill in shaft 10' deep	Helicopter	Backfill mitigation and preserve rock wall
				9										
				Fall hazard, animal trap, collapsing trench and adits										
53.	Martinez 7a	Trench	9.8' x 49' x 9.8'	5	2	2	0	Bat use Woodrat Gray fox	Eligible	Y	PUF/backfill	PUF/backfill in shaft 10' deep	Helicopter.	Backfill mitigation and preserve rock wall
				9										
				Fall hazard, animal trap, collapsing trench and adits										
54.	Milton 11	Shaft and waste rock – barbed wire fence	5.6' x 11' x 10.10'	4	1	2	0	No evidence of bat use. Woodrat	Eligible	Y	Partial backfill	Backfill in trench	Vehicle or Foot	Backfill mitigation
				7										
				Danger of collapse										
55.	Milton 13	Shaft and waste rock – barbed wire fence	4.6' x 7.2' x 10'	5	1	2	0	No evidence of bat use. Woodrat	Eligible	Y	Partial backfill	Backfill in shaft	Vehicle or Foot	Backfill mitigation
				8										
				Fall hazard and animal trap										
56.	Milton 14	Shaft and waste rock – barbed wire fence	4.7' x 7.1' x 6.5'	5	1	2	0	No evidence of bat use. Woodrat	Eligible	Y	Partial backfill	Backfill in shaft	Vehicle or Foot	Backfill mitigation
				8										
				Fall hazard and animal trap										

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				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
57.	Milton 15	Shaft, waste rock and structure – barbed wire fence	4.7' x 6.11' x 5.3'	2	1	2	0	No evidence of bat use. Woodrat Desert tortoise	Eligible	Y	Partial backfill	Backfill in shaft	Vehicle or Foot	Backfill mitigation
				5										
58.	Milton 22	Shaft and waste rock – barbed wire fence and metal cover	6.3' x 6.10' x 62'	5	1	2	0	No evidence of bat use. Woodrat	Eligible	Y	PUF/backfill	PUF/backfill in shaft 10.5' thick	Helicopter	Backfill mitigation
				8										
				Grated. Fall hazard and animal trap if grate is removed.										
59.	Milton 24	Shaft and waste rock barbed wire fence	6.10' x 4.6' x 6.10'	5	1	2	0	No evidence of bat use. Woodrat	Eligible	Y	Partial backfill	Backfill in shaft	Vehicle or Foot	Backfill mitigation
				8										
				Fall hazard and animal trap										
60.	Milton 25	Shaft and waste rock – barbed wire fence	4.3' x 5.5' x 7.10'	5	1	2	0	No evidence of bat use. Woodrat	Eligible	Y	Partial backfill	Backfill in shaft	Vehicle or Foot	Backfill mitigation
				8										
				Fall hazard and animal trap										
61.	Milton 26	Shaft and waste rock – barbed wire fence	6' x 4' x 13.5'	5	1	2	0	No evidence of bat use. Woodrat Gambel's quail	Eligible	Y	Partial backfill	Backfill in shaft	Vehicle or Foot	Backfill mitigation
				8										
				Fall hazard and animal trap										

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				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
62.	Milton 27	Shaft and waste rock – barbed wire fence	5' x 5' x 20'	5	1	2	0	No evidence of bat use. Woodrat	Eligible	Y	Partial backfill	Minor backfill in bottom of pit	Vehicle or Foot	Backfill mitigation
8														
Fall hazard and animal trap														
63.	Milton 30	Shaft and waste rock – barbed wire fence	5' x 7'x 5.8'	4	1	2	0	No evidence of bat use. Woodrat	Eligible	Y	Partial backfill	Backfill in shaft	Vehicle or Foot	Backfill mitigation
7														
Fall hazard and animal trap														
64.	Milton 32	Shaft and waste rock – barbed wire fence and metal cover	6.5' x 6.5' x 65.6'	5	1	2	0	No evidence of bat use. Woodrat	Eligible	Y	PUF/backfill	PUF/backfill in shaft 9' thick	Helicopter	Backfill mitigation
8														
Grated. Fall hazard and animal trap if grate is removed.														
65.	Milton 34	Shaft and waste rock – barbed wire fence	14' x 11' x 6.10'	5	1	2	0	No evidence of bat use. Woodrat	Eligible	Y	Partial backfill	Backfill in shaft	Vehicle or Foot	Backfill mitigation
8														
Fall hazard and animal trap														
66.	Milton 35	Shaft and waste rock – barbed wire fence	4' x 6.8' x 8.2'	5	1	2	0	No evidence of bat use. Woodrat	Eligible	Y	Partial backfill	Backfill in shaft	Vehicle or Foot	Backfill mitigation
8														
Fall hazard and animal trap														

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				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
67.	Milton 36	Shaft and waste rock – barbed wire fence	4.3' x 7.3' x 4.10'	2	1	2	0	No evidence of bat or wildlife use.	Eligible	Y	Partial backfill	Backfill in shaft	Vehicle or Foot	Backfill mitigation
5														
68.	Milton 6	Shaft and waste rock – barbed wire fence	7' x 5' x 6.2'	2	1	2	0	No evidence of bat use. Woodrat	Eligible	Y	Partial backfill	Backfill in shaft	Vehicle or Foot	Backfill mitigation
5														
This 6'2 shaft presents a fall hazard and animal trap.														
69.	Milton 1	Declining adit – found during field surveys	3' x 5' x 6.5'	4	1	2	0	No evidence of bat use. Packrat	Listed	Y	Partial backfill	Backfill in adit	About 2 miles from Senita Basin Road.	
7														
Adit is unstable with danger of sloughing.														
70.	Montezuma Mine 1	Shaft and waste rock, and building – barbed wire fence	6.5' x 6.5' x 15'	5	1	2	0	No evidence of bat use. Woodrat	Eligible	Y	Partial backfill	Backfill in shaft	Backcountry wilderness; foot access.	Backfill mitigation
8														
Deteriorating, unstable wooden platform over shaft. Fall hazard and animal trap.														

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				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
71.	Senita Basin Mine 1	Shaft and waste rock – barbed wire fence	8' x 6' x 21.5'	5	2	2	0	No evidence of bat or wildlife use.	Eligible	Y	PUF/backfill	PUF/backfill in shaft 11.5' thick	Helicopter	Backfill mitigation
9														
Fall hazard and animal trap														
72.	Senita Basin Mine 2	Prospect pit – covered and closed 1985	20.1'						Eligible	Y	No action			
None														
73.	Senita Basin Mine 3	Adit and waste rock – barbed wire fence	9.3' x 5.6' x 11.6'	4	2	2	0	Bats – probable night roost. Woodrat Collared peccary	Eligible	Y	No action			
8														
Possible sloughing														
74.	Senita Basin Mine 4	Shaft and waste rock – barbed wire fence	4.4' x 6.6' x 6.9'	5	2	2	0	No evidence of bat use. Woodrat	Eligible	Y	Partial backfill	Backfill in shaft	Vehicle or Foot	Backfill mitigation
9														
Fall hazard and animal trap														

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				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
75.	Senita Basin Mine 5	Shaft and waste rock – barbed wire fence	5.6' x 7.6' x 49.6'	5	2	2	0	No evidence of bat use. Woodrat	Eligible	Y	PUF/backfill	PUF/backfill in shaft 11.5' thick	Helicopter	Backfill mitigation
				9										
				There is an inverted cattle guard and some wire mesh panels over the shaft. If it is removed it will be a fall hazard and animal trap.										
76.	Senita Basin Mine 6	Prospect pit and waste rock – backfilled 2004							Eligible	Y	No action			
				None										
77.	Victoria Mine 2	Adit and waste rock – barbed wire fence	6' x 6' x 190'	2	1	4	0	Heavy bat use Black-tailed rattlesnake Javelina Ringtail Woodrat Deer mice Desert cottontail Collared peccary Cougar	Eligible	Y	Bat gate folded/bay Window – 4-inch angle iron. Part of longer-term adaptive management experimental approach.		Vehicle or Helicopter	Bat gate mitigation – pre and post construction monitoring and special gate design. Bat gate and cultural gate mitigation
				7										

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				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
78.	Victoria Mine 21	Shaft and waste rock – barbed wire fence	7.5' x 5.7' x 15.2'	5	1	4	0	Bats Woodrat Rattlesnake	Eligible	Y	Cupola–4-inch angle iron. Part of longer-term adaptive management experimental approach.	Over shaft	Vehicle or Helicopter	Bat gate mitigation Cupola cultural mitigation – ensure cupola design does not detract from historic setting and integrity of mine (minimum height; compatible material, color, & texture, etc.).
79.	Victoria Mine 22	Shaft, prospect pit and waste rock – barbed wire fence	6.7' x 6.1' x 8.5' 26' long trench	5	1	2	0	No evidence of bat use.	Eligible	Y	Partial backfill	Backfill in shaft	Vehicle or Helicopter	Backfill mitigation
				8				Woodrat						
80.	Victoria Mine 23	Waste rock – backfilled						No evidence of bat use.	Eligible	Y	No action			
								Woodrat						
				None										
81.	Victoria Mine 23A	Shaft and waste rock – barbed wire fence	6.11' x 3.10' x 7.11'	5	1	2	0	No evidence of bat or wildlife use.	Eligible	Y	Partial backfill	Backfill in shaft	Vehicle or Helicopter	Backfill mitigation
				8										
82.	Victoria Mine 4	Shaft and waste rock – barbed wire fence and metal grating	5' x 6.5' x 164'	5	1	4	0	Bats Woodrat	Eligible	Y	Shaft culvert and cupola – 4-inch angle iron		Vehicle or Helicopter	Bat gate and cupola cultural mitigation
				10										

Abandoned Mine Lands Closure Plan and EA

Organ Pipe Cactus National Monument List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h × w × d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction*
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
83.	Victoria Mine 61	Shaft and waste rock – chain link fence and metal cover	5.11' × 6.10' × 24'	5	1	2	0	No evidence of bat use. Woodrat	Eligible	Y	PUF/backfill	PUF/backfill in shaft 10.5' thick	Vehicle or Foot	Backfill mitigation
10														
84.	Victoria Mine 7	Shaft and waste rock and structure – barbed wire fence and metal cover	7.8' × 4.11' × 300'	5	1	4	0	Low bat use – day/night roost.	Eligible	Y	Shaft culvert and cupola – 4-inch angle iron		Vehicle or Foot	Bat gate and cupola cultural mitigation
				10				No evidence of wildlife use.						
85.	Victoria Mine 71	Shaft and waste rock and structure – barbed wire fence and metal cover	4' × 4' × 50'	5	1	4	0	No evidence of bat use.	Eligible	Y	Shaft culvert and cupola – 4-inch angle iron		Vehicle or Foot	Bat gate and cupola cultural mitigation
				10				Woodrat Barn owl						
86.	Victoria Mine 8	Shaft, waste rock, building and structure – barbed wire fence and metal cover	8' × 8' × 65'	5	1	4	0	Small amount of guano; suitable for bat day/night roosts.	Eligible	Y	Shaft culvert and cupola – 4-inch angle iron		Vehicle or Foot	Bat gate and cupola cultural mitigation
				10										
87.	—	300 prospect pits throughout park						None	Potentially eligible – DOE needed	Y	Partial backfills as needed based on conditions noted		Varies	Backfill Mitigation if needed

*Sonoran pronghorn mitigation **parkwide**: no construction from February 1 to July 31 (fawning season).

Table 5. Saguaro National Park List of Abandoned Mine Land Structures

Features to be closed with ARRA funding are shaded

Saguaro National Park List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h × w × d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
1.	Rincon Mtn District Mines (RMD) (West 202)	Declining adit	8' × 6' × 20'	5	2	0	0	No potential for bats	Not eligible	N	Backfill or PUF/backfill if not enough waste rock	In shaft	Heavy equipment access via existing road	Backfill mitigation – Check for wildlife presence before backfilling and use exclusion techniques to ensure wildlife do not become trapped when backfilling. Site and road restoration – recontour/ rehabilitate site and access route, including disposal of debris and waste rock.
				7										
				Steeply inclined adit with water at bottom.										
2.	RMD Mines (Center 203)	Shaft	8' × 10' × 50'	5	2	0	0	No bats or potential for them	Not eligible	N	Backfill or PUF/backfill if not enough waste rock	In shaft	Heavy equipment access via existing road	Backfill mitigation Site and road restoration
				7										
				Deep shaft with several feet of water at bottom.										
3.	RMD Mines (East 204)	Shaft	6.1' × 8.3' × 100'	5	2	0	0	No bats or potential for them.	Not eligible	N	Backfill or PUF/backfill if not enough waste rock	In shaft	Heavy equipment access via existing road	Backfill mitigation Site and road restoration
				7										
				Deep shaft										

Saguaro National Park List of Abandoned Mine Land Structures														
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				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
4.	Tucson Mtn District (TMD) TMD 028	Adit with winze	Adit – 5' x 6' x 30' Winze – 6' x 6' x 30'	2	2	4	0	Bats; but no guano seen. Packrats Clark spiny lizard	Not eligible	Y	Bat gate – 3-inch square tube	5' from dripline	Foot, Stock or Helicopter	Survey before construction to protect any bats, and do post construction monitoring. Interpretive sign outside mine near trail. Site restoration mitigation
				8										
				Adit is adjacent to a popular trail; old gate is breached; uncovered 30' deep winze is about 20' into adit.										
5.	TMD 001	Shaft IF54 in 1994B archeological survey	5.1' x 5' x 30'	2	3	2	0	No evidence of bat use. Barn owls Woodrat	Not eligible	Y	PUF/backfill	In shaft	Stock or Foot	Backfill mitigation – close when owls not nesting. Site and road restoration
				8										
				Deep shaft near popular trail and parking lot.										
6.	TMD 057	Shaft with small alcove about 25' down	Shaft – 6.5' x 9.5' x 43'	5	2	2	0	No bats. Barn owls Passerines	Not eligible	Y	PUF/backfill	In shaft	Foot, Stock, or Helicopter	Backfill mitigation – close when owls not nesting. Site and road restoration
				9										
				Deep uncovered, shaft near a trail, also visible (i.e., attractive) from road.										

Saguaro National Park List of Abandoned Mine Land Structures														
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				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
7.	TMD 065	Shaft	7' x 7.8' x 130'	5	2	4	0	No bats.	Not eligible	Y	Cupola - 4-inch angle iron	At shaft portal	Foot, Stock, or Helicopter	Construct cupola when owls not nesting. Site restoration
				11				Barn owls						
				Very deep, uncovered shaft with water at 80', unstable, collapsing (antlion) collar, very visible from trails and roads.				Possible passerines. Also desert tortoise burrow 15' east of shaft.						
8.	TMD Comet Claims 135	Shaft	5.5' x 5' x 30'	5	1	2	0	No evidence of bat or wildlife use.	Not eligible	N	Partial Backfill or PUF/backfill if not enough waste rock	In shaft	Foot, Stock, or Helicopter	Backfill mitigation Site restoration
				8				Bees present.						
				Deep, unfenced, shaft close to trail.										
9.	TMD Comet Claims 136	Declining adit with winze	Adit – 5' x 6' x 30' Winze – 20'd	3	1	4	0	No bats, but guano on walls.	Not eligible	N	Bat gate – 3-inch square tube	15' from dripline (toward winze)	Foot, Stock, or Helicopter	Bat gate mitigation – avoid potential impacts on bats and other wildlife – avoid breeding seasons for species present – generally avoid April to October. Site restoration
				8				Javelina						
				Unfenced adit, close to trail, with deep winze.				Owl whitewash Rattlesnake						

Saguaro National Park List of Abandoned Mine Land Structures														
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				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
10.	TMD Comet Claims 137	Vertical shaft with drift	5' x 6' x 8' Drift continues for 15', and is 2-3' high	2	1	2	0	No bats. Javelina Possible mountain lion Packrat Spiny lizard.	Not eligible	N	Partial backfill or PUF/backfill if not enough waste rock	At shaft portal	Foot, Stock, or Helicopter	Backfill mitigation Site restoration
				5										
				Unfenced shaft close to trail.										
11.	TMD Old Yuma Mine 147a (main decline, also NE open stope, SW open stope, SE shaft 153)	Declining adit, two collapsed stopes open to surface, unconnected to 153 (SE shaft)	11.5' x 12' x 300'	5	3	2	4	Bats Great horned owl	Eligible	N	Closure will, depend on outcome of CERCLA EE/CA action			
				14										
				Steep, slippery decline; site is visible from road. Site is known gem producer and attracts collectors.										
12.	TMD Old Yuma Mine 147b	Large stope	80' x 80' x 20'	3	3	2	4		Eligible	N	Closure will, depend on outcome of CERCLA EE/CA action			
				12										
				See above										
13.	TMD Old Yuma Mine 147c	Small stope	14' x 37' x 50'	3	3	2	4		Eligible	N	Closure will, depend on outcome of CERCLA EE/CA action			
				12										
				See above										

Saguaro National Park List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h × w × d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
14.	TMD Old Yuma Mine 148a archeological report 1996, site number 96B-8, AZ:AAA12:758	Declining adit	9' × 13' × 40'	2	3	4	4	No bats observed; bat surveys needed to determine bat habitat status, and connection to #147. Javelina	Eligible	N	Closure will, depend on outcome of CERCLA EE/CA action		See above	Bat gate Mitigation Construct sill at bottom of gate to keep tortoises out. Old Yuma Native American site mitigation Site restoration
				13										
				Steep decline										
15.	TMD Old Yuma Mine 148d	Shaft	5'x7'x?					See above	Eligible	N	Closures will, depend on outcome of CERCLA EE/CA action		See above	Backfill mitigation Site restoration
16.	TMD Old Yuma Mine 149	Prospect Pit	7' × 4.5' × 6'	1	3	2	4	No evidence of bat use. Potential use for great horned owl, desert tortoise previously found trapped in shaft.	Eligible	N	Closures will, depend on outcome of CERCLA EE/CA action		See above	 Avoid owls breeding season. Backfill mitigation Site restoration Old Yuma Native American site mitigation
				10										
				Upslope is steep and slippery										
17.	*TMD 003A	Decline adit with drift	3' × 5' × 47'					2003 – javelina	Not eligible	N	No action			

Abandoned Mine Lands Closure Plan and EA

Saguaro National Park List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
18.	TMD 003AF/R								Not eligible	N	No action			
19.	TMD 003B	Adit with drift	6' x 5' x 8'					2003 – javelina, little guano	Not eligible	N	No action			
20.	TMD 004	Decline adit	6' x 10' x 15'					None	Not eligible	N	No action			
21.	TMD 005	Shaft with drift?	Depth of 50'					2003 – barn owl roost	Not eligible	N	No action			
22.	TMD 006A	Prospect pit	Depth of 10'					None	Not eligible	N	Backfill		Foot	Backfill mitigation
23.	TMD 006B	Prospect pit	Depth of 10'					None	Not eligible	N	Backfill		Foot	Backfill mitigation

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				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
24.	TMD 007	Adit with shaft	Depth of 66'					2003, 1991 – bats	Not eligible	N	No action			
25.	TMD 008	Adit	6.5' × __' × 44'					2003, 1991 – bats	Not eligible	N	No action			
26.	TMD 009	Shaft with decline	Depth of 30'					1992 – barn owl roost	Not eligible	Y	Partial backfill or PUF/backfill		Foot or Stock	Backfill mitigation
				Unstable, antlion collar, can slide into shaft from outside fence.										
27.	TMD 011	Prospect pit	Depth of 12'						Not eligible	Y	No action			
28.	TMD 012/013	Adit with drift	5' × __' × 38'					2003 – guano	Not eligible	Y	No action			
								2003, 1992 – javelina						

Saguaro National Park List of Abandoned Mine Land Structures														
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				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
29.	TMD 016	Shaft with drift?	Depth of 60'					–	Eligible	Y	No action			
			Sulfur smell, hazardous runoff?											
30.	TMD 017	Adit	5.5' x 5' x 70'					2003 – javelina, guano	Eligible	Y	Bat gate		Foot, Stock or Helicopter	Bat gate mitigation
31.	TMD 018	Prospect pit	Depth of 5'					None	Not eligible	Y	Backfill		Foot	Backfill mitigation
32.	TMD 019	Shaft with drift	Depth of 30'					None	Not eligible	Y	No action			
			Very accessible, timber in shaft											
33.	TMD 020	Shaft with decline	Depth of 20'					None	Not eligible	Y	No action			
			Car debris in shaft											

Saguaro National Park List of Abandoned Mine Land Structures														
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				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
34.	TMD 021	Adit	6' × 5' × 107'					2003, 1991, 1987, 1962 – bat, ringtails 1992, 1982 – javelina, snake	Not eligible	Y	Bat gate		Foot, Stock or Helicopter	Bat gate mitigation
35.	TMD 022	Adit	6.5' × 5' × 70'					2003, 1990, 1962 bat, vulture nest 1985 owl	Not eligible	Y	Bat gate		Foot, Stock or Helicopter	Bat gate mitigation
36.	TMD 023	Shaft with drift?	Depth of 50'					1985 owl	Eligible	Y	Grate		Foot, Stock or Helicopter	Follow backfill mitigation for exclusion.
37.	TMD 024	Adit above shaft	Depth of 20'					None	Eligible	Y	PUF/backfill		Foot, Stock or Helicopter	Backfill mitigation
38.	TMD 025	Prospect pit	Depth of 8'					None	Not eligible	Y	Backfill		Foot, Stock or Helicopter	Backfill mitigation

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				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
39.	TMD 026	Decline shaft/no drift	Depth of 25'					None	Not eligible	Y	Partial backfill or PUF/backfill		Foot, Stock or Helicopter	Backfill mitigation
40.	TMD 027	Adit with drift	7' x __' x 31'					2003 guano, javelina	Not eligible	Y	No action			
41.	TMD 029	Prospect pit	Depth of 5'					None	Not eligible	Y	Backfill		Foot	Backfill mitigation
42.	TMD 030	Adit	6' x 5' x 35'					Javelina Bat Calcite formations	Not eligible	Y	No action			
43.	TMD 031	Shaft with drift?						–	Not eligible	Y	No action			
				Dangerous from above										
44.	TMD 032	Shaft with drift?						–	Not eligible	Y	No action			
				Dangerous from above										

Saguaro National Park List of Abandoned Mine Land Structures														
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				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
45.	TMD 033	Adit	5.5' x 4' x 56'					Javelina Bat Ringtail Speleothems Pyrite crystals	Not eligible	Y	No action			
46.	TMD 034	Adit	5.5' x 4' x 17'					Mac guano	Not eligible	Y	No action			
47.	TMD 035	Shaft with drift	Depth of 12'					Javelina	Not eligible	Y	Partial backfill or PUF/backfill		Foot, Stock or Helicopter	Backfill mitigation
48.	TMD 036	Adit with drift	7' x 5' x 117'					Bats Skunk Snake	Not eligible	Y	Bat gate		Foot, Stock or Helicopter	Bat gate mitigation
49.	TMD 037	Adit	7' x 5' x 119'					Water at rear Javelina Skunk Guano	Not eligible	Y	No action			
50.	TMD 038	Shaft with drift?	Depth of 30'					Whitewash	Not eligible	N	No action			
				Collapsed collar										

Abandoned Mine Lands Closure Plan and EA

Saguaro National Park List of Abandoned Mine Land Structures														
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				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
51.	TMD 043	Adit with winze	6' x 5' x 266'					Bats Javelina Water in winze	Not eligible	N	Bat gate		Foot, Stock or Helicopter	Bat gate mitigation
52.	TMD 044	Adit	Depth of 22'					Javelina	Not eligible	Y	No action			
53.	TMD 050	Adit with drift - Bat-gated	Depth of 700'					Bats Wildlife watering place	Not eligible	Y	Has bat gate			
54.	TMD 051								Not eligible	Y	No action			
55.	TMD 052	Prospect pit	5' x 10' x 10'					–	Not eligible	Y	Backfill		Foot	Backfill mitigation
56.	TMD 053	Adit	4.5' x 5' x 39'					Javelina Guano	Not eligible	Y	No action			
57.	TMD 054	Adit	3' x 5' x 20'					Javelina	Not eligible	Y	No action			

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				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
58.	TMD 055	Decline shaft/no drift	Depth of 25'					Barn and great-horned owl roost	Not eligible	Y	No action			
59.	TMD 055B	Prospect pit	Depth of 7'					–	Not eligible	Y	No action			
60.	TMD 056	Prospect pit	Depth of 10'					–	Not eligible	Y	Backfill		Foot	Backfill mitigation
61.	TMD 058	Shaft/no drift	Depth of 15'					–	Not eligible	Y	Partial backfill or PUF/backfill		Foot, Stock or Helicopter	Backfill mitigation
62.	TMD 059	Shaft with drift	Depth of 15'					–	Not eligible	Y	Partial backfill or PUF/backfill		Foot, Stock or Helicopter	Backfill mitigation
63.	TMD 060	Shaft/no drift	Depth of 50'					Owl whitewash	Not eligible	Y	PUF/backfill		Foot, Stock or Helicopter	Backfill mitigation
				Antlion collar										

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				Hazard Rating	Access Rating	Resource Rating	Impacts Rating								
															Ranking Score Total
70.	TMD 067A	Shaft/no drift	Depth of 70'					Barn owl, water	Not eligible	Y	Cupola with 3-inch angle iron		Foot, Stock or Helicopter	Backfill mitigation	
				Antlion collar, visibility of #065 will attract visitors to area											
71.	TMD 067B	Prospect pit	Depth of 10'					–	Not eligible	Y	Partial backfill		Foot	Backfill mitigation	
72.	TMD 068A	Decline adit	5' x __' x 20'					Small area of old beetly guano	Not eligible	Y	No action				
73.	TMD 068B	Adit	4.5' x __' x 15'					–	Not eligible	Y	No action				
				Portal rock unstable											
74.	TMD 069	Prospect pit	Depth of 6-10'					–	Not eligible	Y	Backfill with dump		Foot	Backfill mitigation	
75.	TMD 072	Prospect pit	Depth of 7-10'					–	Not eligible	N	Backfill, bring in fill		Foot, Stock or Helicopter	Backfill mitigation	

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				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
76.	TMD 073	Shaft with decline	Depth of 20'					–	Not eligible	Y	Partial backfill or PUF/backfill		Foot, Stock or Helicopter	Backfill mitigation
77.	TMD 074	Adit	3' × 5' × 25'					Javelina	Not eligible	Y	No action			
78.	TMD 075	Decline adit	Depth of 20'					Barn owl roost	Not eligible	Y	No action			
79.	TMD 078	Shaft with drift?	Depth of 50'					–	Not eligible	N	Cupola		Foot, Stock or Helicopter	Bat gate mitigation
80.	TMD 082	Adit	6' × __' × 165'					Guano Javelina	Not eligible	Y	Replace breached rebar gate with bat-friendly gate		Foot, Stock or Helicopter	Bat gate mitigation
81.	TMD 083	Shaft	8 'x 8' x 18'						Not eligible	Y	No action			

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				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
82.	TMD 084	Adit	Depth of 82'					Guano Javelina Snakes	Not eligible	Y	Replace breached rebar gate with bat-friendly gate		Foot, Stock or Helicopter	Bat gate mitigation
83.	TMD 085	Adit	Depth of 80'					Javelina Snakes Has good potential for bats when rebar gate is removed.	Not eligible	Y	Replace breached rebar gate with bat-friendly gate		Foot, Stock or Helicopter	Bat gate mitigation
84.	TMD 086	Shaft/no drift	Depth of 17'					–	Not eligible	Y	Partial backfill or PUF/backfill		Foot, Stock or Helicopter	Backfill mitigation
85.	TMD 087	Adit above shaft	Depth of 15'						Not eligible	Y	No action			
86.	TMD 088	Adit	6' × 5' × 15'					Javelina	Not eligible	Y	No action			

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				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
93.	TMD 094	Decline adit with drift	Depth of 14'					Barn owl	Not eligible	Y	Partial backfill or PUF/backfill		Foot	Backfill mitigation
94.	TMD 095	Shaft with drift?	Depth of 34'					Barn owl	Not eligible	Y	No action			
Antlion collar														
95.	TMD 096A	Shaft with drift?	Depth of 30'					Barn owl	Eligible	Y	No action			
96.	TMD 096B	Adit with shaft	2' × 5' × 40'					Barn owl	Eligible	Y	No action			
97.	TMD 097	Shaft with drift?	Depth of 30'						Not eligible	Y	No action			
98.	TMD 098	Decline shaft with drift?	Depth of 86'					Barn owl	Not eligible	Y	No action			

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				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
99.	TMD 100	Adit	Depth of 45'					Guano Javelina	Not eligible	Y	No action			
100.	TMD 101	Shaft with drift	Depth of 12'					Guano Tortoise fell in	Not eligible	Y	Partial backfill or PUF/backfill		Foot, Stock or Helicopter	Backfill mitigation
101.	TMD 102	Prospect pit	Depth of 7'					–	Not eligible	Y	Backfill		Foot	Backfill mitigation
102.	TMD 103	Adit	3-5.5' x 5.5' x 54'					Javelina	Not eligible	Y	No action			
103.	TMD 104	Shaft	6' x 8'x 9'						Not eligible	Y	No action			
104.	TMD 105	Prospect pit	Depth of 8'					–	Not eligible	Y	No action			

Saguaro National Park List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h × w × d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
105.	TMD 106	Shaft	Depth of 10'	<div></div>	<div></div>	<div></div>	<div></div>		Not eligible	Y	No action			
106.	TMD 107A	Prospect pit	Depth of 12'	<div></div>	<div></div>	<div></div>	<div></div>	–	Not eligible	Y	Backfill		Foot	Backfill mitigation
107.	TMD 107B	Adit above shaft	Depth of 30'	<div></div>	<div></div>	<div></div>	<div></div>	Barn owl	Not eligible	Y	No action			
108.	TMD 109	Shaft with decline	Depth of 6'	<div></div>	<div></div>	<div></div>	<div></div>		Not eligible	Y	Partial backfill or PUF/backfill		Foot, Stock or Helicopter	Backfill mitigation
109.	TMD 110	Adit	Depth of 15'	<div></div>	<div></div>	<div></div>	<div></div>	Javelina Olivine with pyrite on dump	Not eligible	Y	No action			
				Crumbly fault gouge										
110.	TMD 112	Prospect pit	Depth of 8'	<div></div>	<div></div>	<div></div>	<div></div>		Not eligible	N	Backfill		Foot	Backfill mitigation

Saguaro National Park List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h × w × d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
111.	TMD 113	Adit with drift	6' × 5' × 110'					Bats Javelina	Not eligible	Y	No action			
				Severe erosion at portal, slope creep										
112.	TMD 114	Adit	5.5-6' × 4-5' × 54'					Guano Javelina	Not eligible	N	No action			
113.	TMD 115	Prospect pit	Depth of 7'					–	Not eligible	N	Backfill		Foot	Backfill mitigation
114.	TMD 116	Shaft with drift?	Depth of 50'					Barn owls	Not eligible	N	No action			
				Unsafe collar										
115.	TMD 117	Shaft/no drift	5' × 30' × 20'					–	Not eligible	N	Partial backfill or PUF/backfill		Foot, Stock or Helicopter	Backfill mitigation
116.	TMD 118	Shaft/no drift	Depth of 50'					Barn owls	Not eligible	N	No action			

Saguaro National Park List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h × w × d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
117.	TMD 119	Prospect pit	Depth of 8'					–	Not eligible	Y	Backfill		Foot	Backfill mitigation
118.	TMD 120	Shaft/no drift	Depth of 14'					–	Not eligible	Y	Partial backfill or PUF/backfill		Foot, Stock or Helicopter	Backfill mitigation
119.	TMD 121	Prospect pit	Depth of 6'					–	Not eligible	Y	Backfill		Foot	Backfill mitigation
120.	TMD 123	Prospect pit	Depth of 10'					–	Not eligible	Y	Backfill		Foot	Backfill mitigation
121.	TMD 124	Prospect pit						–	Not eligible	Y	Backfill		Foot	Backfill mitigation
122.	TMD 127	Prospect adit	6' × 4' × 10'					Javelina	Not eligible	N	No action			
123.	TMD 128	Prospect pit	Depth of 7'					–	Not eligible	N	Backfill with dump		Foot	Backfill mitigation
				By trail										

Saguaro National Park List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h × w × d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
124.	TMD 130	Prospect pit	Depth of 9'	<div></div>	<div></div>	<div></div>	<div></div>	–	Not eligible	N	Backfill with dump		Foot	Backfill mitigation
125.	TMD 132	Adit	10' × 10' × 15'	<div></div>	<div></div>	<div></div>	<div></div>	Little guano	Not eligible	Y	No action			
126.	TMD 133	Adit	5' × 5' × 15'	<div></div>	<div></div>	<div></div>	<div></div>	Javelina	Not eligible	Y	No action			
127.	TMD 134	Decline adit	6' × 6' × 42'	<div></div>	<div></div>	<div></div>	<div></div>	Guano (none in 2008) Javelina	Not eligible	Y	No action			
				Portal rock instability										
128.	TMD 141	Shaft/no drift	Depth of 15'	<div></div>	<div></div>	<div></div>	<div></div>	–	Not eligible	N	Partial backfill or PUF/backfill		Foot, Stock or Helicopter	Backfill mitigation
				No fence										
129.	TMD 142	Prospect adit	Depth of 6'	<div></div>	<div></div>	<div></div>	<div></div>	Water collects Fox	Not eligible	N	No action			
				No fence										

Saguaro National Park List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h × w × d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
130.	TMD 143	Prospect adit	5' × __' × 10'					Javelina	Not eligible	N	No action			
131.	TMD 144	Prospect pit w/ associated features	Depth of 6-10'					–	Eligible	Y	Grate		Foot	Backfill mitigation
132.	TMD 145	Prospect pit	Depth of 10'					–	Not eligible	Y	Backfill		Foot	Backfill mitigation
133.	TMD 146	Prospect pit	Depth of 8'					–	Not eligible	N	Backfill		Foot	Backfill mitigation
				No fence										
134.	TMD 147	Decline adit with drift	Depth of 200'					Bats	Eligible	N	Closure will depend on outcome of CERCLA EE/CA action			
				Lead dust, cave-in										
135.	TMD 148	Decline shaft with drift?	4' × 10' × 50'					Javelina	Eligible	N	Closure will depend on outcome of CERCLA EE/CA action			
				Lead dust, cave-in										

No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h × w × d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
136.	TMD 149	Prospect pit	Depth of 6’	<div></div>	<div></div>	<div></div>	<div></div>	–	Eligible	N	Closure will depend on outcome of CERCLA EE/CA action			
137.	TMD 150	Prospect pit	Depth of 6’	<div></div>	<div></div>	<div></div>	<div></div>		Not eligible	N	Backfill		Foot	Backfill mitigation
138.	TMD 151	Decline shaft	Depth of 26’	<div></div>	<div></div>	<div></div>	<div></div>	Old honeycomb, not active	Not eligible	N	Partial backfill or PUF/backfill		Foot, Stock or Helicopter	Backfill mitigation
139.	TMD 152	Adit	6’ × 5’ × 20’	<div></div>	<div></div>	<div></div>	<div></div>	Little guano	Not eligible	Y	No action			
140.	TMD 153	Shaft	Depth of 35’	<div></div>	<div></div>	<div></div>	<div></div>	–	Not eligible	N	Partial backfill PUF/backfill		Foot, Stock or Helicopter	Backfill mitigation
				Barbed wire fence falling in across entrance										

Saguaro National Park List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
141.	TMD 154	Shaft with decline	Depth of 85'						Not eligible	N	No action			
142.	TMD 200	Shaft with drift?	Depth of 6'						Not eligible	N	No action			
				Low oxygen, no fence, no signs										
143.	TMD 201	Adit	5' x 4' x 20'						Not eligible	N	No action			
				No fence										

* From 003A to end of list – site and biological information is from Wolf (2009b), cultural eligibility from November 2009 field surveys and DOEs.

Table 6. Grand Canyon National Park List of Abandoned Mine Land Structures

Features to be closed with ARRA funding are shaded

Grand Canyon National Park List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
Ranking Score Total														
1.	Bass Asbestos 1	Adit – closed naturally	3' x 3' x 16'	1	2	0	0	No bats or signs of bats.	No DOE needed – no action	Y	No action			
3														
Stable; little rockfall; no airborne fibers noted														

Grand Canyon National Park List of Abandoned Mine Land Structures															
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction	
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating								
															Ranking Score Total
2.	Bass Copper 1	Adit, and water-filled sump ~ 1m deep – not a safety hazard. There is a narrow, small shaft above the adit	6' x 5' x 98'	2	0	4	0	Bats	Eligible	Y	Bat gate – 3-inch angle iron			Helicopter Difficult access off river.	Bat gate mitigation – Avoid bat breeding season for species present – generally April to August. Do post construction monitoring. MSO mitigation – survey area near mine prior to construction; avoid MSO breeding season of March through August. Limit number of helicopter trips. Cultural gate mitigation – ensure gate does not detract from historic setting and integrity of mine).
				6											
				Moderate rock consolidation; fairly stable											
3.	Bat Guano	Cave	1.25' x 1' x 15'	1	2	0	0	Unknown	No DOE needed – no action	Y	No action				
				3											
4.	Bonnie Tunnel	1 Pit		1	2	0	0	No bats	No DOE needed– no action	Y	No action				
				3											

Grand Canyon National Park List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h × w × d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
5.	Boucher Mine	1 Adit	4' × 3' × 49'	1	2	0	0	No bats	No DOE needed– no action	Y	No action			
				3										
				Fairly stable										
6.	Cameron Claims 1	Adit – may be collapsed		1	2	2	0	Potential bats	No DOE needed– no action	Y	No action			
				5										
7.	Copper Grant 1	Adit	6' × 5' × 112'	4	2	4	0	Bat guano Packrats	Eligible	Y	Bat gate – 3-inch angle iron (or other lighter weight material if similar or less impacts)		Helicopter	Bat gate mitigation MSO mitigation Cultural gate mitigation
				10										
				Loose rock; unstable walls and ceiling; possibly dangerous air										
8.	Grandview/ Last Chance	Adit – Bat-gated	6' × 5' × 36' to bat gate '	1	1	4	0	Bats – potential night roosts Turkey vultures Ravens Cooper's hawk American kestrels	Listed – 7/9/74	Y	No action – Already closed with bat gate			
				6										

Grand Canyon National Park List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
9.	Grandview/ Last Chance	Adit – Bat-gated	5.5' x 6' x 37' to bat gate	1	1	4	0	Bats Wildlife – see above.	Listed	Y	No action - Already closed with bat gate			
				6										
10.	Grandview/ Last Chance	Adit – Bat-gated	Undetermined original measurements	0	0	4	0	Bats Wildlife – see above	Listed	Y	No action – Already closed with bat gate			
				4										
11.	Grandview/ Last Chance 13	Adit feature #13	5' x 3' x 11.5'	2	1	2	0	See above	Listed	Y	PUF/backfill ALSO includes reclamation of social trails across tailings and near adit and better directing people around the mine site along official trails		Helicopter	Bat mitigation for trail realignment – same as bat gate mitigation. MSO mitigation Backfill mitigation – prior to construction, exclusion methods would be used to ensure wildlife including bats do not become trapped when closing.
				5										
				Unstable ceiling										
12.	Grandview/ Last Chance	Shaft	8' x 10' x 20'	5	1	2	0	Potential bat roost Wildlife – see above	Listed	Y	PUF/backfill		Helicopter	MSO mitigation Backfill mitigation
				8										
				Potential for subsidence										

Abandoned Mine Lands Closure Plan and EA

Grand Canyon National Park List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
13.	Grandview/ Last Chance	Prospect pit	12' x 12' x 6'	1	1	2	0	No evidence of bat use.	Listed	Y	No action			
				4				Wildlife – see above						
14.	Grandview/ Last Chance	Prospect pit – may be collapsed adit	20' x 24' x 12'	5	1	2	0	No evidence of bat use.	Listed	Y	Partial backfill		Helicopter	Backfill mitigation
				8				Wildlife – see above						
				Cannot climb out										
15.	Havasut Adit 3	Adits (only found main adit 1/09 – with passage that forks off)	6' x 6.5" x 115'	1	2	4	0	Bats	Eligible per site form 2/23/84	Y	Bat gate – 3-inch angle iron (or other lighter weight material if similar or less impacts)		Helicopter or possible river access	Bat gate mitigation MSO mitigation Cultural gate mitigation
				7										
				Good rock consolidation; very little rockfall; passage appears stable										
16.	Hermit Road Prospects Pits	Prospect pit	8.5' x 6' x 5'	1	2	2	0	No potential bat habitat.	Eligible per site form 2/23/84	N	No action			
				5				Wildlife – mule deer, elk, chipmunk, various birds						
17.	Hermit Road Prospects Pits	Prospect pit	6' x 7' x 7'	1	2	2	0	See above	Eligible per site form 2/23/84	N	No action			
				5										

Grand Canyon National Park List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
18.	Hermit Road Prospects Pits	Prospect pit	10' x 12' x 3'	1	2	2	0	See above	Eligible per site form 2/23/84	N	No action			
				5										
19.	Little Chicken 1 (includes Saddle Mine)	Adit		1	2	2	0	Bats possible	No DOE needed – no action	Y	No action			
				5										
20.	Marble Canyon Dam Exploration Site 1	Adit	7' x 6' x 65'	2	2	2	0	Bats – guano present Packrats.	Not eligible per site form 11/27/91	Y	Bat Gate – 3-inch angle iron (or other lighter weight material if similar or less impacts)		Helicopter (possible river access)	Bat gate mitigation MSO mitigation.
				6										
				Good rock consolidation, little rock fall, seems stable										
21.	Marble Canyon Dam Exploration Site 2	Adit	7' x 6' x 200'	2	2	2	0	Same as above	Not eligible per site form 11/27/91	Same as above	Bat Gate – 3-inch angle iron (or other lighter weight material if similar or less impacts)		Helicopter (possible river access)	Same as above
				6										
22.	Marble Canyon Dam Exploration Site 3	Adit	8' x 7' x 575'	2	2	2	0	Same as above	Not eligible per site form 11/27/91	Same as above	Bat Gate – 3-inch angle iron (or other lighter weight material if similar or less impacts)		Helicopter (possible river access)	Same as above
				6										

Grand Canyon National Park List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
23.	Marble Canyon Dam Exploration Site 4	Adit	8' x 7' x 82'	2	2	2	0	Same as above	Not eligible per site form 11/27/91	Same as above	Bat Gate – 3-inch angle iron (or other lighter weight material if similar or less impacts)		Helicopter (possible river access)	Same as above
				6										
24.	Marble Canyon Dam Exploration Site	Marble Canyon Dam upper exploration site		2	2	2	0	Bat guano Packrats	No DOE needed– no action	Y	No action			
				6										
25.	Marshall Lazune Group	Survey (BCI) of 1/26/09 found one partially collapse adit and one storage area, the rest of the working seemed to be collapsed.	5' x 5' x 55'	5	2	4	0	Bat guano Packrats	Eligible per site form 2/23/84	y	No action			
				11										
				Poor rock consolidation and unstable										

Grand Canyon National Park List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
26.	Tanner McCormick Mine 1	Adit	5' x 5" x unknown	3	2	4	0	No evidence of bat use. Ringtail Desert big horn sheep Mountain lion Raven Canyon wren Turkey vulture Muskrat California condor overhead.	Eligible per site form 11/27/91	Y	Bat gate – 3-inch angle iron		Helicopter (possible river access)	Bats – preconstruction check for presence; bat gate mitigation if present. MSO mitigation Cultural gate mitigation
27.	Tanner McCormick Mine	Prospect adit	4' x 3.5' x 11'	2	2	2	0	No evidence of bat use.	See above	Y	No Action			
				6										
				Feature is flowed with approximately 2 feet of water; only hazard is falling rock.										
28.	Morning Star 1	Pit (All workings seemed to be collapsed or closed naturally, no underground openings found)		0	2	0	0		No DOE needed– no action	Y	No action			
				2										
29.	N. Bass Mine Adit 1	Adit	6' x 5' x 11.5'	2	2	2	0		Eligible per site form	Y	No action			
				6										

Abandoned Mine Lands Closure Plan and EA

Grand Canyon National Park List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP 2/23/84	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
Ranking Score Total														
30.	Pinto Mine 3 (aka Tuckup Mine)	Adit shaft 2 other adits – no action	4' x 4.5' x 65'	2	1	4	0	Bat use – night roost and potential hibernacula. Say's phoebes nests Woodrat	Eligible	Y	Bat gate – 3-inch angle iron		Helicopter	Bat gate mitigation MSO mitigation. Cultural gate mitigation
				7										
31.	Pinto Mine	Shaft	6' x 7' x 35'	5	1	4	0	See above – need to assess	Eligible	Y	Grate or cupola (3-inch angle iron), depending on outcome of winter (cold) season survey		Helicopter	See above – need to ensure cupola does not detract from historic setting and integrity of mine.
				10										
32.	Point Sublime Prospect Pit 1	Prospect, 3' deep		0	2	0	0		No DOE needed– no action	N	No action			
				2										
33.	Rowe Well Claim	Well	3' x 22'	0	2	2	0	No potential bat habitat. Elk Songbirds Hairy woodpecker Ravens	Eligible	N	No action – already capped			
				4										

Grand Canyon National Park List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
34.	Rowe Well Claim	Prospect pit	7.5' x 17' x 5'	1	2	2	0	See above	Eligible	N	No action			
				5										
35.	Rowe Well Claim	Prospect pit	9' x 12' x 3'	1	2	2	0	See above	Eligible	N	No action			
				5										
36.	S. Rim Prospect Pit	Prospect pit 6 small pits – site form says 7, 1-4 feet deep	Dimension given in inches for these 115" x 108" x 42"	1	2	2	0	No bat use. Elk Songbirds Ravens	Eligible per site form 2/23/84	N	No action			
				5										
37.	S. Rim Prospect Pit	Prospect pit	139" x 108" x 48"	1	2	2	0	See above	Eligible	N	No action			
				5										
38.	S. Rim Prospect Pit	Prospect pit	98" x 81" x 46"	1	2	2	0	See above	Eligible	N	No action			
				5										
39.	S. Rim Prospect Pit	Prospect pit	105" x 105" x 14"	1	2	2	0	See above	Eligible	N	No action			
				5										
40.	S. Rim Prospect Pit	Prospect pit	91" x 62" x 12"	1	2	2	0	See above	Eligible	N	No action			
				5										

Abandoned Mine Lands Closure Plan and EA

Grand Canyon National Park List of Abandoned Mine Land Structures														
No.	Name of Mine Site/Feature Number	Type of Mine Feature	Dimensions of Features (h x w x d in feet)	Ranking*				Presence of Bats and Other Wildlife	Listed or Eligible for NRHP	Presence of Wilderness Values [Y/N]	Closure Method	Location for Closure	Access	Mitigation/Timing Restriction
				Hazard Rating	Access Rating	Resource Rating	Impacts Rating							
41.	S. Rim Mine Adit	Adit	4.5' x 6' x 36'	1	2	4	0	Guano – low use day roost possible hibernacula. California condor Turkey vultures overhead Ravens Songbirds Chipmunk	Eligible per site form 2/23/84	N	Bat gate – 3-inch angle iron (or other lighter weight material if similar or less impacts)		Foot	Bat mitigation MSO mitigation. Cultural mitigation
7														
42.	Snyder Mine	4 Adits		1	2	2	0	Potential bats	No DOE needed– no action	Y	No action			
5														
43.	Trail Canyon Mine and Camp	1 Adit		1	2	2	0		Eligible per site form 2/23/84	Y	No action			
5														
44.	Yavapai Ob. Station Tunnel	Adit (really a basement – houses monitoring equipment)	4' x 5' x 17.7'	1	2	2	0	Potential bat use during cold seasons, but limited – no dark zone. Wildlife – songbirds and woodrat	No DOE needed – no action	N	No action			
5														

*If no ranking, was not recently surveyed; information from park-supplied data

Closure Descriptions and Construction Process

Table 7 provides a description of the type of closure action proposed at AML features within each park. The following section describes the various types of closures and the process used to construct these. 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 uninhibited access.

Appendix A provides photos and typical design diagrams for the various closures included in this plan.

Table 7. Summary of Closure Actions by Park

Park	Bat Gates	Cupolas	Grates	PUF / Backfill Closures	Backfills	No Action*	Other	TOTAL
Coronado	17	11	2	21	1 light	13 (6 already closed, rest are low visitation/low hazard shallow pits or small adits)		65
Organ Pipe Cactus	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 management)	87 (one action listed for partial backfill of all 300 prospect pits)
Saguaro	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
Grand Canyon	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

* no action indicates where no further action is proposed because the features has 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 Saguaro).

All of the proposed bat gate designs have been used effectively throughout the United States to accommodate various bat species under certain conditions. Their selection for each opening addressed in this EA 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), 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 “Monitoring and Adaptive Management” below).

Bat Gates

Types of gates and gate selection. 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. Those that are being considered for use in the Arizona parks, as indicated on tables 3 through 6, 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.

One- inch Manganal® roundbar has also been used to fabricate bat- gates. One- inch roundbar is a lighter- weight material that is suitable for small openings, but requires a concrete footing and vertical supports every 2 feet. The NPS elected not to use 1- inch round Manganal® for bat-gating ARRA- funded mine features because it does not meet the ARRA standard for 100% American- made materials. The 1- inch Manganal® roundbar is not manufactured in the United States because its manufacturing exceeds pollution standards. However, should a comparable 1- inch roundbar steel alloy be available that provides comparable work- hardening and wear-resistance properties, the NPS may use 1- inch roundbar in fabricating bat- gates at mine features in the future, where this material is suitable.

Photos and generic designs for the types of gates proposed in this EA are provided in appendix A. 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 USFWS and as presented in the biological assessment conducted for those sites.

It is important to select the most appropriate bat gate design and materials from those available that would ensure bat protection and minimal impacts. As mentioned above, the decision should be made based on many factors, but especially bat species, bat numbers, type of use, and size of opening, while also weighing the ease of transport of material, required construction time and associated disturbance, resistance of material to vandalism, the relative risk of vandalism at the site (site accessibility and knowledge of visitation), and cultural resource values. Input on gate selection was solicited from several knowledgeable sources during the preparation of this EA, including Bat Conservation International (BCI), the local USFWS representative, and several state AML directors and various experienced practitioners, and scoping comments related to bat gate design were also considered. Also, literature addressing bat gating was reviewed, including a recent publication from BCI, *Managing Abandoned Mines for Bats* (Sherwin et al. 2009). There was a wide range of opinions on designs and their advantages and

disadvantages among the individuals and sources consulted; however, not much hard data or peer-reviewed literature is available, and species-specific data are lacking.

The BCI publication (Sherwin et al. 2009) addresses gating adits and shafts. The authors state, “Protective closures include a variety of gate designs that have been built of a wide range of materials. Construction material and design usually can be selected during the planning phase of a project and modified as necessary. Construction material is largely determined by the type of closure and budget.” The authors go on to say that “bat gates with a 5 3/4-inch horizontal spacing are generally recommended by BCI, but that bar spacing and other modification to a standard design may be adjusted to meet site-specific requirements and to best accommodate the size of the colony utilizing the mine.” They emphasize that care needs to be taken when applying a design to a species without knowing how the species would tolerate the design. For shafts, they discuss the use of shaft grates, netting, and cupolas.

The Arizona Tucson office USFWS representative (Richardson pers. comm. 2009) indicated that he had no particular preference for construction materials (round bar, square tube, or angle iron) for any of the bat species of concern. He stated that the important issue is maintaining suitable flight space for the bats. Dave Waldien, Co-director of Programs and Conservation Scientist at BCI reiterated what is in the BCI handbook, stating that the design selected needs to fit the variables present at the site (bat species type of use, population size, configuration of the opening) (Waldien pers. comm. 2009). Jim Kennedy, Conservation Biologist, Cave and Mine Resources Specialist for BCI offered detailed comments about bat gates. He stated in his correspondence (Kennedy pers. comm. 2009) that design and placement of the gate is critical, and that there are many factors which must be considered for a gate to be successful, including biology (microclimate); use of the mine by bats (e.g., smaller colonies of bats can adapt to almost any type of gate design or materials) and the size, stability, and orientation of the opening. As for materials, he stated that there are many choices, but decisions are based on security, cost, and biological friendliness, and he offered his professional opinion on the types commonly used today, with an emphasis on bats being able to negotiate vertical elements of gates and having adequate net passage cross-section and flight space available for bats.

Airflow is important, and Roebuck (2002) suggests choosing a location for the closure such that air flow is less than 10 feet/second to avoid airflow blockage issues with tube designs, minimizing vertical columns to avoid creating air flow interference, and assuring that the amount of the path blocked by the gate design is less than 45% of the total airflow path at the gate location. He stated that most open design gates should fall into this category, and that at slow air velocity, the materials used are roughly equal in allowing air to pass through the gate.

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 type of gates selected and listed in the tables in this section reflects 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.

Construction Process. Regarding the construction process for any gate, construction would take place during specified times 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 one day for small to medium adits and up to four days for large bat- gate adits 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 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 accessibility of sites. 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, gate construction (actually, 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 (see “Mitigation” below).

Cupolas

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 A.

Cupola construction would take place during times as 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- 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 accessibility of sites. 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 $\frac{3}{4}$ 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 drill, cutting torches, and miscellaneous small tools. Similar to bat-accessible gates, cupolas are typically built using non-reflective materials.

PUF/Backfill Closures (Combination of Polyurethane Foam Plug and Backfill)

A PUF/backfill closure uses polyurethane foam (PUF) 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 to avoid adverse impacts under Section 106 of the NHPA, since they are not considered permanent closures. 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 15–30 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 A.

PUF/backfill closures would take place during times as 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 one 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 accessibility of sites 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 from surface, with 2 to 3 feet of soil/rock debris to ground level
- Clean-up and re-vegetation if necessary
- De-mobilization

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 A.

Backfill closures would take place during times as 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 one day; larger closures and “heavy” backfills may take several days to complete. There would likely be less than 5 people on site during a “light” backfill, and up to 10 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

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 angles 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.

Helicopter Use

To develop the proposed action, consideration was given to avoiding or minimizing use of mechanized equipment in designated or proposed wilderness. However, as indicated on tables 3

through 6, 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 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 8, and Appendix B, Minimum Requirements Analysis). Helicopters may be used at other sites that are listed as foot, stock, or helicopter, subject to minimum requirements analyses.

Table 8. Site Closures for which Helicopters Would Likely Be Needed

Park	Total
Coronado	45
Organ Pipe Cactus	15
Saguaro	7 known
Grand Canyon	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 Organ Pipe Cactus or Grand Canyon or most of Saguaro, since most or the majority of these parks are designated or proposed wilderness (see figures 2–6; Coronado 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 (2–4 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 a 8- foot x10- foot cupola) to 9 hours (for a 14- foot x 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 500–3,000 pound range for materials and equipment and the 1–2 hour range for helicopter transport.

Also, larger helicopters can carry up to 6,000–8,000 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.

Mitigation

Mitigation specific to each site is listed on tables 3 through 6; **bolded** types of mitigation are described in more detail below. Other mitigations may be determined by the individual parks identified in the Minimum Requirement Analysis. Additional details and other measures follow.

General/ Soils/Water Quality: NPS staff or designated project supervisors would monitor all construction activities to minimize potential impacts. Care would be taken to minimize trampling of vegetation and erosion at mine sites and along trail. Best Management Practices (BMPs) would be used as needed to reduce the potential for erosion and runoff to nearby drainages and downstream waters.

Helicopter Mitigation

- 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.
- When transporting sling loads, helicopters would remain a minimum of 100 feet above the ground to minimize noise impacts at ground level.

Protection of Listed Species and Other Wildlife

- The NPS would monitor construction activities to minimize potential environmental impacts.
- To minimize impacts on wildlife, work would be done during daylight hours only. Disruption and noise would be limited by limiting the number of people on site to fewer than 10 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 (see below). If disturbance even from monitoring activity is a major 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 below.
- 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.

Bat gate mitigation (see tables 3 through 6) would occur to minimize impacts on various special status species during key reproductive or hibernation periods. Gate construction would generally avoid the period of March to August to avoid disrupting the Mexican spotted owl (*Strix occidentalis lucida*) breeding season at sites where the owl is of concern. The owl is a federally- listed threatened species. Mexican spotted owl may occur in Saguaro, Coronado, or Grand Canyon. At Coronado, the NPS established a 600- acre Protected Activity Center for the owls after a nest was discovered in the northwest sector of the memorial in 2001.

Bat compatible gates or cupolas would be constructed during non- critical periods for bats (i.e., avoiding maternity sites during maternity period, post- maternity roosts, and openings used for hibernation). For lesser long- nosed bats, this means avoiding their active season in the parks that ranges from April until October, depending in the park. At Organ Pipe Cactus, construction would not occur from February through July to avoid disturbance during the Sonoran pronghorn breeding period. Given these restrictions, construction would generally be limited in all parks to the fall/early winter months. Seasonal breeding restrictions for federally listed species, as included in the biological assessment, are shown in figure 7. Construction timing would also take into account other wildlife that could be affected, such as hibernating bats or nesting birds disrupted by helicopter transport of equipment and supplies. However, the restrictions in place for bats and special status species would often protect most other wildlife breeding or nesting seasons.

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 January/February 2011 into 2013). 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 bats and birds such as the Mexican spotted owl and barn owl (see "Mitigation" below).

Figure 7. Seasonal Restrictions for Federally Listed Species**Coronado National Memorial Seasonal Restrictions**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
LLNB Post-maternity												
Mexican Spotted Owl												
Construction Window												

*During this period, no construction is allowed at the Clark/Smith Group.

Organ Pipe Cactus National Monument Seasonal Restrictions

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lesser Long-nosed Bat												
Sonoran Pronghorn												
Construction Window												

Saguaro National Park Rincon Mountain District Seasonal Restrictions

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
LLNB and other Bats												
Construction Window												

* Construction may proceed if no bats are present.

Saguaro National Park Tucson Mountain District Seasonal Restrictions

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
LLNB Maternity												
LLNB Post-maternity												
Mexican Spotted Owl												
Construction Window												

*Construction possible if no bats are present.

Grand Canyon National Park Seasonal Restrictions

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mexican Spotted Owl												
Southwestern Willow Flycatcher												
Construction Window												

LLNB - Lesser Long-nosed Bat

In desert tortoise habitat, contractors would be educated prior to mobilization to increase their awareness of the potential risks prior 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 with potential Southwestern willow flycatcher habitat nearby, activities would be conducted outside of the breeding season (typically early May through July) to avoid potential disturbance to breeding populations. In addition, activities would avoid disturbance of 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 fencing mitigation (see table 4) would be used where temporary fences are proposed at Organ Pipe Cactus in conjunction with the longer term adaptive management approach for protection of the lesser long-nosed bat. This would include no construction during breeding or hibernation periods and consultation with USFWS regarding placement and design.

Backfill mitigation (see tables 3 through 6) 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 one-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 – Grand Canyon Only

Grand Canyon National Park 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 USFWS. 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 EA. The following list of measures would be implemented during construction of mine closures at Grand Canyon:

- Cover all water when not in use
- Keep camp areas free of trash
- Provide all project personnel with literature or instruction regarding condor concerns
- Record and report immediately any condor presence in the project area to a Resource Advisor or a park wildlife biologist
- 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
- Minimize aircraft use along the rim to the greatest extent possible
- 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
- Aircraft would give up airspace to the extent possible if airborne condors approach aircraft, as long as this action does not jeopardize safety
- Projects would not occur within ½ mile of active condor nesting sites
- Crews would stop activity if condors arrive on site and immediately notify appropriate NPS personnel

Sentry Milkvetch – Specific Conservation Measures – Grand Canyon 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 (see below). 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 USFWS and will not proceed with closure activities at that particular site until authorized.

Sonoran Pronghorn – Specific Mitigation Measures – Organ Pipe Cactus only

Construction activities for the abandoned mine lands project would be restricted to avoid the fawning for the Sonoran pronghorn (February 1 through July 31). In the unlikely event that pronghorns are encountered during flight operations, supply flight paths would be altered to maintain 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.

Protection of Archeological and Historical Resources/Visual Mitigation

The selection and placement of closure options was made to minimize impacts on all resources, including cultural resources. No adverse effects as defined by Section 106 are expected at those sites that are eligible for listing in the National Register. At eligible sites, no full or permanent backfills are proposed. **Cultural backfill mitigation** (see tables 3 through 6) at sites designated for non- permanent PUF/backfill closure would consist of minimizing disturbance to any site features that contribute to the cultural significance and by limiting partial backfills to shallower sites and ensuring that the use of partial backfills does not reduce the overall historic context of the site. For sites where gates or cupolas are proposed, **cultural gate / cupola mitigation** (see tables 3 through 6) would be followed. Gates would generally be placed within the opening so that they are not visible from the outside. Cupolas would be designed to be as unobtrusive as possible. Efforts would be made to follow as closely as possible the form, line, color and texture of the surrounding natural features. Cupolas and gates would utilize earth tones (including natural rust) and non- reflective surfaces to better blend in with the existing landscape. Existing topography would also be used to the extent possible in shielding the surfaces from long- range views. **Cultural fencing mitigation** (see table 4) would be used where temporary fences are proposed at Organ Pipe Cactus in conjunction with the longer term adaptive management approach for protection of the lesser long- nosed bat. This mitigation is basically met by ensuring that fencing is not permanent.

For National Register eligible sites, any surface disturbance needed for closure operations would be monitored by a cultural resource specialist to ensure recovery of any artifacts that may be present in the material excavated. If significant resources, as determined by the monitor, are encountered during work activities, all activities would stop in the vicinity of the find until significance of those resources can be determined by the monitor. Archeological sites would be avoided by a redesign, or if that is not possible, adverse recovery efforts would be mitigated through a data recovery program per Section 106 of the National Historic Preservation Act, as amended. If data recovery were needed, adverse actions on cultural resources that would result in the loss of cultural resources would require some form of mitigation after consultation and agreement with the SHPO and the Advisory Council on Historic Preservation. Acceptable mitigation actions in the past have included documentation to Historic American Engineering Record standards. The level of HAER documentation would be determined by the NPS HAER program and in cooperation with the SHPO. These may include ink on Mylar record drawings, large format (4 x 5 negative) black and white, archivally processed photographs, and history narratives or data sheets. For the mitigation of the loss of historical archeology, the site would require the development of a research design, approved by the SHPO. The mine site would require complete or partial salvage archeology, depending on the scale of the project, and analysis of the mine site's archeological features (trash middens, for example). The final report would be submitted for SHPO review and concurrence on completion.

If American Indian human remains or objects are discovered during the course of closure activities, the NPS would comply with Section 3 of the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA).

Mitigation Related to Visitor Use and Experience

For the most part, the construction periods that avoid key breeding seasons would also avoid higher visitor use periods. In addition, construction scheduling would attempt to avoid any special visitor use events or high visitation periods if possible.

Mitigation Related to Wilderness

Many of the measures listed above, especially those listed as helicopter mitigation and visual mitigation, would also minimize impacts to the wilderness character of the parks. Other mitigation is discussed for each park with wilderness resources in the Minimum Requirements Analysis (appendix B). In general, parks would consider use of access other than helicopter access (pack animals for Saguaro and Organ Pipe Cactus; river access for Grand Canyon) to minimize disturbance in or over wilderness areas.

Monitoring and Adaptive Management

As previously mentioned, the NPS is committed to pre- construction assessment of site conditions and post- construction monitoring and inspection by NPS staff to confirm the continuing integrity of the closures and to identify areas needing additional corrective action. Pre- construction data is already available for many of the mine features, but pre- construction monitoring would be done where no data exist and a closure is planned that could affect the use of the openings by bats. The data from post- construction monitoring would be used in an adaptive management approach that compares the effects of the implemented management actions to the baseline data and the desired or expected outcome. This approach is formalized in the biological assessment that was completed in conjunction with this EA.

In all cases, if the actions are not having the desired effect, the parks would review their goals and modify the action to encourage the desired outcome (e.g., continued or enhanced bat use of a feature). Monitoring would 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 with use by listed bat species and where the outcome of gating the feature is uncertain, and yet the feature needs protection (e.g., some sites in Organ Pipe Cactus used as maternity colonies by the lesser long- nosed bat). The information obtained from this effort would also be invaluable in making future decisions on closure designs and mitigations.

In general, post construction monitoring would include regular checks for vandalism and biological monitoring to determine if the bats using the mines accept the closures. A specific experimental adaptive management approach is proposed to protect the lesser long- nosed bat. This includes phasing in of closure construction at Organ Pipe Cactus; only four of the features that support the lesser- long- nosed bat would be initially closed and with different types of closures to see how the bat adapts to the change before taking additional action at other and/or larger maternity colonies. All other features that support this listed species would be temporarily fenced pending the results of the closures. A 3- year program is proposed to monitor key indicators, such as bat use, bat behavior, temperature, and humidity. The results would be used to make future decisions about closures and to adjust the closures that were put in place as needed.

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 that utilize 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 Biological Assessment (BA) that was completed in conjunction with this EA and submitted to the USFWS. For example, should the impacts of a selected closure method to lesser long-nosed bat exceed limits considered acceptable by the NPS and the USFWS, the closure method implemented at that site would 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 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 the information gained from pre- and post-construction monitoring efforts. The determination of the level of acceptable effects under the adaptive management approach will be made during section 7 consultation and documented in the biological opinion proffered by the USFWS.

For example, at Organ Pipe Cactus, 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 the mine features that are currently identified for temporarily fencing. It is likely that a standard or folded gate could be used at an adit entrance and a cupola would be needed at a shaft entrance. It is anticipated that a chute gate would be proposed for the major maternity colony at Organ Pipe Cactus. This gate could alter 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 BA includes additional details about this proposed approach.

Under the adaptive management program, two pre-construction and post-construction monitoring/survey protocols would be implemented as follows:

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 Survey 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 USFWS 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 adaptive management. For all non-lesser long-nosed bat sites closed with a gate or cupola, post-construction monitoring will be conducted using Monitoring Method 1 for at least two 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 bat are

known to occur at Organ Pipe Cactus and Coronado, 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 or Rincon Mountain District of Saguaro¹, and Grand Canyon occurs outside the range of the lesser long-nosed bat. Monitoring Method 2 would only be implemented at Saguaro 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 USFWS. 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, correctable 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.

Alternatives Considered but Dismissed

Use of cable netting – Use of steel cable netting was considered in the evaluation process. Installing cable netting would allow some bat access via the standard 6-inch by 6-inch grid pattern, which is also conducive to the flow of sunlight, air and small animals (Kretzmann 1997). The ¼-inch to 5/16-inch thick galvanized aircraft cable is often the most economical means to safeguard large openings with a minimum amount of materials. Additionally, nets can

accommodate irregular- shaped openings more easily than other structural solutions. However, the potential for vandalism and corrosion as well as an expected lifespan of only 20 to 30 years are downsides of cable net installation. Bolt cutters, hacksaws, and cutting torches can easily breach ¼- inch thick cable, and in recent years, vandals have sawed through the cable netting at one of the mines at Coronado. Cable netting can also be breached in less than ten minutes without using man- made tools (e.g., by hitting it with a rock). Furthermore, cable wires tend to unravel over time and projecting wires can harm bats. For example, in 2005, a lesser long- nosed bat at the State of Texas mine site died after it impaled a wing on a loose wire of a cable net and was unable to free itself. For these reasons, steel cable netting was dropped from consideration.

Blasting – Blasting can be used to close off mine openings; however, there is concern about the stability and completeness of the closure as well as safety concerns with the transport and use of explosives. Since other safe and effective options for permanent closures (backfilling) are available, blasting was not included in this plan.

Closures for all mine features at all parks – The original intent of this plan was to provide closure recommendations and implement those closures for all parkwide mine features. During the course of the field and data evaluations, it was apparent that some features required additional data to make the best decision on closures, so no action would be taken at this time. These were therefore not included as part of the action alternative, but are listed in tables 3 through 6 so that anticipated future closures can be considered in the cumulative impact analysis, along with other features that have already been closed.

Environmentally Preferred Alternative

The environmentally preferred alternative is determined by applying the criteria suggested in NEPA, which guides the CEQ. The CEQ provides direction that “[t]he environmentally preferred alternative is the alternative that will promote the national environmental policy as expressed in NEPA section 101:

- fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
- assure for all generations safe, healthful, productive, and esthetically and culturally pleasing surroundings;
- attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;
- preserve important historic, cultural and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice;
- achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life’s amenities; and
- enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.”

Alternative B (Proposed Action) is the environmentally preferred alternative because it would better address these six evaluation factors, and it best protects, preserves, and enhances historic,

cultural, and natural resources (40 CFR 1500–1508). Alternative A, No Action, would not meet criteria 1 or 2 as well as alternative B, since alternative B would ensure the features are protected against vandalism and damage for future generations, and would assure that all generations have a safe and healthful environment by correcting current dangerous conditions at open mine shafts, adits, and deep pits. Installation of bat-accessible closures, as well as more permanent closures where bats, other wildlife, and cultural resources are not of concern, would provide more and better long-term protection to park staff, visitors, and wildlife (including sensitive species) from the safety hazards that exist at unguarded openings. Alternative B would also best attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences (criterion 3). Alternative A may not have the potential for as many unintended consequences, since there would be no construction or structure that could potentially adversely affect wildlife currently using the features or the cultural fabric of the sites. However, alternative A would not attain the widest range of beneficial uses of the environment without long-term degradation, since it would continue current unsafe conditions including risks to health and safety of park visitors and staff. Alternative B would better preserve important historic, cultural, and natural aspects of our national heritage by preserving mine sites and selecting closures that would not cause adverse effects to cultural or historic features or important biological resources, and that would have little impact on site appearance or character, thus supporting diversity of visitor experience at these sites (criterion 4). Both alternatives would contribute to achieving a balance between population and resource use that would permit sharing of life's amenities, but alternative B would better ensure that the amenities are preserved for the future by protecting mine sites and their associated natural and cultural resources. Finally, alternative B would better enhance the quality of renewable resources by providing protected habitat for bats and other wildlife (criterion 6).

Alternatives Comparison Tables

The following tables summarize the major components of alternatives A and B and compare the ability of these alternatives to meet the project objectives (the objectives for this project are identified in Section 1, Purpose and Need). As shown in tables 9 and 10, alternative B meets each of the objectives identified for this project, while the no-action alternative does not address all of the objectives.

Table 9. Major Components of Alternatives A and B

Alternative A, No Action	Alternative B, Mine Closure Implementation
Mine openings and surrounding areas would maintain current management status and remain in their present condition, subject to natural forces. Parks would conduct routine monitoring that would check for vandalism, safety concerns, and bat usage, and warning signage would remain in place or be maintained as needed. Open adits, shafts, and some pits would continue to pose a safety risk to park visitors.	A variety of closure methods would be implemented to address safety concerns at open or dangerous mine features. Type of closure would depend on site-specific conditions and features. In some cases, the decision for a particular feature that is not a high risk or hazard would be to do nothing but continue to monitor that site. For most openings of substantial depth, however, the proposed action for each consists of some type of gate, fencing, backfill or other closure method.

Table 10. Analysis of How Alternatives Meet Objectives

Objectives	Alternative A, No Action	Alternative B, Mine Closure Implementation
Correct health and safety hazards at the abandoned mine sites to reduce exposure of park staff and visitors to the dangers posed at these sites, while preserving natural and cultural resource values.	Does not meet objective. No additional management actions would be taken to close unsafe mines.	Fully meets objective. Proposed closure actions, access, and mitigation would correct health and safety hazards, while minimizing adverse impacts to resources; proposed monitoring would provide feedback on resource effects and site conditions.
Avoid or minimize impacts on the park's natural and cultural resources and values, and visitor use and experience.	Does not meet objective. Park natural and cultural resources at mine sites remain subject to intrusion and damage; health and safety risks continue to exist.	Fully meets objective. Proposed actions would include mitigation to minimize or avoid adverse impacts on park resources and values, and adaptive management and monitoring would provide continued assurance of minimal impacts.
Prevent impairment of the park's resources and values.	Partially meets objective. Taking no action could lead to severe impacts to selected locations in the future, but this level of impact would likely not reach the level of impairment.	Fully meets objective. Closures would provide protection for key cultural and biological resources in all parks.

Summary of Environmental Consequences

Table 11 summarizes the impacts of the project alternatives, including no action, based on the analysis in Section 3, Affected Environment and Environmental Consequences.

Table 11. Environmental Impact Summary by Alternative

Impact Topic	Alternative A, No Action	Alternative B, Proposed Action (NPS Preferred Alternative)
Historic Structures and Districts	Potentially long-term, local, negligible to moderate impacts to historic structures and districts, with the moderate effects stemming from potential impacts to features that remain open and are susceptible to vandalism. Cumulative impacts would be long-term minor adverse.	Long-term, local, mostly minor, but possibly some moderate adverse effects on historic structures and districts as a result of installing gates, grates, cupolas, or moving earth, rocks, or tailings piles; steps would be taken to mitigate for adverse impacts of any ground-disturbing activities. Long-term benefits from protection of cultural resources inside mine openings. Cumulative impacts would be long-term negligible to minor adverse.
Bats and Other Wildlife (including Federally Listed Species and Species of Management Concern)	Long-term negligible to moderate adverse impacts on bats and other wildlife; possible benefits of unobstructed openings; impacts would depend on the accessibility and vulnerability of the feature. Cumulative impacts would be long-term minor adverse.	Long-term beneficial impacts on bats and other wildlife; closures would be accurately selected and suit the needs of resident species. Short-term negligible to moderate adverse impacts could occur during construction or during the implementation of the adaptive management approach. Cumulative impacts would be long-term minor adverse.

Impact Topic	Alternative A, No Action	Alternative B, Proposed Action (NPS Preferred Alternative)
Visitor Use and Experience including Human Health and Safety	Long-term negligible to moderate adverse impacts on visitor use and safety. Cumulative impacts would be long-term negligible to minor adverse.	Long-term beneficial impacts to visitor use and safety, with localized short-term minor to moderate adverse effects during project activities to visitor use and experience. Cumulative impacts would be long-term beneficial and short- and long-term minor to moderate adverse.
Wilderness	Long-term negligible adverse impacts on wilderness. Cumulative impacts would be long-term negligible adverse to beneficial.	Short term moderate and long-term minor to moderate adverse impacts on wilderness, with some long-term benefits at sites that are restored. Cumulative impacts to wilderness would be long-term minor to moderate adverse.

SECTION 3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section provides a description of the affected environment and environmental consequences for the impact topics carried forward for detailed analysis. Topics analyzed in this section include:

- Historic Structures and Districts,
- Bats and Other Wildlife (including Federally- Listed Species/Species of Management Concern),
- Visitor Use and Experience including Human Health and Safety, and
- Wilderness.

All remaining impact topics were dismissed as discussed in Section 1, Purpose and Need. A description of the affected environment for each resource topic included in this section precedes the analysis of that topic under the subheading “Affected Environment.” Direct, indirect, and cumulative effects, as well as impairment and unacceptable impacts, are analyzed for each resource topic carried forward. Impairment analysis is not performed for the impact topic “Visitor Use and Experience including Human Health and Safety.”

The impact analyses are presented by alternative, starting with the no- action alternative. The analysis first addresses the impacts of actions taken under the alternative, then presents a cumulative impact analysis, followed by a conclusion or summary of the impacts discussed for both the alternative- specific actions and the relevant cumulative actions. A determination of unacceptable impacts and impairment is made at the end of each the Conclusion section.

Potential impacts are described in terms of type, context, duration, and intensity. General definitions are defined as follows, while more specific impact thresholds are given for each resource at the beginning of each resource section.

Type describes the classification of the impact as either beneficial or adverse:

Beneficial: A positive change in the condition or appearance of the resource or a change that moves the resource toward a desired condition.

Adverse: A change that moves the resource away from a desired condition or detracts from its appearance or condition.

Context describes the area or location in which the impact would occur (i.e., are the effects site-specific, local, regional, or even broader)?

Duration describes the length of time an effect would occur, either short- term or long- term. For this EA, duration is defined as follows:

- Short- term impacts generally last only during construction activities, and the resources resume their conditions following activities.

- Long- term impacts last beyond the period of construction activities, and the resources may not resume their conditions for a longer period of time following activities.

Intensity describes the degree, level, or strength of an impact. For this analysis, intensity has been categorized into negligible, minor, moderate, and major for adverse impacts (beneficial impacts are not qualified). Because definitions of intensity vary by resource topic, intensity definitions are provided separately for each impact topic analyzed in this EA.

Methods

The evaluation of each impact topic was based on a qualitative assessment of proposed closure actions and how they would affect the resources. To assess impacts on impact topics, the following steps were taken:

- Identification of which resources were likely to be affected by the proposed closure (as described in the “Affected Environment” section).
- Evaluation of sites and features that merit special consideration – e.g., those eligible for inclusion in the National Register of Historic Places, special status species
- Analysis of alteration caused by the closure actions
- Analysis of the disturbance potential of proposed actions and the resources to be affected by the disturbance.

Information in the analysis was obtained through best professional judgment, input from park staff and experts in the field, and available literature.

The area of analysis for all topics focuses on the areas in the immediate vicinity of abandoned mines where closures would occur; for those resources that could be adversely affected by noise (visitor use, wildlife, wilderness), the area of analysis also includes a buffer extending out about one mile to account for noise impacts originating at the sites from mechanized equipment and heavy machinery, plus any area over which helicopters would be used to transport materials to the sites. For federally listed species, the area of analysis includes any critical habitat or PACs in the vicinity of the parks.

The analysis of wilderness is focused on wilderness character and wilderness experience, which are integrally related because much of wilderness character can only be subjectively determined by the visitor’s experience (for example, solitude or freedom of movement).

Cumulative Impact Analysis Method

This EA also includes an assessment of cumulative impacts. The CEQ regulations for implementing NEPA (40 CFR 1500–1508) require assessment of cumulative effects in the decision making process for federal projects. Cumulative effects are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non- federal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative effects are considered for both the no- action and the proposed action alternative, and are presented at the end of each impact topic discussion analysis.

Cumulative effects were determined by qualitatively estimating the effects of the alternatives with other past, present, and reasonably foreseeable future actions relevant to the resources affected by the proposed closures. The temporal boundary for cumulative impacts was five years

(past and future), and the area of analysis for cumulative impacts was the same area of analysis used for assessment of impacts of the proposed actions as described above. The following were considered as potentially contributing to cumulative effects on the resources and values analyzed in the area of analysis:

- NPS management and operations – NPS performs regular management oversight of visitor uses, mine sites, and resource preservation within the parks. Impacts to several environmental resources may occur in the analysis area from NPS staff presence and use of motorized vehicles, and NPS interpretation programs can contribute to beneficial impacts for all resources and values addressed.
- Visitor use in the park, especially hikers in the backcountry.
- Aircraft overflights including helicopter tours (Grand Canyon).
- Use of the area by undocumented aliens (the southern Arizona parks).
- Past and future closures – the cumulative analysis takes into account those features that have already been closed and those that would be closed under pending future actions, as indicated on tables 3 through 6 in Section 2, Alternatives. It also includes those actions taken to install or repair fences and add or replace signage.
- At Saguaro, the Old Yuma mine is being evaluated for mitigation of contamination under CERCLA. One site at Coronado may have contaminated water.
- At Saguaro, the park is implementing a Comprehensive Trails Plan approved in July 2009, which will involve the construction of new trails, rerouting of existing trails, abandonment of parallel trail routes, and establishment of new trailheads and access points. Implementation is expected to continue for as long as five years.
- For special status species and wildlife, actions taken in or outside the parks that affect or have affected the status of wildlife habitat or the listed species, as described in the biological assessment completed in conjunction with this EA. Increased population growth and associated development in the southern Arizona area has effects on habitat for species that cross park boundaries, especially listed species.

Historic Structures and Districts

Affected Environment

The NPS defines historic structures as “a constructed work, usually immovable by nature or design, consciously created to serve some human activity” (NPS 1998). Examples are buildings, monuments, dams, roads, railroad tracks, canals, millraces, bridges, tunnels, locomotives, nautical vessels, stockades, forts and associated earthworks, Indian mounds, ruins, fences, and outdoor sculpture. In the National Register context of mining activities, a historic structure is any engineered structure constructed by or utilized by humans during the period of exploration and development. Historic districts are a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development (NPS 1997b). Each park unit was assessed for existing or potential new historic mining districts eligible for listing in the National Register of Historic Places.

Information about the mines was gathered during field surveys conducted at the parks during September and October 2009. Mining feature information was either provided by the parks or collected during the same field surveys. Other information about the mines was supplied from readily available park records or county records, and from information provided by park cultural resource specialists during the field reviews.

Determinations of Eligibility were prepared for mines at the four park units and submitted to the Arizona SHPO for review and concurrence to support the analysis of historic mining structures and features that could be affected by the proposed actions. The Determinations of Eligibility are separate documents, and the impact analysis in this EA follows the conclusions reached in the Determinations of Eligibility. The eligibility determinations are included in tables 3 through 6 in Section 2, Alternatives. Note that the NPS does not reveal locations of sensitive resources, so the exact features and locations are not provided in the affected environment discussion or in the impact analysis that follows.

Coronado National Memorial

There is evidence that the early Spanish and Mexican settlers prospected in the southern Huachuca Mountains prior to the 1850s (Van Cleve 1997). The locating of mining claims in the Huachuca Mountains was a direct response to the mineral discoveries in southeastern Arizona. Prospecting began in the mountains the late 1870s following erection of an army post on the east side of the mountains and the subsequent, and almost immediate, discoveries of mineral wealth in the area. At the turn of the 20th century significant mining activity was ongoing in the Huachuca Mountains. Many of the miners were from the Tombstone (and Bisbee) area and searching for new gold and silver prospects (Van Cleve 1997). Though prospectors staked claims throughout the mountains, in the southeast section of the Huachuclas, the focus was on the canyons of Montezuma and Ash creeks. By the 1920s, claims covered much of these two watersheds and miners wanting to locate new claims, found it necessary to locate outside of the canyons.

Historical archeologists recorded the physical aspects of the mines in the field and a mining historian conducted research for the extant mine workings of the Bob Thompson, Clark- Smith, Crest Trail, Headquarters, Montezuma Peak, and the Smugglers Ridge mines. Various structural remains recorded at the sites included waste rock piles, prospect pits, adits, stopes, shafts, concrete pads, stone lined foundations, a dry laid stone retaining wall, metal water storage tank, historic two- track road, stacked rock check dam, and a stacked rock ring. In general, the integrity of the physical remains of the mines is poor, with just enough evidence to interpret that fairly “low- tech” mining methods (simple techniques, including hammers and rock drills, picks and shovels, and black powder for blasting) were used. The exception is at the Bob Thompson and Clark- Smith mines where a more “high- tech” method (incorporating the use of mechanical hydraulic systems, dredges, power shovels, and scrapers) was employed (Hardesty 1988). A team of archeologists and a mining historian prepared maps of each site, prepared historic assessments, and made evaluations for Determinations of Eligibility for listing in the National Register of Historic Places. The Paring- Doredor Mine at Coronado National Memorial was already determined eligible by the NPS and the SHPO for listing in the National Register in 2006. None of the other mines addressed at Coronado National Memorial – Bob Thompson Mine, Clark- Smith Mine, Crest Trail Mine, Headquarters Mine, Montezuma Peak Mine, Smugglers Ridge Mine, and State of Texas Mine – was determined eligible for listing in the National Register of Historic Places because they lacked the physical integrity to support their

importance to local settlement and economic trends, individuals associated with mining development, and events important to the history of southern Arizona.

Organ Pipe Cactus National Monument

Humans have been searching for various minerals – gold, silver, copper, and lead – in the southern Arizona region since before the 1500s, possibly back 3,000 years (NPS 1999), but especially by Euro- Americans since the mid- 1800s (Huggard n.d.). The early national monument faced many challenges, especially with local miners and ranching families. Mineral mining began in the late 19th century, and was allowed to continue up to 1976, even though the monument was established in 1937 (NPS 2009m).

Historic mining structures recorded at Organ Pipe Cactus National Monument included shafts, adits, stopes, waste rock piles, ore piles, prospect pits, concrete pads or foundations, rock cairns, and a historic two- track road. In general, the integrity of the physical remains of the mines is fair to good, with enough evidence to interpret that fairly “low- tech” mining methods (simple techniques, including hammers and rock drills, picks and shovels, and black powder for blasting) were used. There are exceptions, such as at the Copper Mountain and Dripping Springs mines, where a more “high- tech” method (incorporating the use of mechanical hydraulic systems, dredges, power shovels, and scrapers) was employed (Hardesty 1988).

It should be noted that The Victoria Mine, the Growler Mine Area, and Milton Mine #1 are all listed in the National Register of Historic Places. Any closure activities at these mines would have to conform to *Secretary of Interior Standards for the Treatment of Historic Properties* (NPS 1990, reissued in 1995). A team of archeologists and a mining historian prepared maps of each site, prepared historic assessments, and made evaluations for Determinations of Eligibility for listing in the National Register of Historic Places. The Lost Cabin Mine was determined eligible by the NPS in 1996. In the Determination of Eligibility, the NPS expanded the previously eligible Milton Mine #1 to include other features at that mine. The other mines addressed at Organ Pipe Cactus National Monument – Baker Mine, Copper Mountain Mine, Dripping Springs Mine, Golden Bell Mine, Growler Mine, Kuakatch Mine, Martinez Mine, Montezuma Mine, and Senita Basin Mine – were determined eligible for listing in the National Register of Historic Places on the basis of their importance to local settlement and economic trends, individuals associated with mining development, and events important to the history of southern Arizona.

Saguaro National Park

Mineral exploration in the Tucson Mountains of Pima County, Arizona is believed to have started with the native peoples in excess of 3,000 years ago (NPS 1999). However, non- native prospecting probably dates back to the founding of the San Xavier Mission in the late 1600s (Clay et al. 1993). Exploring for Arizona’s minerals was intensified in the 1730s with the Spanish Period. Spaniards moved northwestward from central Mexico and in 1736, some of the Spaniards discovered the Planchas de Plata district which contained a large silver deposit. This discovery created much anticipation which in turn brought additional miners, including Mexicans and early Americans into the area. Mining and prospecting continued within the region, although did nearly cease on various accounts which included Apache Indian attaches and the Civil War. In 1872, General O.O. Howard and Apache leader Cochise reached a truce that encouraged prospecting in the region again by eliminating some of the vital threats that the miners faced (Clemensen 1987).

In 1880, the area experienced a boom in production as the Southern Pacific Railroad reached the city of Tucson, thus enabling mass amounts of the metals (especially copper) to be hauled away. The boom was short-lived, as in 1884 the price of copper began to fall and in 1886 most mining operations had to close. Then in 1896, the price of copper began to rise due to the growing electrical industry. From 1898 through 1930, copper was Arizona's most profitable metal and nearly the only ore that was mined. This boom had a fall too which started in 1907 with the financial depression and lasted until World War I. However, the 1930s depression put an end to most of Arizona's mining industry except for a few low-grade mines that barely survived due to the production of metals for World War II (Clemensen 1987).

Within the TMD of the park, the Amole Mining District on the north end of the Tucson Mountains was dominated by the Old Yuma Mine and Comet claims. The mine was active during the dawn of the twentieth century and through World War I for steel-hardening minerals such as wulfenite, molybdenite, and vanadinite, and base and precious metals such as lead, copper, silver, and gold.

In November 1990, the Arizona Exploration and Mining Company submitted a plan of operations to the BLM for underground drifting and stoping to explore and develop Old Yuma Mine and to cyanide leach the mine tailings to recover gold. At the time, the proximity of the mine workings to the Tucson Mountain Unit of Saguaro National Park was of great concern to the NPS. Consequently, in 1992, the BLM conducted a validity examination on the claims finding that only three of the overlapping claims in the group were supported by a discovery: Comet 1 lode, Old Yuma #1 lode, and the west half of the Old Yuma placer claim. The remainder of the claims were nullified and voided for lack of discovery. These three claims were included in the 1994 expansion in which Saguaro was upgraded to a national park and the NPS acquired the property in 2001 (Baker 2005).

Features recorded at the mines in Saguaro National Park included waste rock piles, ore piles, prospect pits, adits, stopes, shafts, concrete pads or foundations, rock cairns, and a historic two-track road. In general, the integrity of the physical remains of the mines is poor, with just enough evidence to interpret that fairly "low-tech" mining methods (simple techniques, including hammers and rock drills, picks and shovels, and black powder for blasting) were used. There are exceptions, such as at the Comet Mine or Mile-Wide Mine Complex, where a more "high-tech" method (incorporating the use of mechanical hydraulic systems, dredges, power shovels, and scrapers) was employed (Hardesty 1988). A team of archeologists and a mining historian prepared maps of each site, prepared historic assessments, and made evaluations for Determinations of Eligibility for listing in the National Register of Historic Places. The mines in the Rincon Mountain District – Comet Mine 135, 136, and 137; RMD 028; RMD 057; and RMD 065 – addressed at Saguaro National Park were determined not eligible for listing in the National Register of Historic Places. However, the mine sites containing extensive shafts and adits within the Tucson Mining District, including the Old Yuma, Comet, and Mile Wide mines, are considered potentially contributing elements of the larger Amole Mining District, which is considered eligible for the Register (for a listing of contributing elements, see tables 3 through 6 in Section 2, Alternatives). The mines are considered potentially contributing elements to the district on the basis of their importance to local settlement and economic trends, individuals associated with mining development, and events important to the history of southern Arizona.

Grand Canyon National Park

The earliest miners within the current boundaries the Grand Canyon National Park were Native Americans who mined salt, red clay, and copper stones, which were valuable for trade and employed for domestic and ceremonial uses. While Spanish explorers toured the area in 1540 in search of wealth, they saw the Grand Canyon as nothing more than a barrier to travel. This remained the status quo for the next two centuries (Billingsly et al. 1997).

Euro- American mineral interest in the canyon remained practically non- existent until the 1870s, when the Indians traded their knowledge of mineral locations to early prospectors in exchange for European- American goods. Gold and silver attracted prospectors to the area; the popular opinion was that the canyon's natural excavation would lay bare the hidden minerals, making their access easier. However, with the exception of early minimal silver finds in Havasu and Cataract canyons, both minerals were relatively scarce.

William Wallace Bass, John Hance, William Owen "Bucky" O'Neill, Ralph Henry Cameron, and Peter Berry were just some of the early entrepreneurs who came to the canyon to explore and stake claims for gold, silver, copper, and asbestos in the 1880s and 1890s (Billingsly et al. 1997). And some stayed to promote the Grand Canyon as a tourist attraction, building hotels and establishing livery or freight businesses.

Beginning in 1882, Benjamin Harrison, then an Indiana Senator, introduced a bill in Congress to establish the canyon as a national park. The bill never made it to a vote, but as president, the following year Harrison was able to proclaim the eastern part of the canyon and adjacent areas as the Grand Canyon Forest Preserve, February 20, 1893. This action exempted the canyon from homestead and other land laws, except for those involving mining claims. This exemption was removed in 1908 when President Theodore Roosevelt invoked the Act for the Preservation of American Antiquities, which allowed him to preserve scientific and historic sites. Using the Antiquities Act, Roosevelt set aside the forest reserve as Grand Canyon National Monument thereby restricting future mining claims.

Working concurrently with a mining historian, a historical archeologist recorded the extant mine workings for the Hermit Road Prospects, Last Chance Mine, Pinto Mine, Rowe Well Claim, South Rim Adit, South Rim Prospects, Tanner- McCormick, and the Yavapai Observation Station Adit. Other sites were not recorded in 2009 but were dealt with in a general manner in the analysis. These include: Bass Asbestos, Bass Copper, Bat Guano, Bonnie Tunnel, Boucher Mine, Brady Canyon Mine, Bridge Canyon Dam Site, Cameron Claims, Copper Grant, Copper Mountain in Parashant, Copper Mountain in Upper Nanko, Hance Asbestos Inholding, Havasu Adit, Little Chicken, Marble Canyon Dam Exploration Site, Marble Canyon Dam upper exploration site, Marshall Lazune Group, South Rim Mine Adit, Morning Star, North Bass Mine Adit, Point Sublime Prospect Pit, "Saddle Mine," Snyder Mine, and the Trail Canyon Mine and Camp.

Of the various structural remains, adits, cabins, waste rock piles, prospect pits, stone retaining walls, claim markers, shafts, sweat lodges, cairns, stone foundations, wooden and stone structures, a well, irrigation ditch, earthen dam, and a culturally modified tree were recorded. In general, the integrity of the physical remains of the mines is varied, with evidence to interpret that both "low- tech" mining methods (simple techniques, including hammers and rock drills, picks and shovels, and black powder for blasting) and more "high- tech" methods

(incorporating the use of mechanical hydraulic systems, dredges, power shovels, and scrapers) were used (Hardesty 1988). A team of archeologists and a mining historian prepared maps of each site, prepared historic assessments, and made evaluations for Determinations of Eligibility for listing in the National Register of Historic Places. In the 1980s, a Determination of Eligibility was submitted to the Arizona SHPO for all archeological sites within the park, including mine sites (Jones 1981). In 1984, the SHPO concurred that the sites within the canyon were eligible, and the park has since managed the sites as eligible for listing in the National Register of Historic Places. Additional documentation was submitted to the SHPO as part of the AML closure evaluations to support the eligibility of the Hermit Road Prospects, Last Chance Mine, Pinto Mine, Rowe Well Claim, South Rim Adit, South Rim Prospects, Tanner- McCormick, and the Yavapai Observation Station Adit for the National Register.

Environmental Consequences

The thresholds for the intensity of impact were defined as follows:

- | | |
|-------------|--|
| Negligible: | The impacts on historic structures or districts are at the lowest levels of detection, barely perceptible and not measurable. |
| Minor: | The impacts on historic structures or districts are measurably perceptible, but are slight and affect a limited area of a site or group of sites. The impacts do not affect the character defining features of National Register of Historic Places eligible or listed properties and would not have a permanent effect on the integrity of any historic structures. |
| Moderate: | The impacts on historic structures or districts are measurable and perceptible. The impacts change one or more character defining feature(s) of historic structures but does not diminish the integrity of the resource(s) to the extent that National Register eligibility is jeopardized. |
| Major: | The impacts on historic structures or districts are substantial, noticeable, and permanent. The impacts are severe or of exceptional benefit. For National Register eligible or listed historic structures, the impacts change one or more character defining features(s) of the resource, diminishing the integrity of the resource to the extent that it is no longer eligible for listing in the National Register. |

Impacts on Historic Structures and Districts under Alternative A, No Action

The no- action alternative would not measurably change current conditions at mines within the project area. The mines would remain open and warning signs at each mining feature would continue to alert visitors to potential safety hazards. Adit and shaft openings, associated debris, and mine tailings would remain in their current form. Continuing existing management and conditions means that visitors could access unprotected mine features and ignore any warning signs, and unauthorized entry to mine sites would continue (especially those with relatively easy access).

The no- action alternative would result in long- term localized negligible adverse impacts to the historic structures and districts at the four park units because no gate, grate, or cupola

installation, earth moving, or other disturbance activities would be conducted. However, the project area adits, shafts, stopes, and other openings would remain open to visitors, and the continued use of the mines would have long- term, localized, negligible to potentially moderate adverse impacts on the cultural resources in the area, depending on the location of the mine, the ease or difficulty in access, and the level of unauthorized entry leading to vandalism. For example, at Grand Canyon National Park, there are several mine adits, such as Last Chance and South Rim mines, which are easily accessible by hiking trails. The Last Chance mine has modern graffiti on the walls that detracts from the historic setting of the mine. The no- action alternative could lead to more graffiti at this and other mines that are easily accessed.

Cumulative Impacts

Those actions that could contribute to cumulative impacts on cultural resources (historic structures and districts) include past closure of AML sites within individual park units and future closure of AML sites within individual park units as funding is made available. Only a few mine openings have already been closed, as indicated in the tables in Section 2, Alternatives; this would contribute long- term beneficial impacts to the resource by providing protection from vandalism, but there could be negligible to minor long- term adverse effects from the presence of the closure structure on the cultural fabric of the sites (the presence and appearance of bars on gates, cupolas). Mine features that would be addressed in the future, pending additional surveys and funding, and any that are not completed under the no- action alternative, would also contribute long- term beneficial impacts to the resource by providing protection from vandalism, but with minor to moderate adverse impacts from the construction and presence of the closures. No permanent closures would be permitted if the resource is eligible for listing in the National Register of Historic Places, and mitigation similar to that proposed in the action alternative would ensure that impacts do not reach major adverse levels.

Other actions that could cumulatively impact historic structures and districts are park visitors and hikers in the backcountry. Visitors can intentionally or unintentionally vandalize historic sites by displacing or collecting artifacts, adding graffiti to mine walls, or climbing on structures. Although shafts and adits are considered safety hazards, some park visitors ignore the warnings and enter into features. The Comprehensive Trails Plan at Saguaro could impact mining sites by making mining sites more accessible or bringing more hikers closer to the mines, increasing the chances of vandalism. This could result in long- term negligible to minor adverse impacts on historic structures and districts.

The southern Arizona parks have heavy undocumented alien traffic, and there is evidence that these people enter mines for shelter and use adits and shallow shafts as hiding places. These actions could result in long- term negligible to minor adverse impacts on historic structures.

NPS performs regular management oversight of visitor uses, mine sites, and resource preservation within the parks. Beneficial impacts to cultural resources would be expected from NPS oversight and interpretation programs.

All of the above impacts, added to the long- term, local, negligible to moderate impacts to historic structures and districts expected from the actions under this alternative, would result in long- term minor adverse cumulative impacts on historic structures and districts.

Conclusion

The no- action alternative would result in potentially long- term, local, negligible to moderate impacts to historic structures and districts, with the moderate effects stemming from potential impacts to features that remain open and are susceptible to vandalism. Cumulative impacts would be long- term minor adverse.

Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the parks; (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the parks; or (3) identified as a goal in any park's or other relevant NPS planning documents, there would be no impairment of the parks' resources or values. Implementation of this alternative would not result in unacceptable impacts and is consistent with *NPS Management Policies* 2006.

Impacts on Historic Structures and Districts under Alternative B, Proposed Action (NPS Preferred Alternative)

The proposed action would include the closure of abandoned mine features to human access using a variety of closure designs including bat- accessible gates and cupolas, grates, backfilling, partial backfilling, and a combination of polyurethane foam plugs and backfilling. Except for backfilling, all of the remaining closure types would be reversible. To install bat- accessible gates and cupolas, and grates, minimal ground- disturbance would be needed to set a sill place on a flat surface. Backfilling, partial backfilling, and a combination of PUF/backfilling would utilize waste rock piles for fill material.

Any ground- disturbing activity, including using rock and tailings piles for backfilling, and moving loose rock on the floor of adits and around shaft collars to install gates, grates, and cupolas, has the potential to reveal and disturb unknown historic resources. To minimize potential harm to these resources, cultural resource specialists would monitor any ground- disturbing activities at eligible properties. If a cultural resources discovery is made during installation, all related construction activities would cease until cultural resource specialists assess the resource and determine the appropriate manner in which to proceed. Installation of gates, grates, and cupolas would contribute to the protection of cultural resources by eliminating access to the inside of the mine feature and the historic structures or artifacts present there, a long- term beneficial impact.

During the installation of gates, the gates would be recessed as much as possible so that their presence would not detract from the appearance and integrity of the historic mine structure. Grates would be installed as much as possible below ground surface so as to be non- intrusive to the visual setting of the mining landscape. Impacts from placement of gates or grates would be long- term, minor and adverse. Closure by bat- gating would impact two mine sites that are considered eligible for or listed in the National Register of Historic Places at Coronado; four sites at Organ Pipe Cactus; two sites at Saguaro; and six sites at Grand Canyon. Grates would be installed at two mine sites that are considered eligible for or listed in the National Register of Historic Places at Saguaro and at no sites at the other three parks.

The installation of cupolas or shaft culverts with cupolas would result in long- term, local, minor adverse impacts to historic structures and districts. Because this method is considered a non-

permanent closure that is reversible, it has low potential to impact historic structures and districts. The cupolas would be constructed to minimize detracting from the integrity and the fabric of the historic structures by using materials, textures, and colors/natural rusting that are as compatible as possible to the surrounding natural and cultural feature(s). However, concrete footers may be necessary at some sites to stabilize loose mine shafts, which could have the same impacts as described above from ground disturbing activities. The installation of cupolas or shaft culverts/cupolas would impact two mine sites that are considered eligible for or listed in the National Register of Historic Places at Coronado; five sites at Organ Pipe Cactus; no sites at Saguaro; and one site at Grand Canyon.

Closure by PUF/backfill is considered a non-permanent closure that is reversible, which would limit adverse effects to even National Register-eligible sites. The site would be changed in appearance and the action would involve earth moving or ground disturbance, resulting in long-term minor adverse impacts. This method of closure would impact three mine sites that are considered eligible for or listed in the National Register of Historic Places at Coronado; 21 sites at Organ Pipe; one site at Saguaro; and two sites at Grand Canyon.

Full backfill would involve ground disturbance and partial or total destruction of the integrity of the historic mining feature. Full backfill would consist of filling the mine shaft or adit sometimes using heavy equipment and, essentially, obliterating the feature. This type of backfill would not be used at mine sites that are considered eligible for the National Register of Historic Places. Partial backfill would involve filling the feature with just enough soil or waste rock to allow a ramp for wildlife or humans to escape the feature without destroying the historic feature. Site access for "light"/partial backfills would consist of hand carrying, stock (mule or horse) packing, and vehicle access, while site access for a full closure would likely consist of vehicle access and use of existing abandoned roads. Generally on-site staging and work area would utilize the waste rock debris created by mining at the site.

Partial backfills of numerous small, shallow prospect pits, as is proposed at many small pits that are scattered throughout Organ Pipe Cactus, would not be done at eligible sites or in culturally sensitive areas without clearances by cultural resource staff. These sites would be selected for their shallow depth, would not be subject to total obliteration of the feature, and would retain the characteristics of their historic fabric and integrity within the mining landscape. Partial backfill would result in long-term minor to moderate adverse impacts, depending on the complexity and depth of the individual feature. This closure method would impact no mine sites that are considered potentially eligible for or listed in the National Register of Historic Places at Coronado; 31 sites at Organ Pipe Cactus; no sites at Saguaro National Park; and one site at Grand Canyon.

The use of helicopters and sling-loaded equipment would have no impacts on historic structures and districts as long as the landing areas avoid features associated with historic mining, such as cabin foundations, stone retaining walls, and rock cairns. All helipads would be located away from these areas in previously disturbed sites, and no landing would be done at the mine sites, so impacts would be negligible.

At several of the mines at Organ Pipe Cactus Saguaro, and Grand Canyon, there are prehistoric sites that are near the mines slated for closure. Closure activities would need to be designed, and

approved by park staff knowledgeable in cultural resources, to protect these archeological sites from damage during access to the mine sites.

Construction of numerous bat gates, grates, and cupolas has the potential to adversely affect cultural resources due to ground disturbance and from their presence/appearance at the mine site. Alternative B would result in long- term, local, mostly minor adverse impacts to historic structures and districts from rock or tailings collection, ground disturbance, and installation activities. Long- term moderate adverse effects could occur with partial backfilling of eligible sites if one or more character- defining feature(s) of historic structures are changed, but the partial backfilling would not diminish the integrity of the resource(s) to the extent that National Register eligibility is jeopardized. Installation of gates, grates, and cupolas would contribute a long term benefit by eliminating access to the inside of mine features and the historic structures or artifacts present there.

Cumulative Impacts

Cumulative impacts from other actions would be the same as described under the no- action alternative, with overall minor adverse effects from hikers, undocumented aliens, the proposed CERCLA action at Old Yuma Mine, and trails use/development. These impacts, added to the long- term, local, negligible to moderate impacts and beneficial impacts to historic structures and districts expected from the actions under this alternative, would result in long- term negligible to minor adverse cumulative impacts on cultural resources.

Conclusion

The preferred alternative would have long- term, local, negligible to mostly minor, but possibly some moderate adverse effects on cultural resources as a result of installing gates, grates, cupolas, or moving earth, rocks, or tailings piles; steps would be taken to mitigate for adverse impacts of any ground- disturbing activities. Cumulative impacts would be long- term negligible to minor adverse.

Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the parks; (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the parks; or (3) identified as a goal in any park's or other relevant NPS planning documents, there would be no impairment of the parks' resources or values. Implementation of this alternative would not result in unacceptable impacts and is consistent with *NPS Management Policies* 2006.

Bats and Other Wildlife (including Federally Listed Species and Species of Management Concern)

Affected Environment

Information about wildlife and wildlife habitat was gathered during field surveys conducted at the parks during September and October 2009 (WestLand Resources, Inc. 2009; JBR Environmental 2009). Bat survey information was either provided by the parks or collected during the same field surveys by an independent party hired by the NPS for that purpose. Other information about park wildlife was supplied from readily available park literature or website,

and from information provided by park biologists from the field reviews. Based on survey results, the following describes the general vegetative community types /wildlife habitat at each park's mining locations, and the common wildlife noted or expected there, with an emphasis on bats and other wildlife using the mine features.

Also, a separate discussion is provided about the presence or likely presence of federally listed species and other state special status species of management concern (AZGFD 2009a) that were identified by park staff or in correspondence with USFWS or AZGFD as potentially occurring in the area of the features to be closed. A biological assessment was prepared to address potential impacts on the federally listed species that could be affected by the proposed actions. The biological assessment is a separate document provided to the USFWS, and the impact analysis in this EA parallels the analysis provided in the biological assessment. Note that the NPS does not reveal locations of sensitive species, so the exact features and locations for the listed species are not provided in the affected environment discussion or in the impact analysis that follows.

Coronado National Memorial

General Plant Community/Habitat

Coronado National Memorial contains elements of both the Madrean evergreen woodland and Plains and Great Basin grassland biotic communities as described by Turner and Brown (1982). Most of the mine features evaluated in this project were within either the Madrean evergreen woodland community or a transition between woodland and grassland. Based on field observations, the vegetation in the vicinity of most mine features is dominated by a number of oak species and a variety of grass species. Other common and widespread species observed within Coronado 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.), and mountain mahogany (*Cercocarpus montanus*).

Bats

Information on bats in Coronado presented below was taken from a wildlife survey report compiled by Wolf (2009a). Ten species of bats have been documented at Coronado within current park boundaries:

- Mexican long- tongued bat *Choeronycteris mexicana*
- Lesser long- nosed bat *Leptonycteris yerbabuenae* (formerly *L. sanborni* and *L. curasoae*)
- Townsend's big- eared bat *Corynorhinus townsendii* (formerly *Plecotus*)
- Big brown bat *Eptesicus fuscus*
- Southwestern myotis *Myotis auriculus*
- Cave myotis *Myotis velifer*
- Fringed myotis *Myotis thysanodes*
- Western small- footed myotis *Myotis ciliolabrum* (formerly *M. leibii*)
- California myotis *Myotis californicus*
- Canyon bat *Parastrellus hesperus* (formerly western pipistrelle *Pipistrellus hesperus*)

Four species, the Mexican long- tongued bat, the lesser long- nosed bat, Townsend's big- eared bat, and the cave myotis are completely dependent on caves and mines for survival and have been found in Coronado mines. Big brown bats, fringed myotis, and southwestern myotis have also been observed in mines at Coronado.

In addition to the federally endangered lesser long- nosed bat, of particular concern are Townsend's big eared bats and Mexican long- tongued bats. Both of these species roost in small numbers and move from site to site frequently. Shallow adits serve as day- roosts for both species. Shafts, even if they are bald and without drifting, can serve as hibernacula for Townsend's big- eared bats (Sherwin pers. comm. 2009).

Biologists visited 31 abandoned mine features within Coronado from September 15 through 18 and from September 21 through 24, 2009. Only a few bats were seen incidentally during those visits, which were not scoped as bat surveys, and guano was observed in a few features. A summary of bat use known in the Coronado features that are being considered for action under this EA is provided in table 3 in Section 2, Alternatives. Specific species information is not provided to protect the resource, but is on file with the NPS as part of the administrative record for this project.

Other Wildlife

Numerous other wildlife species may take advantage of the special conditions found in abandoned mine features. In an arid region, these features provide refuges with more moderate conditions of temperature and humidity. Evidence of at least 14 species was found and identified in the evaluated mine features at Coronado, either during the September 2009 visit or previously recorded by Wolf (2009a) or Foster (2009a). These records include direct observations, skeletal material, nest material, and feces. The most common and widespread vertebrate in evidence was the woodrat (*Neotoma* sp.), with evidence in at least 10 of the 31 features evaluated. The next most widespread species other than bats was the spiny lizard (*Sceloporus* sp.; primarily *S. jarrovi*), which was present in five features.

Federally Listed or Species of Management Concern

The only federally listed species that is expected or known to be present in mine features at Coronado is the endangered lesser long- nosed bat (*Leptonycteris yerbabuenae*). This species was not detected in any of the features visited from September 15 through 24, 2009, but is known to be present in other features planned for closure that were not visited during the field assessment in September 2009.

Lesser long- nosed bats are known to be present in Coronado National Memorial during the late summer and early fall post- maternity dispersal period. The primary post- maternity roost site has been surveyed for many years. Other than primary features at this roost site, there are relatively few records of lesser long- nosed bat in other mines within Coronado. Wolf (2009a) mentions several adits that had small amounts of yellow fecal splatter that could have been left by lesser long- nosed bat or the Mexican long- tongued bat. The Mexican long- tongued bat was seen in low numbers in several adits on Coronado during this survey; however, based on this evidence, the presence of yellow fecal splatter cannot be interpreted as a confirmation of the presence of lesser long- nosed bats.

The Mexican spotted owl (*Strix occidentalis lucida*; threatened) is known to be present in Coronado National Memorial. Most of the Huachuca 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 Coronado National Memorial, as well as adjacent lands of the Coronado National Forest. The upper part of Montezuma Canyon, on the east side of Montezuma Pass is mapped as a Protected Activity Center (PAC) for the Mexican spotted owl. The abandoned mine features in the Clark-Smith group, the Crest Trail group, the Montezuma Peak group, and State of Texas Mine are within or very close to this PAC. Biologists did not observe any evidence of this species in the vicinity of evaluated features, but there is some potential that closure activities could disturb nearby individuals known to occur near the Clark- Smith abandoned mine features.

The Chiricahua leopard frog (*Rana chiricahuensis*; threatened) is associated with mines containing water that have vegetation and a food source (insects) for the frogs. This species has been recorded in the general vicinity of Coronado, but not within the memorial itself. Suitable habitat is very limited in Coronado. Although there is surface, water in or near three of the evaluated mine features, these mines do not contain vegetation or a food source, and no evidence of the presence of this species was noted during field surveys.

The Mexican long- tongued bat (discussed under “Bats” above) is a Wildlife Species of Concern (WSC) in Arizona. Barking frog (*Craugastor augusti*), also a WSC in Arizona, is known to occur in one of the mines that contains water; the park would ensure that any closure activities do not impact this species if it is present.

No federally listed threatened or endangered species of plants were observed during the field visits or reported by park staff, nor would any of these species be reasonably expected in the vicinity. Schmidt et al. (2007) have completed intensive plant surveys throughout Coronado, and none of these species have been reported.

Organ Pipe Cactus

General Plant Community/Habitat

Most of Organ Pipe Cactus National Monument is within the Arizona Upland Subdivision of the Sonoran Desertscrub biotic community, as described by Turner and Brown (1982). All of the mine features evaluated in this project were within this subdivision. Dominant species observed in the vicinity of the mine features surveyed include foothill paloverde (*Parkinsonia microphylla*), saguaro (*Carnegiea gigantea*), organ pipe cactus (*Stenocereus thurberi*), triangle bursage (*Ambrosia deltoids*), creosote (*Larrea tridentata*), and ironwood (*Olneya tesota*).

Bats

A bat survey of 16 abandoned mine features at Organ Pipe Cactus was conducted on August 25 through 26, 2009 (Diamond and Lowery 2009). Three species were observed using mines in Organ Pipe Cactus National Monument and evidence of an unknown insectivorous bat use was present at six sites.

The lesser long- nosed bat (*Leptonycteris yerbabuenae*) is federally listed as Endangered (see listed species discussion, below) and occurs throughout southeastern Arizona, from Phoenix in the North, Agua Dulce Mountains in the west and into extreme east New Mexico (Hoffmeister

1986). This species is associated with caves and mines near foraging habitat (< 30 kilometers or about 10 miles) that includes agaves, saguaro, organ pipe, and senita cactus (*Lophocoreus schottii*) (Adams 2003). This species occurs in large colonies in caves and mines in Organ Pipe Cactus. Males and females generally select separate roosts during the summer. Large colonies are characterized by adult females and non- volant (not capable of flight) young, while small colonies may be bachelor roosts of which little is known (Hoffmeister 1986; Adams 2003).

California leaf- nose bat (*Macrotus californicus*), a former federal C2 species, is a state candidate species in Arizona (Castner et al. 1994) and is a WSC in Arizona. This species occurs in western, southwestern, and south central Arizona (Adams 2003) and is generally observed day roosting in abandoned mines and caves (Hoffmeister 1986). California leaf- nosed bats have broad wings allowing them to hover and glean food from substrates. They are known to feed on grasshoppers (*Caelifera*), cicadas (*Cicadidae*), moths and caterpillars (*Lepidoptera*) and beetles (*Coleoptera*) (Huey 1925; Ross 1967). Females form large colonial roosts (>100 individuals) while little is known about bachelor roosts (Bradshaw 1962).

Townsend's big- eared bat is also a former C2 species (Adams 2003). This species has a cosmopolitan distribution in Arizona and is strongly associated with cave and mine roosts. Townsend's big- eared bat is generally viewed as a moth specialist and occurs across habitat types with suitable foraging resources.

Table 4 in Section 2, Alternatives, provides a summary of the bat use known from Organ Pipe Cactus mines considered for action under this EA. Specific species information is not provided to protect the resource, but is on file with the NPS as part of the administrative record for this project.

Other Wildlife

As mentioned previously, numerous other wildlife species may take advantage of the special conditions found in abandoned mine features. Evidence of at least 24 species was found and identified in the mine features in Organ Pipe Cactus during field surveys in October 2009, including 16 mammals, 4 birds, and 4 reptiles. The most common and widespread species was the white- throated woodrat (*Neotoma albigula*), with evidence in 69 of the 74 features surveyed. The next most widespread species were ringtail (*Bassariscus astutus*), and barn owl (*Tyto alba*), each of which was using at least eight features. Many of the features were shallow test pits that provide little wildlife habitat except for woodrat nests.

Federally Listed or Species of Management Concern

The only federally listed species known to occur in any of the features evaluated at Organ Pipe Cactus is the lesser long- nosed bat (*Leptonycteris yerbabuenae*). This species is migratory and was not present at the time of the most recent field surveys (October 20–29, 2009). However, they are known to be present throughout Organ Pipe Cactus National Monument, including the largest known maternity colony in the United States (Cockrum and Petryszyn 1991; Schmidt et al. 2007; Diamond and Lowery 2009). The Copper Mountain maternity colony is the most important lesser long- nosed bat roost at Organ Pipe Cactus. This feature is a tunnel about 1,000 feet long with entrances on the north and south sides of Copper Mountain. During simultaneous roost surveys conducted by Arizona Game and Fish Department (AZGFD 2009b), about 38,600 lesser long- nosed bat were reported on June 21, 2008, and about 33,500 were

counted on June 27, 2009. In addition to the Copper Mountain roost, there are probable satellite maternity colonies at Lost Cabin Mine #13, Baker Mine #1/#2, Victoria Mine #2, and Kuakatch Mine #1. Red and yellow fecal splatter confirms the presence of lesser long-nosed bat at Senita Basin #3, Lost Cabin #14 and Victoria Mine #21, which may be very small maternity colonies or temporary night roosts.

The California leaf-nosed bat is an Arizona WSC and was noted at five of the sites surveyed in August.

The Sonoran pronghorn (*Antilocapra americana sonorensis*) is known to be present in Organ Pipe Cactus, and some areas in the western part of the Monument are used as fawning areas. Access in those areas is seasonally restricted seasonally to disturbance to the pronghorns during a particularly vulnerable period (fawning season). Of the mine features evaluated, the areas around the Growler Pass mines and the Golden Bell Mine are most likely to have some seasonal use by pronghorns, although this species could occur anywhere.

The desert tortoise (*Gopherus agassizii* – Sonoran population) is not formally listed as a proposed or candidate species, but there is a reasonable possibility that it will be listed at some time in the future. It is recognized as a WSC in Arizona. The USFWS recently published their 90-day finding on a petition to list the Sonoran population of the desert tortoise (Federal Register Vol. 75, No. 166, Pg 44335, August 28, 2009). In their finding the USFWS determined that there was sufficient information in their files and in the petition to warrant further evaluation of the status of the Sonoran desert tortoise to determine if listing as a threatened or endangered species is warranted. The desert tortoise is relatively common in Organ Pipe Cactus, and shafts or shallow test pits can be death traps for this species. Pygmy owl (*Glaucidium*) (also a WSC) is also known in the park, but was not noted during field surveys in the vicinity of the mine features.

No federally listed plant species were observed during the September 2009 surveys, nor would any of these species be reasonably expected in the vicinity of the features. The Acuña cactus (*Echinomastus erectocentrus* var. *acunensis*), a candidate species, is known to be present on Organ Pipe Cactus, but it is not found in the vicinity of any of the abandoned mine features (Tibbitts pers. comm. 2009).

Saguaro National Park

General Plant Community/habitat

Saguaro consists of two non-contiguous districts: the TMD on the west side of Tucson, and the RMD on the east side of Tucson. Most of the TMD of Saguaro is within the Sonoran desertscrub vegetation community, with semi-desert grassland represented in a small area around Wasson Peak (Powell et al. 2007), the highest point within the TMD. The RMD encompasses a larger area and elevational range. Vegetation communities within the RMD are very diverse, ranging from Sonoran desertscrub at the lowest elevations, to coniferous forest at the upper elevations (Powell et al. 2006).

All of the mine features evaluated in this project were within the Sonoran desertscrub vegetation community, except for one feature in the TMD near Wasson Peak in semi-desert grassland. The Sonoran desertscrub vegetation community generally included leguminous trees such as velvet

mesquite (*Prosopis velutina*) and desert ironwood (*Olneya tesota*) and mixed cacti as major components. Other typical species present included white- thorn acacia (*Acacia constricta*), ocotillo (*Fouquieria splendens*), creosotebush (*Larrea tridentata*), wolfberry (*Lycium* spp.), ratany (*Krameria* spp.), and brittlebush (*Encelia farinosa*). At TMD #028 near Wasson Peak in semi- desert grassland, jojoba (*Simmondsia chinensis*) provided dominant cover, with other common species including buckhorn cholla (*Opuntia acanthocarpa*), ocotillo, oreganillo (*Aloysia wrightii*), shin dagger (*Agave schottii*), and various grasses.

Bats

Information on bats in Saguaro presented below was taken from a wildlife survey summary table and other field data compiled by Wolf (2009b) and other sources including input from the park resource manager (Weesner pers. comm. 2009).

Sidner and Davis (1994) report that 16 species of bats had been recorded at Saguaro:

- Mexican long- tongued bat (*Choeronycteris Mexicana*)
- Lesser long- nosed bat (*Leptonycteris yerbabuenae*) (formerly *L. sanborni* and *L. curasoae*)
- Townsend's big- eared bat (*Corynorhinus townsendii*) (formerly *Plecotus*)
- Big brown bat (*Eptesicus fuscus*)
- Southwestern myotis (*Myotis auriculus*)
- Cave myotis (*Myotis velifer*)
- Fringed myotis (*Myotis thysanodes*)
- Western small- footed myotis (*Myotis ciliolabrum*) (formerly *M. leibii*)
- California myotis (*Myotis californicus*)
- Long- legged myotis (*Myotis volans*)
- Yuma myotis (*Myotis yumanensis*)
- Hoary bat (*Lasiurus cinereus*)
- Silver- haired bat (*Lasionycteris noctivagans*)
- Western pipistrelle (*Pipistrellus hesperus*)
- Canyon bat (*Parastrellus hesperus*) (formerly western pipistrelle *Pipistrellus hesperus*)
- Pallid bat (*Antrozous pallidus*)
- Brazilian free- tailed bat (*Tadarida brasiliensis*)

The most numerous species at the time of their surveys (1992–1994) was the cave myotis, which is not present during the winter months through March. More recent surveys have found that the cave myotis continues to be the most abundant bat species in the TMD (Wolf and Dalton 2003, 2005). These reports indicate that the California leaf- nosed bat is also relatively common in the TMD. Some abandoned mine features are used by both species, but other features are used by only a single species. Wolf and Dalton's (2007) observations indicated that human

visitation to mines could adversely affect bat populations. The federally endangered lesser long-nosed bat has been found in only one location in the Rincon District (Sidner 1991), which is not one of the features addressed in this EA.

Biologists visited 13 abandoned mine features within Saguaro from September 15 through 18 and from September 21 through 24, 2009, to assess general wildlife use. Only a few bats were seen incidentally during those visits, and guano was observed in a few features. It was noted that adits and shafts could be potential roosting habitat for lesser long-nosed bats passing through the area, but based on recent surveys completed at the park (Wolf 2009b; Weesner pers. comm. 2009), this use has not been observed and is not expected. Wolf (2009b) reports use of some mine openings by California myotis and cave myotis. Table 5 in Section 2, Alternatives, provides a summary of the bat use known in Saguaro mines considered for action under this EA. Specific species information is not provided to protect the resource, but is on file with the NPS as part of the administrative record for this project.

Other Wildlife

As noted above, numerous wildlife species may take advantage of the conditions found at abandoned mine features. Observations of wildlife using the mining features recorded during the site surveys of September 2009 or provided by park staff are listed in table 5. Species directly observed within the features were white-throated wood rat (*Neotoma albigula*), great horned owl (*Bubo virginianus*), and Clark's spiny lizard (*Sceloporus clarkii*). Species for which evidence was found or was confirmed by the NPS were barn owl (*Tyto alba*), javelina (*Pecari tajacu*), desert tortoise, mountain lion (*Felis concolor*), and whitewash that was too small to be from a barn or great horned owl. Numerous other species certainly use at least some of the features, although many of the features were shallow test pits that provide little wildlife habitat except as wood rat nest sites.

Federally Listed or Species of Management Concern

The only federally listed species that could be present in mine features at Saguaro is the endangered lesser long-nosed bat (*Leptonycteris yerbabuenae*). Although this species was not detected in any of the features visited from September 15 through 24, there are historic records of lesser long-nosed bats occurring in the RMD. Despite the lack of records for lesser long-nosed bats, in the TMD (Cockrum and Petryszyn 1991; Hoffmeister 1986; Powell et al. 2006, 2007; Sidner 2003; Sidner and Davis 1994), it is possible that the species occurs in the Tucson Mountains (Powell et al. 2007; Sidner and Davis 1994). None of the mines visited by the field team in September 2009 likely have lesser long-nosed bats, but some have potential based on the size of the feature and the bats' seasonal distribution in Arizona. Shafts are not likely to be appropriate for the bat species present at SNP (Wolf and Dalton 2003).

The Mexican spotted owl (*Strix occidentalis lucida*) occurs in the RMD, where there is also critical habitat for the species. However, it is found only at elevations above that of the mine features considered in this document. No other federally listed species have reasonable potential to occur within Saguaro at or near the mining locations included in the EA for closure actions.

Other species of concern considered in this evaluation are the desert tortoise and species of bats besides the lesser long-nosed bat. The Sonoran population of the desert tortoise (*Gopherus agassizii*) is not formally listed, proposed for listing, or considered a candidate species by the

USFWS, but it is a WSC in Arizona. The desert tortoise is relatively common in both districts of Saguaro, and shafts or shallow test pits can trap individuals. Of the 13 features surveyed in September 2009, tortoises were seen at two and the potential for tortoise shelter was considered moderate to high in the immediate area of the features. Mine features that are potential traps for tortoise or other wildlife species are identified in table 5. The Mexican long-tongued bat *Choeronycteris mexicana* is listed as WSC in Arizona and has been documented in Saguaro.

No threatened or endangered plant species were observed during the surveys, nor would any of these species be reasonably expected in the vicinity of the mine features surveyed.

Grand Canyon National Park

General Plant Community/Habitat

The geologic diversity and elevational range of the Grand Canyon create a wide range of biotic communities. The entire park area is considered to be semi-arid desert, but distinct habitats are located at different elevations along the 8,000 foot elevation gradient. North-facing slopes receive about one-third the normal amount of sunlight, so plants growing there are similar to plants found at higher elevations, or in more northern latitudes. The south-facing slopes receive the full amount of sunlight and are covered in vegetation typical of the Sonoran Desert (NPS 2009b).

The mine features included in the EA are located throughout the park and therefore occur in various habitats found in the park. Near the Colorado River, the riparian community includes species such as coyote willow (*Salix exigua*), arrowweed (*Pluchea sericea*), seep willow (*Baccharis salicifolia*), western honey mesquite (*Prosopis glandulosa* var. *torreyana*), catclaw acacia (*Acacia greggii*), and exotic tamarisk (saltcedar; *Tamarix ramosissima*). Several of the mines addressed in this EA, such as Tanner McCormick, Havasu, and Marble Canyon, are located close to the river in this type of habitat. Just above the river corridor a desert scrub community exists, with a wide variety of cacti and warm desert scrub species including creosote bush (*Larrea tridentata*), white bursage (*Ambrosia dumosa*), catclaw acacia (*Acacia greggii*), ocotillo (*Fouquieria splendens*), mariola (*Parthenium incanum*), western honey mesquite (*Prosopis glandulosa* var. *torreyana*), four-wing saltbush (*Atriplex canescens*), big sagebrush (*Artemisia tridentata*), blackbrush (*Coleogyne ramosissima*) and rubber rabbitbrush (*Chrysothamnus nauseosus*). A pinyon pine (*Pinus*) and juniper (*Juniperus*) forest grows above the desert scrub up to 6,200 feet. This woodland consists of pinyon pine and one seed and Utah junipers (*Juniperus osteosperma*), with big sagebrush (*Artemisia tridentata*), snakeweed (*Gutierrezia sarothrae*), Mormon tea (*Ephedra viridis*), cliffrose (*Purshia*), apache plume (*Fallugia paradoxa*), Utah agave (*Agave utahensis*), narrowleaf (*Yucca angustissima*) and banana yucca (*Yucca baccata*), winterfat (*Krascheninnikovia*), Indian ricegrass (*Oryzopsis hymenoides*), dropseed (*Sporobolus*), and needlegrass (*Achnatherum*). Several of the mines, such as the Hermit Road prospects and Grandview Mine, are located in this habitat. Between 6,200 feet and 8,200 feet ponderosa pine forest is abundant, which typically includes Gambel oak (*Quercus gambelii*), New Mexico locust (*Robinia neomexicana*), mountain mahogany (*Cercocarpus*), elderberry (*Sambucus*), creeping mahonia (*Mahonia repens*), and fescue (*Festuca*). On the North Rim at elevations above 8,200 feet, a spruce-fir forest tops is prevalent, characterized by Englemann spruce (*Picea engelmannii*), blue spruce (*Picea pungens*), Douglas fir (*Pseudotsuga*), white fir (*Abies concolor*), aspen (*Populus tremuloides*), and mountain ash (NPS 2009b).

Bats

A bat survey of 16 abandoned mine features in Grand Canyon was conducted from January 21 to February 2, 2009 by park staff and BCI (2009), assisted by staff from the Arizona Game and Fish Department (AZGFD), and another survey was conducted in October 2009 by AZGFD (Diamond and Frary 2009). Biologists participating in the field survey conducted in late September 2009 also made note of bat or guano presence. Evidence of Townsend's big-eared bat (day, night roosts) was noted at several sites in all surveys, and long-legged myotis also use at least one site for roosting. Two mines may be possible hibernacula for Townsend's big-eared bats. October field surveys found indication of bat use at Grandview Mine/Last Chance (three holes already gated; likely night roosts) and confirmed the use of another mine by Townsend's big-eared bats. A summary of bat use known in the Grand Canyon features that are being considered for action under this EA is provided in table 6 in Section 2, Alternatives. Specific species information is not provided to protect the resource, but is on file with the NPS as part of the administrative record for this project.

Other Wildlife

Wildlife observations in each of the features surveyed in October 2009 are provided in table 6. Species directly commonly observed near mine features or flying overhead include various songbirds (*Passeriformes*), turkey vultures (*Cathartes aura*), ravens (*Corvus*), elk (*Cervus canadensis*), and mule deer (*Odocoileus hemionus*). Evidence of packrats (*Neotoma cinerea*) was very common in many features. At the Tanner McCormick mine site, ringtail (*Pseudocheiridae*), mountain lion (*Puma concolor*), and bighorn sheep (*Ovis canadensis*) were observed or could potentially use the site, and muskrat (*Ondatra zibethicus*) tracks were seen in the adit.

Federally Listed or Species of Management Concern

No federally listed species is known to be present within the mine features at Grand Canyon. The Mexican spotted owl (*Strix occidentalis lucida*) occurs in the park, and may occur in the vicinity of the mines if steep-walled rocky canyons and suitable vegetation are present near these features. Virtually all of the area below the rim within Grand Canyon National Park has been designated as critical habitat (Unit CP-10). The recovery plan for the owl makes virtually no mention of owls in the Grand Canyon, and their distribution map shows no record for that region (USFWS 1995).

Surveys conducted in the Grand Canyon for Mexican spotted owl were completed at 37 study sites, and all territories found were located in the upper reaches of large tributary canyons with steep and rugged rocky canyon terrain (NPS 2009a). The Mexican spotted owl breeding season generally runs from March to August.

The southwestern willow flycatcher (*Empidonax traillii extimus*), a species listed as threatened, is known to be present in the riparian zone along the Colorado River through the Grand Canyon. The greatest concentrations of records are from Nankoweap Creek to Tanner Canyon and from Spencer Canyon to the Grand Wash Cliffs (AZGFD 2004). Breeding has been confirmed in these areas (Corman and Wise-Gervais 2005). This species prefers cottonwood/willow and tamarisk vegetation along rivers and streams, and may be present in the riparian vegetation along the Colorado River in the vicinity of the Tanner-McCormick Mine.

California condors (*Gymnogyps californianus*), a species listed as a federal experimental non-essential population, were observed flying overhead at several of the sites. Condors have also been reported to forage in the vicinity of South Rim Adit. Cliffs, tall conifers, and snags all serve as roost sites. Many condors frequent the Grand Canyon, especially during the summer, coming from all four captive breeding locations and some from wild nest caves in and around the Grand Canyon (NPS 2009c).

Given the distance to nearby water bodies and the use of erosion /sedimentation BMPs as needed, other potential federally listed species that are associated with water or fringing marshes such as the humpback chub (*Gila cyph*), razorback sucker (*Xyrauchen texanus*), Kanab amber snail (*Oxyloma kanabense*), and clapper rail (*Rallus longirostris*) are not likely to be present at any sites or affected by closure actions. No other federally listed species were observed in or near the mining features surveyed.

Other species of concern considered in this evaluation are the state- listed WSC that could occur at or near the Grand Canyon mining features or be disturbed by helicopter transport. These include several species of bats, including the long- legged myotis, which was identified as occurring in one feature. Bighorn sheep may occur in the area, and the California condor, a state WSC, is discussed above. Bald eagle are state listed WSCs and may fly over or nest near mine sites. None was observed during field surveys in October. No desert tortoises or evidence of nearby use were observed during field surveys at the sites.

No threatened or endangered plant species were observed during the surveys, nor would any of these species be reasonably expected in the vicinity of the mine features.

Environmental Consequences

The thresholds for the intensity of impact were defined as follows:

Federally- Listed Species and Species of Management Concern (includes most bats)

- | | |
|-------------|---|
| Negligible: | Impacts would result in a change to a population or individuals of a federal or state- listed threatened and endangered species, but the change would be well within the range of natural fluctuations. |
| Minor: | An action that would affect a few individuals of a federal or state- listed threatened and endangered species or have very localized impacts upon their habitat. The change would have barely perceptible consequences to the species or habitat function. Sufficient habitat would remain functional to maintain species viability. Impacts would be outside of critical reproduction periods. Mitigation measures, if needed to offset adverse effects, would be simple and successful. |
| Moderate: | An action that would cause measurable effects on: (1) a relatively small percentage of the species population; (2) the existing dynamics between multiple species (e.g., predator- prey, herbivore- forage, vegetation structure- wildlife breeding habitat); or (3) a relatively large habitat area or important habitat attributes. A population or habitat might deviate from normal levels under existing conditions, but would remain indefinitely |

viable within the park. Response to disturbance by some individuals could be expected, with some negative impacts to feeding, reproduction, or other factors impacting short-term population levels. Mitigation measures, if needed to offset adverse effects, could be extensive, but would likely be successful.

Major: An action that would have drastic and permanent consequences for a species population, dynamics between multiple species, or almost all available unique habitat. A population or its habitat would be permanently altered from normal levels under existing conditions, and the species would be at risk of extirpation from the park. Frequent responses to disturbance by some individuals would be expected, with negative impacts to feeding, reproduction, or other factors resulting in a decrease in population levels. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.

General Wildlife/Wildlife Habitat

Negligible: Impacts on native wildlife species, their habitats, and the natural processes sustaining them would be at or below the level of detection. There would not be any measurable or perceptible effects on wildlife populations.

Minor: Detectable impacts on native wildlife or their habitats would occur within a small area but would not result in substantial changes in populations or the natural processes, such as competition and dispersal that sustain them. While the mortality of individual animals might occur, population effects would be within the range of natural variation, and the viability of wildlife populations would not be affected. Mitigation measures, if needed to offset adverse effects, would be simple and successful.

Moderate: Readily detectable impacts outside the range of natural variability would occur on native wildlife populations, their habitats, or the natural processes sustaining them. The change would be measurable in terms of population abundance, distribution, quantity, or quality and would occur over a relatively large area. Mitigation measures, if needed to offset adverse effects, could be extensive, but would likely be successful.

Major: Readily apparent impacts outside the range of natural variability would occur on native wildlife populations, their habitats, or the natural processes sustaining them. The change would be measurable in terms of population viability and could involve the displacement, loss, or restoration of a wildlife population or assemblage. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.

Impacts on Bats and Other Wildlife under Alternative A, No Action

Under the no- action alternative, the parks would not complete the mine closures and would only continue to monitor the sites, posting signs as needed. Continuing existing management and conditions means that visitors could access unprotected mine features and ignore any warning signs, and unauthorized entry to mine sites (especially those with relatively easy access) would continue. Where entry by humans into mines used by bats is more likely to occur based on past experience, this would likely disrupt bats occupying the features and could result in their abandonment of the sites. Disturbance could also result in reduced viability of the population due to changes in behavior in response to stress (i.e., there may not be direct mortality to adults, but loss of energy due to avoidance flight). Females may drop their young and/or abandon maternity sites. Bats awakened from hibernation may lose essential energy reserves (Brady et al. 1982 in White and Seginak 1987). Continued public use and subsequent disturbance would reduce the quality of the mine as bat habitat and could result in decline in numbers of individuals through mortality or sublethal effects. Tuttle (1979) demonstrated that declines in gray bat numbers were attributable to disturbance by recreationists. Additionally, there is evidence that other bat species are negatively impacted by human visitation in the roosts. These population declines were reflected in both maternity colonies and at hibernacula sites (Mohr 1972; McCracken 1989; Currie 2000). Of significance to this project, Sidner (2009) documented long- term recovery of a lesser long- nosed bat colony in a southern Arizona cave after the site was seasonally closed to recreational caving. Under the no- action alternative, there are sites where human disturbance has not been an issue over the years (such as has been experienced at sites at Organ Pipe Cactus), such that the probability of disturbance by humans under the no- action alternative is not as high as at other locations. If that would continue, impacts could be lower, at negligible adverse levels or even be considered beneficial due to the unobstructed opening. However, at other sites, the effects of taking no action may ultimately reduce population size resulting in long- term minor to moderate adverse impacts on bats on a landscape level, depending on the species.

Other wildlife using these mine sites, such as javelina (*Tayassuidae*), lizards, owls, mountain lions, and tortoises, would be similarly disturbed, but most would be expected to return to the site after human disturbance was gone. Taking no action to close shafts would mean that these remain as wildlife traps for desert tortoises and other less mobile terrestrial species that can fall in and become trapped. Taking no action would have long- term minor adverse effects on other wildlife species.

Special Status Species

Of particular concern are those species that are federally listed species or state species of concern. For the four Arizona parks, these include several bat species, including the federally listed lesser long- nosed bat. Not providing bat- friendly closures for sites that support these bats would continue to allow disturbance of bats. At Organ Pipe Cactus, there is a large maternity colony of lesser long- nosed bats and several satellite colonies (possible bachelor roosts), and state- listed Mexican long- tongued bats are known at Organ Pipe Cactus, Saguaro, and Coronado also. Many of these sites have been disturbed in the past and would remain susceptible to the impacts from human presence or intrusion into the mine features, as described above for non- listed species. There are also sites where human disturbance has not been an issue over the years, such that the probability of disturbance by humans under the no- action alternative is not as high as at other locations. If that would continue, impacts could be

lower, at negligible adverse levels, or impacts could be considered beneficial due to the unobstructed opening. However, for sites containing endangered species, even if the site has not been subject to past disturbance and the probability of future disturbance may be low, the consequences of even one disturbance could be consequential. Abandonment of a maternity colony at the time when young are dependent on adult females for warmth and feeding would result in mortality of the young and could negatively affect the local population and could result in up to moderate adverse effects on a federally listed species.

The no- action alternative would not adversely impact the other special status species discussed under the Affected Environment except for desert tortoise. Individuals have been found trapped in abandoned shafts, and, based on the number of tortoises seen at the sites and known to have become trapped (according to park staff), taking no action to close open shafts would continue to result in long- term minor adverse impacts on those populations.

Cumulative Impacts

Those actions that could contribute to cumulative impacts on bats and other wildlife include past closure of AML sites within individual park units and future closure of AML sites within individual park units as funding is made available. Only a few mine openings have already been closed, as indicated in the tables in Section 2, Alternatives; this would contribute long- term beneficial impacts to the resource by providing protection from disturbance, and minimal adverse effects were noted during or after closures that were due to closure design. At Saguaro, gating did result in declines in number of cave myotis at one site; the park has been experimenting with different design modifications so that the closure does not constrict passage as much. Mine features that would be addressed in the future, pending additional surveys and funding, would also contribute long- term beneficial impacts to bats using these features by providing protection from disturbance, but with minor to possible moderate long- and short-term adverse effects from the construction of the closures, especially to other wildlife that use the openings for nesting, denning, or shade. Closing some features would prevent certain wildlife use of the features, including bats for certain features. No closures would be permitted if the resource using them was a listed species and the closure would adversely affect that species, based on pre construction surveys and availability of alternate habitat in the area. Given the criteria followed and the mitigation that would be adhered to with any closure, this would have a long- term minor adverse impact.

Contamination can also affect bats and other wildlife, and at Saguaro, the Old Yuma site is undergoing evaluation for remediation or removal of contaminated media, and one site at Coronado may have contaminated water. Wildlife in the area could be adversely affected by exposure to this contamination, with effects not yet thoroughly assessed.

Visitor use (backcountry hiking) and the presence of undocumented aliens in the parks (southern Arizona) also affect wildlife with short- term but continuing minor disturbances from human presence and noise. Aircraft overflights (e.g., Grand Canyon helicopter tours) can cause periodic disruption to various species due to noise, a negligible to minor short- term adverse impact.

NPS performs regular management oversight of visitor uses, mine sites, and resource preservation within the parks. At Saguaro, a trails plan is expected to be implemented over the next five years. Beneficial impacts to biological resources would be expected from NPS

oversight and interpretation programs, with short- term negligible to minor adverse impacts from the disturbances related to noise of maintenance and surveying or projects such as trail construction.

The impacts of all these other actions, added to the long- term, local, negligible to moderate impacts to bats and other wildlife expected from the actions under this alternative, would result in long- term minor adverse cumulative impacts on bats and other wildlife resources.

Cumulative impacts for federally listed species need to take into account actions in and outside of parks that affect these species. These vary from species to species, but include such things as loss of habitat due to increased population growth and development in the area. This is particularly true for southern Arizona, where the population growth in Pima county has resulted in a 23% increase in housing since 1990 (NPS 2009l). As the population continues to grow, the park and surrounding areas will experience more habitat loss or fragmentation and recreational use, with increased opportunities for disturbance to wildlife (USFWS 2007). Although there are no current or pending state or private activities specifically identified that would cause adverse impacts to the lesser long- nosed bat, roost disturbance from periodic human presence or intrusions would continue to occur at features supporting the bat that are not protected, and loss of their primary food source (nectar- bearing cacti and agaves) with increased development in the area could adversely affect this species, resulting in up to moderate adverse impacts. Other threats to roosts besides increasing development that continue to affect the lesser long- nosed bat include illegal border activities, drought, catastrophic fire, recreation (caving), vandalism, roost deterioration, vampire bat control, mine closures, forage availability, grazing of food sources, non- native invasive plants that contribute to fuels for fires, and agave harvesting (USFWS 2007).

For the Sonoran pronghorn (Organ Pipe Cactus), habitat loss and barriers to movement caused by roads, canals, train tracks, and fences have affected the species, as well as overgrazing, diseases, and overhunting (USFWS 2007). The Mexican spotted owl has also been adversely affected by habitat loss, but currently much of its habitat or Protected Activity Centers are located in areas owned by the federal government, and the additional protection afforded by that ownership is a long -term benefit to this species. Cumulative impacts to the southwestern willow flycatcher have occurred mainly from loss and degradation of their preferred dense riparian habitats (USFWS 2009).

California condors have experienced adverse cumulative impacts from many sources (especially lead poisoning and shooting; USFWS 1996) that resulted in its current status as endangered and as a federal experimental nonessential population in Arizona, which could be considered as a current long- term major adverse impact.

In general, numerous past, present, and future actions have adversely affected or have the potential to adversely affect the federally listed species that are found or may be found in the parks, resulting in long- term minor to mostly moderate adverse impacts to the species, which is reflected in their current protected status. The no- action alternative would provide no noticeable increase to overall cumulative impacts to most of these species, and a small increment to the overall adverse impacts for the lesser long- nosed bat due to the continued lack of protection at some key sites.

Conclusion

The no- action alternative could result in a range of impacts from negligible to moderate, long-term, and adverse on bats and other wildlife. Unobstructed openings could even be considered beneficial; impacts would depend on the accessibility and vulnerability of the feature. However, without closures, sensitive bat species would not be fully protected; their habitat could be degraded as more visitors (and potential vandals) are able to enter the features. Over time, unauthorized visitor access could result in serious injury and minor to possibly moderate long-term and possibly regional adverse impacts to a listed species. Cumulative impacts would be long- term minor adverse for most wildlife, and long- term minor to moderate and regional for most federally listed species from other past, present, and future actions, with the no- action alternative providing little increase to overall cumulative adverse impacts to these species.

Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the parks; (2) key to the natural or cultural integrity of the parks or to opportunities for enjoyment of the parks; or (3) identified as a goal in any park's or other relevant NPS planning documents, there would be no impairment of the parks' resources or values. Implementation of this alternative would not result in unacceptable impacts and is consistent with *NPS Management Policies* 2006.

Impacts on Bats and Other Wildlife under Alternative B, Proposed Action (NPS Preferred Alternative)

The closures proposed at the mine features, as listed in the tables in Section 2, Alternatives, are intended to prevent human access while protecting the bat species living in the mines. The proposed closures vary in design, ranging from perimeter fencing (which does not impact bat access) to bat- friendly gates of various designs and materials. These gates would be site specific and designed for each park's requirements and the bat species involved. Although the preferred outcome is that the effect to bats would be long- term beneficial, by preventing human disturbance, it is recognized that these closures could have either adverse or beneficial impacts on the bats living there, depending on the resident species, numbers of bats (colony size), type of use (maternity, post- maternity or hibernation), and type and design of closure selected. The response of bats to protection efforts, such as gates, has been mixed (Currie 2000). The effects of mine closures on bats are difficult to predict and there is a lack of species- specific literature on the subject. In addition, very few rigorous studies have been conducted on the bat species in question in this EA, so the effects of gating cannot be fully evaluated (Sherwin and Altenbach 2002). In all cases, closures were selected and designed to meet the physical conditions and the nature of bat use at the sites. If the bats accept the gates (and the designs were selected to accomplish this), the proposed alternative would offer more protection to bats and their habitat. If the bats reject the gates or the gates interfere with their flight, there could be adverse effects, especially if the species is a listed species. For most non- listed bats and bats with few numbers using a feature, there are other mines and caves in the parks and surrounding area that bats regularly use and can use as alternative roost sites if displacement (temporary or otherwise) would occur.

Currie (2000) notes that no single gate design is applicable in all roost situations or for all species. This is true of this project, and, as stated in Section 2, Alternatives, the closure design for

each feature would be selected based on the factors that would maximize protection while minimizing impacts to bats. In general, all gates would be designed to provide maximum space for access and minimal obstruction to entry and exit of the mine, with adequate strength to prevent expected levels of vandalism at each site. None of the sites except perhaps the large maternity colony at Organ Pipe Cactus has high enough air flow to be concerned that any gate would alter airflow conditions (see discussion under “Special Status Species” below). No significant microclimatic effects are expected, given the designs proposed and the maintenance of adequate spacing between bars. Although there is no current evidence that pregnant lesser long-nosed bats would accept gates, it is hoped that bats would adjust to the structures proposed, given time, and would benefit from the closures. Two years of post closure monitoring of lesser long-nosed bats at Organ Pipe Cactus on a sub-set of the proposed closures would guide future implementation and could result in the removal or redesign of gates if dictated by the results of the monitoring effort. Disturbance by humans entering and exploring the mines during critical roosting or maternity periods would no longer be likely following the installation of the gates. Because there could be short-term adverse impacts from the presence of work crews and noise during gate installation, construction would be scheduled to avoid key breeding periods. Specific construction periods for each of the four parks are provided in Section 2, Alternatives. Therefore, any effects should be avoided or be only short-term and minor for bats that are year-round residents. Overall, impacts of providing protection would be long-term beneficial.

Post-construction monitoring would occur at all gated sites, and pre-construction monitoring is proposed for all sites where additional baseline data are needed. Because inappropriate monitoring procedures can cause adverse effects on bats from the presence of people and actions taken, the staff would be trained NPS or contractor staff well-versed in minimizing impacts. Additionally, some monitoring may be done remotely if disturbance is a major issue. Monitoring would contribute to long-term benefits through additional information, with short-term minor adverse effects.

Regarding the sites that are proposed to be closed by PUF/backfill (i.e., would not remain open), most of these sites were selected for closure because they have no or minimal bat and other wildlife use, and have little potential as future bat habitat. Backfills of numerous small, shallow prospect pits, such as is proposed at Organ Pipe Cactus and Saguaro for many of these scattered through the parks, would have limited effect on wildlife and reduce the chance of these becoming wildlife traps. More extensive backfilling such as that proposed at the RMD sites in Saguaro, may include use of heavy equipment and could have a more extensive adverse localized impact to wildlife displaced from the mine and the immediate surroundings (no bats are present at the RMD sites). Wildlife would be expected to avoid the noise and disturbance in the immediate vicinity of the closure activity, but some incidental mortality of less mobile wildlife on-site could occur. Any scattered vegetation on the site would be removed or crushed where heavy equipment needs room to operate. Wildlife in the vicinity of the mine displaced by noise would be expected to return once construction was completed and the site reclaimed. If any bats or other wildlife are present in features slated to be backfilled, exclusion would be done prior to closures to ensure no wildlife are trapped. It is expected that any displaced wildlife would have other options for suitable habitat in the area. With mitigation, backfilling is expected to have short and long-term minor adverse impacts on some species able to utilize features proposed for backfilling. However, there would be long-term benefits to those species that are susceptible to entrapment in shafts and pits, such as desert tortoise.

Decisions to close mines were made by viewing mines as bat habitat from a parkwide perspective, not by viewing each mine as an individually isolated feature in the park. It is recognized that closing many mines in a relatively short time period (over 1–2 years) as is planned, has greater potential to negatively affect bat populations than closing mines over a long time period, or allowing mines to reclaim by natural processes of rock collapse, erosion, and flooding. This is particularly true in Organ Pipe Cactus for the maternity colonies of lesser long-nosed bat that are intrinsically linked to their food plants when the young are non-volant (not capable of flight). To mitigate this potential adverse effect a long-term pre and post construction monitoring program would be implemented and would guide long-term implementation of the closure program. Where there is insufficient information to determine use by bats (e.g., deep shafts, infrequently visited adits), but where the physical structure of the mine provides potential bat habitat, the closure structure would allow bats access, and monitoring would contribute to mitigation of impacts. Also, some of the closures at Organ Pipe Cactus would open up mine habitat that was previously unavailable by replacing existing metal grates or covers with open shaft culverts and cupolas.

Other wildlife that periodically uses mines for cover or shade or a water source (if present), such as javelina, mountain lions, etc. (see tables 3 through 6 in Section 2, Alternatives), would experience short-term minor to moderate adverse impacts during construction, as they would be precluded from use of the sites and may be displaced some distance due to noise of equipment use (saws, welding, hammering, etc.) and workers, as well as helicopters overhead where helicopter sling loads are required to mobilize equipment and supplies to closure sites. After construction, these animals could still use a portion of the portal for some of the gated features when the gate is placed far enough into the mine. Some smaller wildlife that are commonly found in mines, such as woodrats, would not be displaced because of the nature of the gate designs proposed. For those sites where the gate is proposed to be located close to the portal to prevent undocumented alien use of the features, the animals would need to find other shelter within their range. There are a few mines at Coronado that have water, and at these features 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. Overall impacts to other wildlife that use the features for shade and cover would vary from short and long term, and would be minor adverse.

Many sites are proposed for no action, because they present less of a hazard to human safety and/or are habitat for bats and other species. Allowing some of the features to remain open would minimize impacts to area wildlife and provide alternative habitat for displaced animals and continued unobstructed habitat for bats.

Helicopter access would likely be needed to deliver materials and equipment at approximately 80 features, due to poor or non-existent overland access. Helicopters flying over the parks would disturb wildlife not only at the location of mines to be closed but also along their flight paths. Noise levels would be minimized by limiting helicopter flight times (by selecting lighter weight gate materials where possible) and by maintaining a minimum distance above the ground. Nonetheless, noise impact could cause short-term disturbance to wildlife in the flight path, especially canopy dwelling birds and birds in flight (e.g., raptors). Impacts to nesting birds would be minimized because construction would be limited to the fall and winter seasons due to mitigation for breeding bats and/or Mexican spotted owl at all parks. Overall helicopter use is expected to have no or short-term minor adverse effects on wildlife. Additionally, construction

crews at the sites or hiking into sites are not expected to have more than localized negligible adverse effects on wildlife in the area traversed, mainly temporary avoidance or flight responses due to noise and human presence.

Special Status Species

Federally Listed Species

The lesser long-nosed bat is known to occur in three of the four Arizona parks, including Coronado, Organ Pipe Cactus, and Saguaro. There are two prominent features at Coronado and Organ Pipe Cactus that the lesser long-nosed bat is known to utilize: a post-maternity roost at Coronado and a major maternity colony at Organ Pipe Cactus. In addition to the main maternity roost, Organ Pipe Cactus also contains several other abandoned mines which support important satellite maternity colonies and/or temporary night roosts. Potential effects of the proposed action on bat species, including the lesser long-nosed bat, are discussed above; however, effects specific to the lesser long-nosed bat would be associated with the relative success of the proposed adaptive management approach in both Coronado and Organ Pipe Cactus.

There is an existing adaptive management approach in place at the post-maternity roost in Coronado. Based upon the results of investigations completed to date, all but the roof of the proposed permanent structure would be built prior to the bats return in late summer to this post-maternity roost site. The effects to the lesser long-nosed bat under the proposed action would be tied to the effects of the experimental cover that would be added to the permanent structure built this spring. Additional work at this site would focus on construction of four test roof panels made from wood, PVC fence post material, or similar material that would be placed on the open framework. Post-construction monitoring in late summer and early fall of 2010 would provide estimates of bats using the site through the season. If the numbers of bats using this site are consistent with regional population trends and expectations, based on the opinion of park staff with input from USFWS, the structure would be considered successful, and can proceed to the next stage, as described in more detail under the "Monitoring and Adaptive Management" in Section 2, Alternatives. With this adaptive approach, impacts are expected to be short-term minor to moderate and adverse due to presence of the gate; however long-term effects are expected to be minor adverse and ultimately beneficial due to closure of the area to human access and long term protection of the resource.

The adaptive management approach for Organ Pipe Cactus features would be put in place as part of the proposed action for this project and would include four experimental designs and extensive monitoring to assess the effects of the closures. Future closures would likely include gates on adits and cupolas on shafts, and the placement of a chute gate at the major maternity colony pending the results of the adaptive management program. Although the chute gate could alter preferred flight path on exit from an adit, it provides greater open space than either the standard or folded gate design and 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 probably similar to the risk at a well-constructed security fence.

With the proposed approach and feedback that would be used to avoid adverse effects, impacts to the lesser long-nosed bat are expected to be short-term minor to moderate adverse due to

the presence of gates during the experimental phase and long- term minor to possibly moderate adverse as monitoring and associated adjustments continue during the early stages of the adaptive management program. If monitoring indicates continued adverse effects, then the closures would be modified to reduce adverse impacts and strive toward beneficial protection of bats, while also providing a closure (even fencing) that addresses human access/safety concerns. Implementation of actions specifically relating to the main maternity roost at Organ Pipe Cactus would be initiated in a stepped process based on the programmatic analysis provided in the BA and the information gained from pre- and post- construction monitoring efforts. With this approach, the proposed alternative is expected to result in long- term minor adverse to beneficial effects due to closure of important bat habitat to human access.

The Mexican spotted owl is known to occur in Coronado National Memorial, Saguaro National Park, and Grand Canyon National Park with designated critical habitat in all three parks. In Saguaro National Park, no suitable habitat exists within the area of the proposed action on mine features and critical habitat is located at least two miles from mine features in the Rincon Mountains, resulting in no effect to the Mexican spotted owl or its critical habitat in Saguaro. All of the abandoned mine features to be addressed in the proposed actions for Coronado and Grand Canyon are within the boundaries of the designated critical habitat. Although Mexican spotted owls have the potential to occur in the proximity of the majority of features with proposed actions at Coronado and at a few features in the Grand Canyon, most of the features with proposed actions in Coronado do not occur within the closed canopy habitat that is preferred by the owl. Proposed activities would have limited impacts to any vegetation within and adjacent to each AML feature being considered, and proposed improvements would occur over a relatively short time, resulting in short- term, negligible to minor adverse effects to Mexican spotted owl. Construction activities could cause avoidance of areas of proposed activity; however activities would be conducted outside of the breeding season during the fall and early winter, so effects to Mexican spotted owls would be short- term negligible to minor and adverse. For activities on Horseshoe Mesa within Grand Canyon National Park, use of a helicopter would be required. Helicopter transportation across potential owl habitat and in the vicinity of a mapped territory could result in harassment and disturbance of Mexican spotted owl activities and resulting avoidance of the area and therefore short- term negligible to minor adverse effects to this species for all parks. There would be no long- term effects on the Mexican spotted owl.

The Sonoran pronghorn is known to occur in Organ Pipe Cactus National Monument; however, no critical habitat has been designated and suitable habitat primarily exists in western portions of the park. Although Sonoran pronghorn have not been observed and are not expected to be present in the vicinity of the AML features with proposed actions, they could occasionally pass through these areas. If this occurs, construction activities on proposed features could result in short- term negligible adverse effects to species from the presence of workers and equipment and would likely result in avoidance of areas by pronghorn. Avoidance could result in an increase in energy expenditures by pronghorn, which cause responses including elevated heart rate and metabolism and elevated levels of stress hormones. If effects occur during the fawning and nursing season (February to July), potential effects on individuals could result in long- term minor effects; however, construction activities would be conducted primarily from September through January, reducing potential effects of avoidance to short- term negligible to minor and adverse. There would be no long- term effects on the Sonoran pronghorn.

Southwestern willow flycatcher is known to be present in the riparian zone along the Colorado River through Grand Canyon National Park. This species may be present in the riparian vegetation along the Colorado River in the vicinity of the Tanner- McCormick Mine. Construction activities could result in disturbance to this species as a result of noise from the presence of workers and equipment, resulting in short- term negligible to minor adverse effects from potential avoidance. Activities would be conducted outside of the breeding season (typically early May through July) to avoid potential disturbance to breeding populations. In addition, activities would avoid disturbance of or removal of riparian habitat. There would be no long- term effects on the Southwestern willow flycatcher.

California condors are known to occur within Grand Canyon National Park. Condors were seen flying overhead at two of the surveyed abandoned mine features, and the potential for presence of condors exists as foraging has been reported in the vicinity of the South Rim Adit. Potential effects to the California condor include short- term negligible to minor effects from construction activities and helicopter use; however, with seasonal restrictions on the Mexican spotted owl and other species, effects are expected to be short- term negligible adverse. Condors have been exposed to occasionally heavy helicopter traffic within Grand Canyon and elsewhere since they were reintroduced to northern Arizona, and have shown no indication of being disturbed by the presence of helicopters in their general vicinity (Parish pers. comm. 2009). Although disturbance to individuals due to helicopter traffic is unlikely, measures would be taken to eliminate the possibility of collisions between helicopters and condors. Details of mitigation for the condor are provided in Section 2, Alternatives and include measures to report any condor presence in the area to a park wildlife biologist and to keep aircraft at least 400 meters from condors in the air or on the ground and avoiding condor nesting sites. Personnel involved with closure actions would be provided with instruction regarding condor concerns, and work would cease if condors arrive on site. With these measure in place, impacts would be short- term negligible adverse. There would be no long- term effects on the California condor.

State-listed Species

Mexican long- tongued bats (found at Coronado, Saguaro, and also the Grand Canyon).are in the same family (Phyllostomidae) as lesser long- nosed bats and have similar foraging needs and roost requirements. Although they are generally found in smaller colonies at Coronado and Saguaro, they could use similar mine structures. However, there is no information regarding how this species might accept gate closures on mines. Therefore their roosts would be managed with the same care as with lesser long- nosed bats and would require post- construction monitoring. Construction would be avoided during key breeding periods from generally April to October. With mitigation, impacts would be short- term minor adverse and long- term beneficial.

California leaf- nosed bats are capable of slower, more maneuverable flight, which may aid their acceptance of bat- friendly gate closures. There is some evidence that they continue to use gated features (near Safford, AZ; Buecher pers. comm. 2009) but it is unclear if previously gated mines had post- construction monitoring to determine impacts on the colony size and structure. At Organ Pipe Cactus, features used by California leaf- nosed bats would follow the same pre- and post- monitoring program to determine the impacts on local populations and would be subject to bat gate mitigation measures. With mitigation, impacts would be short- term minor adverse and long- term beneficial.

Desert tortoise (Organ Pipe Cactus and Saguaro). Individual desert tortoise could be run over by vehicles used for mobilization of materials and supplies to the features to be closed. This potential impact would be minimized by educating contractors prior to mobilization to increase their awareness of the potential risks prior to the onset of construction activities, especially if construction occurs during August and September. For those features that would be backfilled, the pre- closure survey to determine if any wildlife are present prior to placement of PUF/backfill would minimize risk to desert tortoise. For those features known to support desert tortoise, gate structures would be modified to allow tortoise movement into and out of the mine feature. Cupolas would be constructed to prevent accidental entrapment of tortoise into the shaft and the existing risk of desert tortoise entrapment would be reduced as shafts are backfilled or closed with cupolas. With mitigation, impacts would be short- term negligible adverse and long- term beneficial.

California condor (see above; also federally listed as an experimental population) and bald eagle (Grand Canyon). Impacts to the California condor are discussed above. Most closure activities would have no potential adverse impacts to either the condor or to raptors including bald eagles. There is the potential for raptor strike with helicopters used to move equipment and supplies to remote closure sites. This is a common risk associated with helicopter use in and around national parks and while it is not discountable, it does not have a high probability and is an unlikely consequence of the proposed action. The seasonal restrictions established to protect listed species such as Mexican spotted owl, and bats would also avoid potential adverse impacts from noise and disturbance to any nesting raptors during the breeding season, resulting in short- term negligible adverse impacts.

Cumulative Impacts

Cumulative impacts from other actions affecting bats and other wildlife in the area of analysis would be the same as described under the no- action alternative, and range from negligible to moderate long- term adverse effects from many other past, present and future actions to beneficial impacts from federal protection of species occurring within federally owned properties. These impacts, added to the long- term, local, negligible to mostly minor impacts and beneficial impacts to bats and other wildlife expected from the actions under this alternative, would result in long- term minor adverse cumulative impacts on bats and other wildlife.

Federally listed species would experience the same cumulative impacts from other past, present and future actions as described under the no- action alternative. The actions proposed under alternative B would include the potential short- term minor to moderate adverse and long- term minor adverse to potentially beneficial impacts of closing off mine openings that support the lesser long- nosed bat. The planned phased implementation of the adaptive management program and the seasonal restrictions that would be followed to avoid breeding seasons for bats, Mexican spotted owl, Sonoran pronghorn, and southwestern willow flycatcher, which would confine construction to the fall to early winter seasons, would minimize adverse impacts from the proposed action to federally listed species. Therefore, similar to all bats and other wildlife, the impacts of the proposed action, when combined with the mostly negligible to moderate long- term adverse effects from many other past, present and future actions, would result in long- term minor to moderate adverse impacts on federally listed species. With the mitigation and monitoring inherent in the proposed adaptive management approach, the action alternative would provide a slight increment in adverse impacts, with the expectation of longer- term benefits if the adaptive management program succeeds.

Conclusion

The preferred alternative would have mainly long- term beneficial impacts on bats and other wildlife; assuming that closures are properly selected for each feature and through implementation of the adaptive management program. Short- term negligible to moderate adverse impacts could occur during construction or during the implementation of the adaptive management approach as experimental designs are evaluated. However, seasonal restrictions would be in place for construction to avoid sensitive breeding or hibernation periods, and construction would be done in a manner to minimize disturbance. The adaptive management approach for lesser long- nosed bats is designed to keep adverse impacts to a minimum and provide essential knowledge for future decision- making about closures at sensitive sites. Cumulative impacts for bats and other wildlife would be long- term minor adverse, and cumulative impacts for federally listed species would be long-term minor adverse impacts, with the action alternative providing only a slight increment in adverse impacts, and the expectation of longer- term benefits with the successful implementation of the adaptive management program and associated monitoring.

Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the parks; (2) key to the natural or cultural integrity of the parks or to opportunities for enjoyment of the parks; or (3) identified as a goal in any park's or other relevant NPS planning documents, there would be no impairment of the parks' resources or values. Implementation of this alternative would not result in unacceptable impacts and is consistent with *NPS Management Policies 2006*.

Visitor Use and Experience including Human Health and Safety

Affected Environment

In this section, the topics of visitor use/experience and human health/safety are discussed for each of the park units. Visitation trends for each park unit are described and the more common visitor activities are highlighted. Because of the potential for health and safety related issues among park visitors who come in contact with these features, information regarding AMLs is presented in relation to this topic.

Coronado National Memorial

Recorded visitation statistics for Coronado National Memorial are based on counts taken at the visitor center and from a road counter. While they may underestimate the actual number of annual visitors to the park, they record a general trend. The total number of recreational visitors to the memorial during the 10- year period from 1998 to 2008 was approximately 3.5 million. On average, roughly 90,000 recreational visitors come to the memorial each year. Recreational visitation declined slightly between 1998 and 2001, but has since shown a general increase, with the exception of a temporary decline in 2006. Visitor use patterns at Coronado are fairly predictable throughout the year. Visitation is bimodal in nature, increasing in the early spring, peaking in May, declining again during the hotter months of summer, and then increasing again in the fall before a decline during the winter months. Overall, most visitation from 1998 to 2008 occurred in the months of May and September, with the highest average visitation occurring in

May. The lowest numbers of visitors to the park over the 10- year period occurred in December and January (NPS 2009i).

Common visitor uses of the park include scenic driving (Montezuma Pass is located 3 miles west of the Visitor Center and accessible by a winding mountain road), caving, hiking, birding, nature walks, wildlife viewing, and picnicking. Coronado National Memorial contains eight miles of hiking on five designated trails: Coronado Cave Trail, Coronado Peak Trail, Crest Trail, Joe's Canyon Trail, and Yaqui Ridge Trail. Within the park, the Yaqui Ridge and Crest Trails together comprise the first two segments of the 750- mile Arizona Trail (NPS 2009j).

Accessibility of AML Sites at Coronado National Memorial

Several AML sites located within the park unit contain evidence of high visitation. Three mines near the Crest Trail have already been closed due to the high amount of visitation. The State of Texas mine is located 1 mile west of the visitor center. Access to Crest Trail is provided by hiking a 1.6- mile trail with an elevation gain of approximately 960 feet. Since the park unit does not maintain a formal system of recording visitation at the sites, it is unknown how much visitation, either by common park visitors, undocumented aliens, or persons evading law enforcement occurs at the sites. Many of the sites in the park have documented illegal trails nearby, either right next to the mine, or close enough that people can visit the mines (Foster pers. comm. 2009b).

Visitor Safety at Coronado National Memorial

Due to the high level of illegal border traffic in the vicinity, all of the mine features at Coronado National Memorial are regarded as safety hazards. Documented safety issues related to the AML sites include the use of adits as hiding locations for persons evading law enforcement. As a result, the U.S. Border Patrol has specifically requested that the park unit close four mines located on the Crest Trail. Three of these sites were closed in the summer of 2008. A fourth mine located on the trail was closed in January of 2010. One case of injury occurred in the summer of 2008 when an undocumented alien fell into a mine shaft on Smuggler's Ridge which was fenced and signed, sustaining spinal injury.

Organ Pipe Cactus National Monument

Visitation Trends

While recorded visitation statistics for Organ Pipe Cactus National Monument are based largely on counts taken at the Kris Eggle Visitor Center and may underestimate the actual number of annual visitors to the park, they record a general trend. The total number of recreational visitors to the monument during the 10- year period from 1998 to 2008 was approximately 3 million. An average of 272,928 recreational visitors come to the monument each year. Recreational visitation declined slightly between 1998 and 2003, but has since shown a general increase, with the exception of a recent decline in 2008. Visitor use patterns at Organ Pipe Cactus are generally predictable throughout the year. Visitation increases in the late spring, peaks in mid- summer and begins to decline in early fall. Overall, most visitation from 1998 to 2008 occurred from July to September, with peak visitation occurring in July for most years. The lowest numbers of visitors to the park over the 10 year period occurred in December and January (NPS 2009i).

Visitor Activities

Common visitor uses of the park include camping, scenic driving and biking, hiking, and ranger led activities. Geocaching (in which participants use a GPS receiver or other navigational techniques to locate natural features) is another popular visitor activity (NPS 2009f). Open and easily accessible hiking trails include visitor center nature trail, Palo Verde trail, desert view trail, Victoria mine trail, Estes canyon trail, bull pasture trail, arch canyon trail, and Alamo canyon trail. Numerous backcountry trails also exist throughout the monument (NPS 2009g). Due to an increase in illegal border activity, backcountry areas are closed indefinitely to overnight camping. Overnight camping is only available at the Twin Peaks and Alamo campgrounds.

Accessibility of AML Sites

A total of 12 AML sites are located in the vicinity of visitor use trails and other points of access within the park: Baker; Copper Mountain; Dripping Springs; Golden Bell Mine; Growler; Kuakatch Mine; Lost Cabin Mine; Martinez; Milton; Montezuma Mine; Senita Basin Mine; and Victoria Mine. These sites are easily accessible by foot and can be entered by crossing a barbed wire barrier. High levels of human activity have been documented at both Baker and Dripping Springs.

Visitor Safety

No safety incidents or complaints have been documented at any of the AML sites. There have been recurring problems with Africanized honeybees at Golden Bell, Martinez, and Copper Mines (Sturm pers. comm. 2009).

Saguaro National Park

Visitation Trends

While recorded visitation statistics for Saguaro National Park are based largely on counts taken at the Rincon Mountain and Red Hills visitor centers and may underestimate the actual number of annual visitors to the park, they record a general trend. The total number of recreational visitors to the park during the 10- year period from 1998 to 2008 was approximately 7.5 million. An average of 688,296 recreational visitors come to the park each year. Average annual recreational visitation has remained steady over the 10- year period with slight declines in 2002 and 2006. Visitor use patterns at the park are generally predictable throughout the year. Visitation increases in the winter months and peaks in early spring, declining again over the hot summer months. Overall, most visitation from 1998 to 2008 occurred from January to March, with peak visitation occurring in March for most years. The lowest numbers of visitors to the park over the 10 year period occurred in June and July (NPS 2009i).

Visitor Activities

Common visitor uses of the park include driving along the scenic Bajada Loop and Cactus Forest Drive, picnicking, camping, hiking (including backcountry hiking), and ranger led activities. Open and easily accessible hiking trails in the TMD area of the park include: Hugh Norris Trail, Sendero- Esperanza Trail, and King Canyon Trail. In the RMD area, most trail use is concentrated in the northwest corner of the park – the Cactus Forest. The Tanque Verde Ridge trail traverses the park from west to east. Other backcountry trails include Douglas Spring Trail, Cow Head Saddle Trail, Heartbreak Ridge Trail, North Slope Trail, Turkey Creek Trail, Rincon Creek Trail and Rincon Peak Trail (NPS 2009h).

Accessibility of AML Sites

Several AML sites are located in the vicinity of visitor use trails and other points of access within the park.

Visitor Safety

Due to the proximity of a city of a million people, including many who love to hike in the desert, all of the mine features at Saguaro are regarded as safety hazards. There are also safety concerns about the unstable condition of many of the mine features and their attractiveness to curious visitors. A seriously injured juvenile required rescue after falling 40 feet down shaft #028 in the early 1970s (Wolf 2010).

Grand Canyon National Park

While recorded visitation statistics at Grand Canyon National Park are based largely on counts taken at the South Rim Visitor Center and may underestimate the actual number of annual visitors to the park, they record a general trend. The total number of recreational visitors to Grand Canyon National Park during the 10- year period from 1998 to 2008 was approximately 47.3 million. On average, roughly 4.3 million recreational visitors come to the park each year. Recreational visitation peaked in 1999, and subsequently declined to its lowest point in 2002, after which time it has generally increased, with only a temporary decline occurring in 2006.

Visitor use patterns at Grand Canyon National Park are generally predictable throughout the year. Visitation increases during the spring season, peaks in early summer and declines in early fall. Overall, most visitation from 1998 to 2008 occurred during the spring and summer, with peak visitation occurring in July for most years. The lowest numbers of visitors to the park over the 10 year period occurred in January and February (NPS 2009i).

Popular activities in the park include guided tours, commercial and non- commercial river rafting, biking, stock use, backcountry hiking, cross- country skiing, and camping. The park's most popular destination for park visitors is the south rim (NPS 2009k), which contains several camping and lodging amenities as well as short trails and scenic overlooks. On the north rim, a developed campground is open from mid- May to mid- October, after which time only a limited number of campsites are available on a first- come, first- served basis until snow closes Highway 67 (NPS 2009d). Access to hundreds of miles of backcountry hiking trails and camping in the river canyon is allowed by permit. Permits are required for overnight backcountry trips (not day hiking), as well as river use. Seventy- seven percent of backcountry use occurs in the area between Bright Angel Point and Yaki Point (NPS 2009e). The Tonto Trail traverses several canyon features as it meanders above the course of the Colorado River through much of the park. It then joins the Hance Trail at Red Canyon in the east, which heads south and out of the canyon towards Moran Point. The Tanner Trail begins further east at Lipan Point and descends northeast into Tanner Canyon to join the Beamer Trail along the river. A number of campsites for river users are located along the 277- mile section of the Colorado River in the park. Access to popular hiking trails is available from the river as well as the rim trailheads.

Accessibility of AML Sites

Several AML sites are located in the vicinity of trails and river access points within the park. The ease with which some of these sites can be accessed by the public presents a potential danger to the public. The McCormick- Tanner Mine has a high potential for visitation, since the adit is

visible from the river and can be easily from the river. Overland access to the site by trail is also possible; however, the overland route is difficult.

Visitor Safety

No safety incidents or complaints have been documented at any of the AML sites (Rice pers. comm. 2009).

Environmental Consequences

The thresholds for the intensity of impact were defined as follows:

- | | |
|-------------|--|
| Negligible: | Changes in visitor use and the visitor experience would not occur. There is no expectation for endangering visitor health and safety. |
| Minor: | Changes in visitor use and/or experience would be detectable, although the changes would be small. Few visitors would be affected. There is little expectation for endangering visitor health and safety with the application of mitigating measures. |
| Moderate: | Changes in visitor use and/or experience would be readily apparent. Many visitors would be affected and would likely express an opinion about the effects. Extensive mitigation is necessary to reduce risk of endangering visitor health and safety. |
| Major: | Changes in visitor use and/or experience would be readily apparent and have important consequences. Most visitors would be affected and would likely express a strong opinion about the effects. Extensive mitigating measures could not reduce risk of endangering visitor health and safety. |

Impacts on Visitor Use and Experience including Human Health and Safety under Alternative A, No Action

Under the no- action alternative, mine features would remain in their present condition, subject to natural forces. Park visitors would continue to visit and explore AML sites, both with and without closed openings. This would be beneficial for those visitors wishing to experience bats or other wildlife associated with mine openings at the parks. No new mine opening closures would occur, and existing closed mines would continue to exist in the parks. Although park staff would continue to periodically monitor the mines for human use, the open adits, shafts, and some pits would continue to pose a safety risk to park visitors, NPS staff and undocumented aliens. Therefore, the selection of alternative A would affect visitor use and safety by allowing hazardous conditions, albeit mitigated somewhat by on- going management activities, to continue for the foreseeable future. Ongoing management activities could result in short- term closures of small areas used by visitors to the park. Closure of AMLs and adjacent areas would mitigate the adverse impacts to visitor health and safety; however, such actions would not completely remove the hazard. Over time, unauthorized visitor access could result in serious injury. As a result, the impacts to visitor use would be localized long- term minor to moderate adverse.

Cumulative Impacts

Those actions that could contribute to cumulative impacts on visitor use and safety include past closure of AML sites within individual park units and future closure of AML sites within individual park units as funding is made available. Future park maintenance activities including other related mine closures that would occur as funding was made available would impact visitor use and safety. Any adverse impacts from these future actions would be short- term, localized, and minor, while the closure would result in long- term beneficial impacts to visitor use and safety. Effects to visitor use and safety also occur from past closure of mine features. These past actions have resulted in a beneficial impact to visitor use and safety.

Park resource management actions also would affect visitor use and health and safety. Beneficial impacts to visitor use and safety would be expected from NPS oversight and interpretation programs. Trails maintenance and trails/access construction and relocation under new trails plans, such as what is now in place at Saguaro, would have short- term minor adverse effects during construction due to temporary noise and disturbance or site- specific closures, with many long- term benefits once work is completed.

Contaminated sites such as those found at the Old Yuma mine complex at Saguaro limit visitor access to that portion of the park, a negligible to minor adverse impact on visitor use. The site represents potential exposure to hazardous materials in tailings and surrounding soils. This site is undergoing evaluation for remediation or removal of contaminated media, with effects not yet thoroughly assessed, but exclusion of public use from the site should keep adverse effects on health and safety to negligible adverse levels.

The presence of undocumented aliens in the parks (southern Arizona) and illegal traffic also affect visitor use and health and safety. All southern Arizona parks inform their visitors of these hazards, which vary in intensity from park to park and area to area. However, the presence and actions of undocumented aliens represent a long- term negligible to potentially moderate adverse impact

Aircraft overflights (e.g., Grand Canyon helicopter tours) are of benefit to those visitors desiring that type of experience, but their presence and noise can cause periodic short- term minor adverse impacts to other visitors on the ground desiring a more natural experience.

While adverse effects of past, present, and reasonably foreseeable future actions on visitor experience and safety would occur, the cumulative effects of these actions are estimated to benefit visitor experience overall. Because no additional mine features would be closed under alternative A, the overall visitor experience would continue to be similar to existing conditions, despite these other actions. These impacts, added to the long- term, local, negligible to moderate impacts to visitor use and safety expected from the actions under this alternative, would result in long- term negligible to minor adverse cumulative impacts

Conclusion

The no- action alternative would result in negligible to moderate long- term adverse impacts on visitor use and safety. Open features would continue to present a safety hazard to visitors. Cumulative impacts would be long- term negligible to minor adverse.

Implementation of this alternative would not result in unacceptable impacts and is consistent with *NPS Management Policies 2006*.

Impacts on Visitor Use and Experience including Human Health and Safety under Alternative B, Proposed Action (NPS Preferred Alternative)

Bat Gates and Cupolas. Under Alternative B, bat gates and cupolas would be installed to prevent human access while minimizing airflow restrictions and allowing uninhibited access for bats. These features would be installed using hand-held welders, generators, rock drills, cutting torches, and miscellaneous small tools deemed the minimum tool by each park with wilderness resources. Within each park, gate construction would be done by area and sequentially, with timing restrictions followed to minimize impacts on any special visitor use events or high visitation periods if possible. The construction periods that have been identified correspond in most cases to times of lowest seasonal park visitation, although an exception exists in the case of Saguaro National Park, where seasonal visitation may be higher during the likely construction period. The average construction time would vary based on the type of gate. The average construction time per adit gate is one day for medium to small adits, while installation of a cupola could span 2–4 days for medium cupolas and as many as 9 days for larger cupolas. Construction is likely to last several months during the fall and winter seasons. The noise associated with such operations would be noticeable to visitors in the vicinity of the activities, and the disturbances would alter important characteristics of the overall visitor experience, particularly in more remote areas of the parks. Noise from heavy equipment and power tools such as saws (with decibel levels of around 90 decibels (dB) at the source) may be heard over a mile beyond the site before reaching background noise levels that are typical for quiet areas (e.g., less than 40 dB). The decrease in noise level with distance would depend on intervening topography and vegetation (Caltrans 1998). Noise impacts from gate construction would therefore be of relatively short duration and intermittent, but would span a period of several months, a short-term minor to moderate adverse effect. The closure design itself is anticipated to have a negligible adverse impact in terms of visual disturbances.

Fencing. The physical appearance of a mine site would be changed by the presence of permanent or temporary fences, as compared with the original mine openings. Visitors could still view mine openings from a relatively close distance, and would be able to view well into the depths of a mine opening, but would not be able to physically enter the feature. This would allow visitors to safely view and appreciate the historical values of the mines and surrounding mine camp or other historical features from a reasonably close distance. To minimize adverse visual effects on visitor experience caused by fencing, naturally colored fences and fence supports would be used that match the desert soil and vegetation, based on the location of the fence in relation to individual site features. Temporary fencing is the only type of fencing proposed under the action alternative (at Organ Pipe Cactus); this would have long-term (several years) minor adverse impacts on visitor experience because these treatments would prevent some visitors from having full access to the sites. Visitors would be aware of the effects of the treatments, but the changes would not appreciably alter important characteristics of the overall visitor experience or visitor satisfaction. Visitors would still have the ability to participate in typical visitor activities.

PUF/Backfill Closures. Backfill may be used in cases where the mine does not provide significant wildlife habitat or cultural significance. 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, as in the case of PUF/backfill closures. The average construction time per average closure is one day, while larger closures may take several days to complete. During these activities, the natural characteristics of the overall visitor experience would potentially be interrupted by noise and visible dust from these operations. Overall, backfill would be the most protective of visitor safety because it would completely prevent access to sites with high safety risk and numerous hazards. Noise from backfilling would be localized and intermittent, but occurring over a period of several months, as described for gates, above. Backfilled mine features would be visible to park visitors, especially when located near roads and trails. Partial backfills of numerous small, shallow prospect pits, such as is proposed at Organ Pipe Cactus and Saguaro, would have minimal impact on visitor use and would eliminate safety hazards. Overall, backfills would have long- term minor adverse impacts on visitor use and experience, and long- term beneficial impacts to safety.

Helicopter Overflights. In cases where access for construction is not possible by roads or trails, helicopter support would be needed (see Minimum Requirements Analysis, appendix B). Equipment would be sling- loaded in bags or other containers and lowered via cable to target areas at mine closure locations, unless landing were necessary or advisable to minimize impacts of hovering over a site (Grand Canyon) Helicopter access would be needed at a total of 80 sites for the four park units due to poor access. Helicopters flying over the parks would affect the natural soundscape not only at the location of mines to be closed but also along their flight paths. Noise levels would be minimized by limiting helicopter flight times (by selecting lighter weight gate materials where possible) and by maintaining a minimum distance of 100 feet above the ground. While helicopter overflights would be employed in situations that necessitated their use, noise disturbances from overflights would be temporary and localized. Helicopter use is expected to have short- term minor adverse impacts on visitor use and safety.

Overall Impact Analysis of the Effects of AML Closure. The closures that are proposed at the mine features, as listed in the tables in Section 2, Alternatives, are intended to prevent human access while protecting park resources. Although the expected outcome is that impacts to visitor use and safety would be long- term beneficial by preventing injury from human access, it is recognized that these closures could have both adverse and beneficial impacts on visitor use. Visitors wishing to experience bats and other wildlife inhabiting mines would not have the opportunity to do so at some closed sites, but other sites would remain open. During the period of activity related to AML reclamation, for instance, there would be short- term closures of small areas used by visitors to the park. However, few visitors engaged in normal recreation activities are expected to be affected during AML closure activities, and there is little to no potential for endangering visitor health and safety during these activities. As a result, the impacts to visitor use and experience, including health and safety, would be localized short- term negligible to minor adverse. Overall, closure of AMLs and adjacent areas would mitigate the existing adverse health and safety impacts. Although such closures would not completely remove the hazard, it would be substantially reduced. As a result, the impacts to visitor use and experience, including health and safety, would be localized long- term moderate beneficial.

Cumulative Impacts

Cumulative impacts from other actions affecting visitor use and experience or health and safety would be the same as described under the no- action alternative and would be mainly long- term beneficial overall. These impacts, added to the localized short- term minor to moderate adverse

effects during project activities to visitor use and experience, but long- term benefits to visitor safety expected from the actions under this alternative, would result in long- term beneficial and short- and long- term minor to moderate adverse cumulative impacts on visitor use and experience, including health and safety.

Conclusion

Alternative B would result in long- term beneficial impacts to visitor use and safety, with localized short- term minor to moderate adverse effects during project activities to visitor use and experience. Cumulative impacts would be long- term beneficial and short- and long- term minor to moderate adverse.

Implementation of this alternative would not result in unacceptable impacts and is consistent with *NPS Management Policies 2006*.

Wilderness

The *Wilderness Act* of 1964 defines a wilderness as “an area where the earth and its community of life are untrammelled by man, where man himself is a visitor and does not remain.” It is further defined as “an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which generally appears to have been affected primarily by the forces of nature, with the imprint of man’s work substantially unnoticeable, has outstanding opportunities for solitude or a primitive and unconfined type of recreation and has at least five thousand acres of land or is sufficient in size as to make practicable its preservation and use in an unimpaired condition.” The act prohibits intrusions into these areas including structures, roads, trails, use of motor vehicles, and landing of aircraft, except to meet the minimum requirements for the administration of the area as wilderness.

NPS Management of Wilderness

According to *NPS Management Policies 2006*, the NPS will manage wilderness areas for the use and enjoyment of the American people in such a manner as will leave them unimpaired for future use and enjoyment as wilderness. Management will include the protection of these areas, the preservation of their wilderness character, and the gathering and dissemination of information regarding their use and enjoyment as wilderness (NPS 2006, sec. 6.1). NPS management policies apply to eligible, study, proposed, recommended, and designated wilderness, regardless of category (NPS 2006, sec. 6.3.1).

All management decisions affecting wilderness must be consistent with the minimum requirement concept. This concept is a documented process used to determine whether administrative activities affecting wilderness resources or the visitor experience are necessary, and it also determines how to minimize impacts.

The minimum requirement concept will be applied as a two- step process that determines:

1. whether the proposed management action is appropriate or necessary for administration of the area as wilderness and does not pose a significant impact on wilderness resources and character; and

2. the techniques and types of equipment needed to ensure that impact on wilderness resources and character is minimized (NPS 2006, sec. 6.3.5).

A minimum requirement analysis was conducted for each park with wilderness resources for the proposed action (see the Minimum Requirements Analysis, appendix B). As no portion of Coronado National Memorial contains wilderness, a minimum requirement analysis was not conducted for this park.

Affected Environment

Organ Pipe Cactus National Monument

The United States Congress designated the Organ Pipe Cactus Wilderness in 1978. Wilderness now accounts for a total of 312,600 acres, which is approximately 95% of the total area of the monument (see figure 3 in Section 2, Alternatives). An additional 1,240 acres was designated as potential wilderness (two sections of Arizona state trust lands, 640 acres each, near Bates Well and Dos Lomitas). These two potential wilderness areas are managed to preserve wilderness values under a cooperative arrangement between the NPS and the State of Arizona. In accordance with NPS *Management Policies 2006*, areas of potential wilderness are managed as if they were designated wilderness, and efforts are made to eliminate those conditions that preclude wilderness designation.

One of the purposes of Organ Pipe Cactus National Monument is to “preserve for future use and enjoyment the character and values of the designated wilderness within the monument under the Wilderness Act.” The monument’s significance statement indicates that “people who visit Organ Pipe Cactus National Monument experience a protected natural area with wilderness character that provides opportunities for solitude and primitive recreation, enjoying the nighttime sky, and spiritual replenishment in a Sonoran Desert setting.” Despite the protection afforded to wilderness areas of the park, the ongoing issue of illegal transport of drugs and people into the United States by vehicle through the park has created hundreds of miles of illegal roads through designated wilderness areas.

A total of 81 abandoned mine features are located in wilderness at the monument, mostly concentrated in the southern central portion of the monument. While some are located near existing roads, several abandoned mine features are located in more remote areas of designated wilderness.

Saguaro National Park

Much of the land in Saguaro National Park (71,400 acres) has been formally designated as wilderness in accordance with the provisions of the *Wilderness Act* (see figures 4 and 5 in Section 2, Alternatives). In wilderness areas, the park seeks to provide outstanding opportunities for solitude or a primitive and unconfined type of recreation, and the opportunity for connection with nature. In addition to an absence of human-produced structures and roads, wilderness is also defined by its natural scenery, natural quiet, and solitude (NPS 2007a).

The park’s purpose statements include the importance of protecting natural quiet in the park, especially in the wilderness areas, as well as providing opportunities to understand and enjoy the park’s resources in a manner that is compatible with the preservation of park resources and wilderness character (NPS 2007a).

The 2007 *General Management Plan* (NPS 2007a) zoned designated wilderness as a Sensitive Resource, Primitive, or Semi- primitive. This zoning would ensure that wilderness qualities are maintained until a wilderness study is completed on the lands found suitable. The 2007 General Management Plan determined that 4,716 additional acres are suitable for Wilderness designation. NPS lands will be considered suitable for wilderness if they are at least 5,000 acres or of sufficient size to make practicable their preservation and use in an unimpaired condition, and if they possess the characteristics identified in the *Wilderness Act* (NPS 2007a). The Saguaro 2007 General Management Plan contains the following actions that the park would take when considering management actions in and around designated wilderness:

- Uses that are in keeping with the definitions and purpose of wilderness, and do not degrade wilderness resources and character, would be encouraged. Appropriate restrictions may be imposed on any authorized activity to preserve wilderness character and resources, or to ensure public safety.
- Managers considering the use of aircraft or other motorized equipment or mechanical transportation within wilderness must consider impacts to the character, aesthetics, and traditions of wilderness before considering the costs and efficiency of the equipment.
- All management decisions affecting wilderness must be consistent with the minimum requirement concept: a proposed management action must be appropriate or necessary for administration of the area as wilderness and not pose a significant impact to wilderness resources and character, and the management method (tools) used must cause the least amount of impact to the wilderness resources and character.
- Administrative use of motorized equipment or mechanical transport would be authorized only if the superintendent determines it is the minimum requirement needed to achieve management of the area as wilderness, or it is needed in an emergency situation involving the health or safety of persons actually within the area.
- In evaluating environmental impacts, the NPS would take into account wilderness characteristics and values, including the primeval character and influence of the wilderness; the preservation of natural conditions (including the lack of manmade noise); and assurances that there would be outstanding opportunities for solitude, that the public would be provided with a primitive and unconfined type of recreational experience, and that wilderness would be preserved and used in an unimpaired condition.

All of the abandoned mines located in designated wilderness are within the TMD, which encompasses 24,034 acres with wilderness accounting for 13,200 acres (NPS 2007b). Traversed by well- maintained dirt roads, the TMD receives mostly day- use visitors. Although some of the abandoned mines are close to Picture Rocks Road and Golden Gate Road, the majority of them are more than a mile from existing roads, making ground access to these sites particularly difficult. A total of 95 abandoned mine features are located in wilderness at the park. While some are located near existing roads, several abandoned mine features are located in more remote areas of designated wilderness.

Grand Canyon National Park

Over ninety percent of Grand Canyon National Park has been recommended for inclusion in the National Wilderness Preservation System (see figure 6 in Section 2, Alternatives). The park

submitted to the Department of Interior a proposal to designate 980,088 acres within the park as wilderness and an additional 131,814 acres as potential wilderness. In 1993, the Park Superintendent transmitted this recommendation to the Director of the NPS. Action on this recommendation is still pending. The 1993 Final Wilderness Recommendation includes two units totaling 1,139,077 acres. Of this total, 1,109,257 are recommended for immediate wilderness designation; and 29,820 are recommended for designation as potential wilderness. Potential wilderness areas include those places that do not qualify for immediate designation as wilderness due to temporary, non-conforming, or incompatible conditions (NPS 2007c).

There is no wilderness management plan for the park, but most of the proposed wilderness in the park is managed in accordance with the park's 1988 Backcountry Management Plan (NPS 2007c). Over 90% of the park is managed as wilderness, in accordance with the park's 1993 wilderness proposal. Areas currently excluded from proposed wilderness include (1) the cross canyon corridor including the Bright Angel and Kaibab Trails; (2) several miles of unpaved non-wilderness road corridors; (3) 300 feet wide (e.g., 150 feet on either side from road's midpoint) on north and south rims; (4) north rim non-wilderness road corridors along the paved roads (300 feet from road center point on either side of paved road) (not limited to just Bright Angel Point); and (5) the Tuweep developed area.

A total of 21 abandoned mine sites in Grand Canyon National Park are located in proposed wilderness.

Environmental Consequences

The thresholds for the intensity of impact were defined as follows:

- Negligible: Impacts of the action would have no discernible effect on wilderness character. Wilderness would remain untrammelled and free from modern human control or manipulation, natural conditions would prevail, wilderness would remain undeveloped and retain its primeval character and influence, and wilderness would provide outstanding opportunities for solitude or primitive conditions. The forces of nature would primarily affect the wilderness zone.
- Minor: There would be perceptible or measurable impacts resulting in small changes to existing natural conditions. There would be a small effect on the untrammelled and undeveloped qualities of wilderness character, including a small presence of modern human activity and manipulation within limited areas of the wilderness zone. The wilderness area would generally appear to have been affected primarily by the forces of nature. Opportunities for solitude and primitive conditions would change slightly, but most of the zone would continue to provide opportunities for solitude or primitive conditions.
- Moderate: There would be perceptible or measurable impacts resulting in intermediate changes to existing natural conditions. There would be an intermediate effect on the untrammelled and undeveloped qualities of wilderness character, including an intermediate presence of modern human activity and manipulation within limited areas of the wilderness

zone. It would be apparent that natural conditions within the zone are affected by the action. Opportunities for solitude and primitive conditions would change substantially, but over a relatively small area and most of the zone would continue to provide opportunities for solitude or primitive conditions for the majority of the time.

Major: There would be substantial permanent impacts resulting in large changes to existing natural conditions. There would be a large effect on the untrammelled and undeveloped qualities of wilderness character, including a large presence of modern human activity and manipulation throughout a large portion of the wilderness zone. It would be apparent that natural conditions are substantially affected by the action. Opportunities for solitude and primitive conditions would change by a large amount, affecting the ability of a large portion of the zone to have a wilderness character for much of the time.

Impacts on Wilderness under Alternative A, No Action

Under the no- action alternative, none of the proposed closures of AML features would occur. The park units would continue to manage wilderness according to NPS *Management Policies 2006* (NPS 2006) and the Wilderness Act of 1964. Visitors would continue to be allowed unabated access to abandoned mine sites in and adjacent to wilderness or proposed wilderness areas via established roads and trails, off- trail areas, or by river access points (as is the case for several sites in Grand Canyon National Park). Under the no- action alternative, wilderness would continue to be protected according to current laws, regulations, and management policies described previously. With no actions occurring in the existing wilderness setting, natural conditions would continue to predominate. Only minimal human- made noise would occur, the primeval character and influence of wilderness would be only slightly affected, and outstanding opportunities for solitude or a primitive and unconfined type of recreation would continue uninterrupted. Therefore, alternative A is estimated to have long- term negligible adverse effects on wilderness.

Cumulative Impacts

Those actions that could contribute to cumulative impacts on wilderness include past closure of AML sites within individual park units and future closure of AML sites within individual park units as funding is made available. Other related mine closures that would occur as funding was made available would impact wilderness. Adverse impacts from these future actions would be short- term, localized, and minor, while the closures would result in long- term beneficial impacts to wilderness if the natural setting was restored. Effects to wilderness also occur from past closure of mine sites. These past actions have resulted in primarily long- term benefits to wilderness.

Any park management project that occurs within or near the AML sites has the potential to impact wilderness within the project areas due to maintenance or other activities that may temporarily close recreational areas, a short- term minor adverse effect. Park resource management actions also would affect wilderness. Beneficial impacts to wilderness would be expected from NPS oversight and interpretation programs. Trails maintenance and trails/access construction and relocation under new trails plans, such as what is now in place at Saguaro,

would have short- term minor adverse effects during construction due to temporary noise and disturbance or site- specific closures, with long- term benefits from restoration of abandoned trails and enhanced access for visitors desiring to access wilderness areas once work is completed.

The presence of undocumented aliens in the parks (southern Arizona) and associated illegal traffic also affect wilderness and wilderness experience. Evidence of this use includes unauthorized trails and trash left behind in wilderness areas throughout the southern Arizona parks. This affects the desired untrammelled nature and desire for solitude in these areas. This represents a long- term negligible to potentially moderate adverse impact.

While aircraft overflights (e.g., Grand Canyon helicopter tours) are of benefit to those visitors desiring that type of experience, their presence and noise can cause periodic short- term minor adverse impacts to visitors on the ground desiring a wilderness experience.

While adverse effects of past, present, and reasonably foreseeable future actions on wilderness would still occur, the cumulative effects of these actions are estimated to benefit wilderness overall. Because no additional mine openings would be closed under alternative A, wilderness values would continue to be similar to existing conditions, despite these other actions. These impacts, added to the long- term, negligible impacts to wilderness expected under this alternative, would result in long- term negligible adverse to beneficial cumulative impacts.

Conclusion

Alternative A would result in long- term negligible adverse impacts on wilderness. Wilderness values would not be substantially affected by taking no additional management action at the existing AML features. Cumulative impacts would be long- term negligible adverse to beneficial.

Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the parks; (2) key to the natural or cultural integrity of the parks or to opportunities for enjoyment of the parks; or (3) identified as a goal in any park or other relevant NPS planning documents, there would be no impairment of parks resources or values. Implementation of this alternative would not result in unacceptable impacts and is consistent with *NPS Management Policies* 2006.

Impacts on Wilderness under Alternative B, Proposed Action (NPS Preferred Alternative)

Under alternative B, many of the proposed closures would occur in areas with wilderness value, since the majority of all parks (except Coronado) contain designated or proposed wilderness. A few of the proposed closures involve the installation of cupolas or larger gates that would be more visible in the wilderness setting (table 12). Because Coronado has no designated or proposed wilderness areas, this park unit is not discussed further in this section.

Table 12. Features with Wilderness Value by Park Unit

Park	Total Features	No. of features with wilderness value with action planned or possible based on future surveys	Number of more visible closures in wilderness (e.g., cupolas)
Coronado	65 (no wilderness)	0	0
Organ Pipe Cactus	87 (85 in wilderness)	65	5 cupolas; 6 temporary fences (fences may be gates or cupolas in future depending on adaptive management outcome)
Saguaro	143 (96 in wilderness)	78	4 cupolas known; others possible
Grand Canyon	44 (30 in wilderness)	4	1 cupola

In most cases, the very nature of the setting within which these AML features are located precludes the option of non- motorized access to the work sites, although the use of pack stock would be considered on a case- by case basis at Saguaro or Organ Pipe Cactus depending on the weight and type of load and access conditions, as explained in the Minimum Requirements Analysis completed for each park (see appendix B). In cases where access for the delivery of construction materials is not possible by roads, trails, or river access (Grand Canyon), helicopter support would be needed. Equipment would be sling- loaded in bags or other containers and lowered via cable to target areas at mine closure locations unless landing were necessary or advisable to minimize impacts of hovering over a site (Grand Canyon). Helicopter support is currently envisioned at a total of 80 sites for all three park units containing wilderness due to poor access, which means helicopter presence at many wilderness locations or flying over wilderness areas during transport of materials to any site, even if the site itself is not in wilderness.

Helicopters flying over the parks would affect the natural soundscape not only at the location of mines to be closed but also along their flight paths. Noise levels would be minimized by limiting helicopter flight times (by selecting lighter weight gate materials where possible) and by maintaining a minimum distance of 100 feet above the ground. While the frequent use of helicopters would span several months during project implementation, helicopter overflights would only be employed in situations that absolutely necessitated their use and would last only 1–3 hours total per site for most bat gates and PUF/backfill closures, which constitute the majority of the closures. Thus noise disturbances from overflights would be temporary and localized, with short- term minor to moderate adverse effects extending over a period of several months.

Under alternative B, bat gates or cupolas would be installed to prevent human access while minimizing airflow restrictions and allowing uninhibited access for bats. In cases where no bats are present, grates would be installed or PUF/backfill measures would be used to close the sites. Gates, cupolas, and grates would be installed using hand- held welders, generators, rock drills, cutting torches, and miscellaneous small tools. The use of these tools would create noise effects in the vicinity of the closure activity, expected to be noticeable up to over one mile away from the source, which would adversely affect wilderness values. Within each park, gate construction

would be done by area and sequentially, with timing restrictions followed to minimize impacts on certain biological resources. As a result, construction would occur in most cases during periods of lower visitation (i.e., fall and early winter). However, the proposed activities would still affect the visitor experience of those seeking solitude in the parks during those times. The average construction time would vary based on the type of closure. The average construction time per bat gate is one day for medium to small adits, while installation of a cupola could span 2–4 days for medium cupolas and as many as 9 days for larger cupolas. PUF/backfill techniques, where employed, would also create noise and dust through the use of heavy machinery or shoveling. The impacts associated with such operations would be noticeable to any backcountry visitors in the vicinity of the activities, and the disturbances could alter important characteristics of the overall wilderness experience, particularly in more remote areas of the parks, resulting in short-term moderate adverse effects. Light/partial backfills, including backfills of numerous small, shallow prospect pits, such as is proposed at Organ Pipe Cactus for many of these scattered through the park, would have minimal adverse effects on wilderness, as most of these would be accomplished using hand tools, and restored surfaces would benefit the natural wilderness character. Light, heavy, and PUF backfills would all result in long-term benefits to wilderness areas as these sites would be restored to a more natural state.

Long-term adverse impacts to the undeveloped and untrammelled character of wilderness would occur from the installation of cupolas and gates, as this would result in permanent structures that could present a visual impact, especially for cupolas that are not recessed into mine shafts. If a grate/grate closure was selected, construction and installation would be accomplished using very low-profile methods that would ensure that the installed features were unnoticeable to visitors except at very close distances. A bat cupola would present a greater visual contrast to the surrounding setting as it would be a box-like structure over the vertical shaft several feet above the ground. However, efforts would be made to follow as closely as possible the form, line, color, and texture of surrounding natural features. Existing topography would also be used to the extent possible in shielding the structure from long-range views. Cupolas and gates would utilize earth tones and non-reflective surfaces to better blend in with the existing landscape. Also, relatively few cupolas are proposed as closures (see table 12). Sites using polyurethane foam plugging would be virtually undetectable in the long term. Although the existing state of “development” at each of the construction sites may vary, the sites would be returned to their natural state once construction is complete.

Depending on the site-specific situation, wilderness may or may not be substantially affected by AML closure actions. The impacts of various gates and constructed closure techniques would not vary substantially between the methods used. The potential adverse impacts on wilderness areas would be managed according to the minimum requirements analysis procedure employed by the NPS in these situations (the minimum requirements analysis form used for these situations is provided in appendix B for the three parks with wilderness). The NPS would, therefore, continue to manage wilderness areas with the maximum statutory protection allowed – to preserve their wilderness character, and to gather information on their use and enjoyment as wilderness, which includes the general prohibition of mechanized or motorized equipment in wilderness.

Overall, implementation of alternative B would result in short-term moderate adverse impacts to wilderness areas from access and construction noise and long-term minor to moderate adverse impacts to the undeveloped and untrammelled quality of wilderness due to the installation of

permanent structures in wilderness, and long- term beneficial impacts of the natural quality of wilderness where sites are backfilled and/or restored to a more natural state.

Cumulative Impacts

Cumulative impacts from other actions affecting wilderness would be the same as described under the no- action alternative and would be long- term negligible adverse to beneficial. These impacts, added to the localized short- term moderate adverse impacts during project activities, long- term minor to moderate adverse impacts from the structural components proposed under alternative B, and long- term beneficial impacts from restoration at certain sites, would result in long- term minor to moderate adverse impacts to wilderness.

Conclusion

Alternative B would result in short term moderate and long- term minor to moderate adverse impacts on wilderness, with some long- term benefits to natural wilderness qualities at sites that are restored by backfill operations. Cumulative impacts to wilderness would be long- term minor to moderate and adverse, due to the effects of permanent structures on the untrammelled and undeveloped quality of wilderness areas.

Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the parks; (2) key to the natural or cultural integrity of the parks or to opportunities for enjoyment of the parks; or (3) identified as a goal in any park's or other relevant NPS planning documents, there would be no impairment of the parks' resources or values. Implementation of this alternative would not result in unacceptable impacts and is consistent with *NPS Management Policies 2006*.

SECTION 4. CONSULTATION AND COORDINATION

This section describes coordination and consultation with various agencies and other stakeholders that are essential elements of the EA process. Public scoping and comments received at the initiation of the EA are described in Section I, Purpose and Need. Consultation letters are included in appendix C.

The NPS is consulting with the USFWS under Section 7 of the Endangered Species Act and with the State Historic Preservation Office under Section 106 of the National Historic Preservation Act. The EA will be released for a 30- day public review and comment period. To inform the public of the availability of the EA, the NPS will publish a news release and post it to the Planning, Environment, and Public Comment (PEPC) website. The parks may also post a notice to their individual park websites. The NPS will distribute a hard copy of the EA or a notification letter on ways to access the document to agencies, tribes, and members of the public on the park's mailing list. Interested individuals may also request a hard copy of the EA. The document will be available for review on the PEPC website at: <http://parkplanning.nps.gov>.

Following the 30- day public review and comment period, the NPS will review and analyze all public comments received prior to the release of a decision document. Copies of the decision document will be sent to those who commented during the public scoping period, those who comment on the EA during the public review period, and those who request a copy.

Individuals and Agencies Consulted

Arizona Game and Fish Department

Arizona State Historic Preservation Office

Native American Tribes

Ak Chin Indian Community Council

Ak- Chin Him Dak Eco Museum & Archives

Cocopah Tribal Council

Colorado River Indian Tribes

Colorado River Tribal Council

Fort McDowell Yavapai Nation

Fort Mojave Indian Tribe

Fort Sill Apache Tribe of Oklahoma

Fort Yuma- Quechan Tribal Museum

Gila River Indian Community

Kaibab Band of Paiutes

Las Vegas Paiute Tribe

Mescalero Apache Tribe
Moapa Band of Paiute
Navajo Nation
Paiute Indian Tribe of Utah
Pascua Yaqui Tribe
Pueblo of Zuni
Salt River Pima- Maricopa Indian Community
San Carlos Apache Tribe
San Juan Southern Paiute Tribe
The Havasupai Tribe
The Hopi Tribe
The Hualapai Tribe
The Kaibab Paiute Indian Tribe
Tohono O'odham Nation
Tonto Apache Tribe
White Mountain Apache Tribe
Yavapai- Apache Nation
Yavapai- Prescott Indian Tribe
Zuni Cultural Resources Enterprise

National Park Service, Coronado National Memorial

Danielle Foster, Natural Resources Program Manager

National Park Service, Organ Pipe Cactus National Monument

Mark Sturm, Chief of Resource Management

Tim Tibbitts, Biologist

National Park Service, Saguaro National Park

Meg Weesner, Chief of Science and Resource Management

Natasha Kline, Biologist

National Park Service, Grand Canyon National Park

Steven Rice, Hydrologist

Jane Rodgers, Deputy Chief - Socio- Cultural Resources

National Park Service, Intermountain Regional Office

Linda Dansby, Regional Minerals Coordinator, Santa Fe, NM

Bob Spude, Historian, Santa Fe, NM

U.S. Fish and Wildlife Service (Tucson)

List of Document Recipients

During the 30- day public review and comment period, a news release, notification letter, or hard copy or CD of this EA will be sent to the agencies, organizations, and businesses listed below.

Congressional Delegation

United States Representative, Honorable Gabrielle Giffords

United States Representative, Honorable Raul Grijalva

United States Representative, Honorable Ed Pastor

United States Senator, Honorable John McCain

United States Senator, Honorable Jon Kyl

Tribal Government

Ak Chin Indian Community Council: Chairperson, Vice Chairperson, and NAGPRA Representative

Ak- Chin Him Dak Eco Museum & Archives, Director

Cocopah Tribal Council: Chair, Cultural Resources Manager

Colorado River Indian Tribes Museum, Director

Colorado River Tribal Council, Chair

Fort McDowell Yavapai Nation: President, Vice President, and NAGPRA Representative

Fort Mohave Indian Tribe, Director, Ahamakav Cultural Society

Fort Mohave Tribal Council, Chair

Fort Sill Apache Tribe of Oklahoma: Chairman and NAGPRA Representative

Fort Yuma- Quechan Tribal Museum

Gila River Indian Community: Governor, and Tribal Historic Preservation Officer and Cultural Resource Specialist

Kaibab Band of Paiute Indians, Chairwoman

Las Vegas Paiute Tribe: Chairman, and Cultural Resources

Mescalero Apache Tribe: President, Vice President, Mescalero Cultural Center and NAGPRA Project, and Tribal Historic Preservation Officer

Moapa Band of Paiute, Chairman

Navajo Nation Historic Preservation Officer

Paiute Indian Tribe of Utah, Chairperson

Pascua Yaqui Tribe: Chairman, Vice Chairman, and Cultural Resources and NAGPRA Representative

Pueblo of Zuni, Governor, Lieutenant Governor, Zuni Tribal Councilman and NAGPRA Representative, Acting Tribal Historic Preservation Officer, and Zuni Heritage and Historic Preservation

Salt River Pima- Maricopa Indian Community: President, Vice President, and Cultural Preservation Program Representative

San Carlos Apache Tribe: Chairman, Vice Chairman, and Heritage Preservation and Archaeology Department

San Juan Southern Paiute Tribe

The Havasupai Tribe: Chairman, Vice- Chairman, and Acting Director of Natural Resources

The Hopi Tribe: Chairman, and Cultural Preservation Officer

The Hualapai Tribe: Chairman, and Tribal Historic Preservation Officer

The Kaibab Paiute Indian Tribe

Tohono O'odham Nation: Chairman, Vice Chairman, NAGPRA Contact, Program Manager of Cultural Affairs Department, and BPA Environmental

Tonto Apache Tribe: Chairman, Vice Chairman, NAGPRA Representative, and Compliance Contact

White Mountain Apache Tribe: Chairman, Vice Chairwoman, Apache Cultural Center, and Tribal Historic Preservation Officer

Yavapai- Apache Nation: Chairman, Vice Chairman, and Office of Cultural and Historic Preservation

Zuni Cultural Resources Enterprise, Acting Tribal Historic Preservation Officer

Federal Government

Advisory Council on Historic Preservation

Bureau of Indian Affairs, Albuquerque

Bureau of Indian Affairs, Gallup

Bureau of Indian Affairs, Parker

Bureau of Indian Affairs, Phoenix

Bureau of Indian Affairs, Safford

Bureau of Indian Affairs, St. George

Bureau of Indian Affairs, Whiteriver

Bureau of Indian Affairs, Valentine

Bureau of Land Management, Arizona State Office

Bureau of Land Management, Ironwood Forest National Monument

Bureau of Land Management, Phoenix

Bureau of Land Management, Safford

Bureau of Land Management, San Pedro Riparian National Conservation Area
Bureau of Land Management, Santa Fe
Bureau of Land Management, St. George
Bureau of Land Management, Tucson Field Office
Bureau of Land Management, Yuma
Bureau of Reclamation, Salt Lake City
Federal Aviation Administration
International Boundary and Water Commission
National Park Service, Albright Training Center
National Park Service, Denver
National Park Service, DOI Library
National Park Service, Glen Canyon National Recreation Area
National Park Service, Intermountain Regional Office - Denver
National Park Service, Intermountain Region - Santa Fe
National Park Service, Lake Mead National Recreation Area
National Park Service, Parashant National Monument
National Park Service, Rivers, Trails, and Conservation Assistance Program
National Park Service, Southern Arizona Office
National Park Service, Southwest Research Coordinator
National Park Service, Sunset Crater Volcano, Wupatki, and Walnut Canyon National Monuments
National Park Service, Tumacacori National Historical Park
National Park Service, Western Archeological Conservation Center
National Park Service, Zion National Park
Natural Resource Conservation Service, Tucson
United States Army Intelligence Center and Fort Huachuca
United States Forest Service, Apache Sitgreaves National Forest
United States Forest Service, Coconino National Forest
United States Forest Service, Coronado National Forest
United States Forest Service, Kaibab National Forest
United States Forest Service, North Kaibab Ranger District
United States Forest Service, Prescott National Forest
United States Forest Service, Southwest Region, Albuquerque

United States Forest Service, Tonto National Forest

United States Forest Service, Tusayan Ranger District

United States Forest Service, Nevada City, CA

United States Geological Survey, Sonoran Desert Research Station

United States Geological Survey, National Biological Survey

State Government

Arizona Department of Environmental Quality

Arizona Department of Transportation, Planning

Arizona Game and Fish Department, Habitat Branch

Arizona Game and Fish Department, Habitat Program Manager

Arizona Game and Fish Department, Regional Supervisor

Arizona State Representative, Honorable David Gowan

Arizona State Representative, Honorable David Stevens

Arizona State Representative, Honorable Frank Antenori

Arizona State Representative, Honorable Olivia Cajero Bedford

Arizona State Representative, Honorable Patricia Fleming

Arizona State Representative, Honorable Phil Lopes

Arizona State Senator, Honorable Manny Alvarez

Arizona State Senator, Honorable Jonathan Paton

Arizona State Senator, Honorable Jorge Luis Garcia

Arizona State Land Department, State Fire Management Officer

Arizona State Parks

Governor of Arizona, Honorable Jan Brewer

New Mexico State Forestry Division

County and City Government

Bowie Fire Department, Fire Chief

City of Benson, City Manager

City of Bisbee, City Manager

City of Douglas, City Manager

City of Flagstaff, Mayor and Senior Project Manager of the Engineering Division

City of Fredonia, Mayor

City of Kanab, UT- Mayor and Director of Communication and Economic Development

City of Page, Mayor
City of Sierra Vista, City Manager
City of St. John's, Mayor
City of Tucson, Bicycle and Pedestrian Manager
City of Tucson, Development Services
City of Tucson, Planning Director
City of Williams, City Manager and Mayor
Cochise County Board of Supervisors
Cochise County Land Advisory Council
Cochise County Sheriff's Office
Cochise County Tourism, Manager
Coconino County Board of Supervisors
Douglas City Council
Fredonia Town Council
Grand Canyon Sheriff's Department
Hispanic Chamber of Commerce
Mayor, City of Bisbee
Mayor, City of Tombstone
Mayor, City of Tucson
Pima Association of Governments
Pima County, Administrator
Pima County Bicycle and Pedestrian Manager
Pima County Board of Supervisors
Pima County, Chair of District 3
Pima County Department of Environmental Quality
Pima County Development Services and Planning
Pima County Flood Control
Pima County Natural Resources, Parks, and Recreation
Pima County Sonoran Desert Conservation Plan, Project Director
Pima County, Supervisors of District 1, 2, 3, 4, and 5
Sunsites- Pearce Fire & Rescue, Fire Chief
Town of Marana, Council Member and Town Manager
Tucson – Pima County Bicycle Advisory Committee

Tucson – Southern Arizona Black Chamber of Commerce
Wilcox City Council

Libraries

Flagstaff Public Library
Kanab City Library
Fredonia Public Library
Grand Canyon Community Library
University of Northern Arizona University Cline Library
Page Public Library
Phoenix Public Library
Sedona Public Library
Washington County Library
Williams Public Library

Concessioners

Arizona River Runners, Inc.
AZ Raft Adventures, Inc.
Canyon Explorations, Inc.
Canyoneers, Inc.
Delaware North Company
Diamond River Adventures
Forever Resorts- Grand Canyon North Rim Lodge
Grand Canyon Trail Rides
Grand Canyon Railway
Grand Canyon National Park Lodges, Phantom Ranch
Hatch River Expeditions, Inc.
Moki Mac River Expeditions
Oars, Inc.
Outdoors Unlimited
Paul Revere Transportation
Tour West, Inc.
Verkamps, Inc.
Western River Expeditions, Inc.
Xanterra, Grand Canyon National Park Lodges

Xanterra Parks and Resorts, Greenwood Village

Xanterra Parks and Resorts, Springdale

Organizations and Businesses

AAA Arizona

Air Star Helicopters

All Aboard America

All Creeds Brotherhood, Inc.

American Museum of Natural History, Southwestern Research Station

Arizona Native Plant Society

Arizona Open Land Trust

Arizona Public Service

Arizona Sonora Desert Museum

Arizona State Horsemen's Association

Arizona Trail Association

Arizona Trailblazers Hiking Club

Arizona Wilderness Coalition

Arizona Wildlife Federation

Auto Bus Tours and Charter

Avra Water Co- Op Inc.

Babbitt's Fly- Fishing

Bat Conservation International

Benson Visitor Center, Manager

Best Tours and Travel

Bisbee Chamber of Commerce & Visitor Center, Manager

CA USA, Inc.

California Charters, Inc.

Canyon Forest Village

Center for Biological Diversity

Certified Transportation Services

Citizens for Picture Rocks

Coalition for Sonoran Desert Protection

Coalition of National Park Service Retirees

Cochise Trails Association

Colossal Cave Mountain Park
Corporate Transportation and Tours
Deer Creek Ranch
Defenders of Wildlife
Denure Tours Limited
Diamond Ventures, Inc.
Douglas Visitor Center, Manager
Family Camp at Davis - Monthan Air Force Base
Fast Deer Bus Charters, Inc.
Flagstaff Friends of Saguaro National Park
Chamber of Commerce
Flagstaff Convention/ Visitor Bureau
Friends of the Huachuca Mountains
Garkane Power and Energy
Gates Pass Area Neighborhood Association
Grand Canyon Airlines
Grand Canyon Airport
Grand Canyon Association
Grand Canyon Chamber of Commerce
Grand Canyon Field Instruction
Grand Canyon Historical Society
Grand Canyon National Park Foundation
Grand Canyon Outback Jeep Tours
Grand Canyon Private Boaters Association
Grand Canyon Squire Inn
Grand Canyon Trust
Grand Canyon Wildlands Council
Greater Arizona Bicycle Association
Hereford Natural Resource Conservation District
High Sonoran Adventures
Holiday Express Inn
Houghton Neighborhood Association
Huachuca Audubon Society

Huachuca Hiking Club
IMAX Theater
Jacob Lake Lodge
Kentucky Wolf Information Center
Knoxville Tours, Inc.
Lazy C Ranch Estates
Lazy K Bar Guest Ranch
McDowell Sonoran Land Trust
Miravel
Mule Deer Foundation
National African American RVer's Association, Inc.
National Tour Association
Northern Pima Chamber of Commerce
Pacific Coast Sightseeing
Page Chamber of Commerce
Papillon Grand Canyon Helicopters
Peak Performance Association, Inc.
Pearce- Sunsites Chamber of Commerce, Manager
PEER
Perimeter Bicycling Association of America
Picture Rocks Community Center
Pima Trails Association
Pine Canyon Camp
Quality Inn
Red Feather, Inc.
Redemptorist Society of Arizona, Inc.
Rincon Creek Estates HOA
Rincon Institute
Rincon Water Company
Ronnie Hilliard Living Trust
Scenic Airlines, Inc.
Seven Mile Lodge
Sierra Club, Flagstaff

Sierra Club, Grand Canyon Chapter
Sierra Club, Rincon Group
Sierra Club, Salt Lake City
Sierra Vista Convention & Visitors Bureau, Manager
Silverado Stages
Sky Island Alliance
Sonoran Desert Mountain Bicyclists
Sonoran Institute
Southern Arizona Hiking Club
Southern Arizona Rescue Association
Southern Arizona Rescue Council
Southern Utah Wilderness Alliance
Summit Hut on Speedway, and Wetmore
SWCA
Tanque Verde Guest Ranch
The Grand Hotel
The Nature Conservancy, Phoenix
The Nature Conservancy, Ramsey Canyon Preserve
The Nature Conservancy, Tucson
The Sundance Center, LLC
The Tusayan Café
The Wilderness Society
Thunder Mountain Trekkers
Tombstone Chamber of Commerce, Manager
Tour West America, Inc.
Tucson Airport
Tucson Audubon Society
Tucson Clean and Beautiful
Tucson Herpetological Society
Tucson Hikers
Tucson LGBT Chamber of Commerce
Tucson Metropolitan Chamber of Commerce
Tucson Mountain Riders

Tucson Saddle Club
U.S. West Communications
Urban Trails Coalition
Vacation Tours, Inc.
Vail Schools
Van Dijk Pace Westlake
Vision Air
Voyager Resort Hiking Club
We Cook Pizza
Western National Parks Association
Western Spirit Cycling
White Stallion Ranch
Wilcox Chamber of Commerce & Agriculture, Manager
Williams Chamber of Commerce
Woodson Engineering
X- 9 Ranch Owners Association

Universities

University of Arizona- Tucson

Newspapers

Access Communications
Arizona Daily Star
Arizona Daily Sun
Arizona Ranger News
Arizona Republic
Associated Press
Bisbee Daily Review
Bisbee Gazette
Civ- Mil Horizons
Desert Lighting News
Douglas Daily Dispatch
Eastern Arizona Courier
El Imparcial
Grand Canyon News

Green Valley News
Lake Powell Chronicle
La Voz
Pinon Press
Saguaro News, Tucson West Publishing
Sahuarita Times
San Pedro Valley News/Sun
Sierra Vista Herald
Sunsiter
The Bisbee Observer
The Explorer
Tombstone News
Tucson Green Times
Tucson Weekly
Tucson West Publishing

Media Contacts

Tucson Area Television Stations
Tucson Area Radio Stations
Tusayan Broadcasting, Inc.

Individuals

A complete list is available upon request.

Preparers

This EA was prepared by the NPS and its contractor, the Louis Berger Group, Inc. and associated subcontractors. The contributions and title/affiliation of each preparer and contributor are listed in table 13. Individuals who participated in the field investigations, as well as data analysis and report preparation, are also listed.

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Victoria Barela	Technical Review of EA	Program Assistant, Office of Minerals/Oil and Gas Support, NPS, Intermountain Regional Office, Santa Fe, NM

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Rachel Stanton Bennett	Technical Review of EA	Environmental Protection Specialist, Office of Planning and Compliance, Grand Canyon National Park

Abandoned Mine Lands Closure Plan and EA

Name	Contribution	Title/Affiliation
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Chanteil Walter	Section 1, Purpose and Need – Public Scoping Summary; Section 4, Consultation and Coordination; Technical Review of EA	ARRA NEPA/106 Specialist, NPS, Intermountain Regional Office, Denver, CO
RV Ward	Technical Review of EA	Wildlife Biologist, Wildlife Program Manager, Science Center, Grand Canyon National Park
Meg Weesner	Development of Proposed Action and Technical Review of EA	Chief of Science and Resource Management, Saguaro National Park
Nancy Van Dyke	Preparer of EA (Biology, Oversight), Contractor Project Manager	The Louis Berger Group
Dan Niosi	Preparer of EA (Section 1, Purpose and Need – NEPA Compliance)	The Louis Berger Group
Lucy Bambrey	Preparer of EA (Cultural), Field Coordinator	Cultural Resources, The Louis Berger Group
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Doug Wetmore	Preparer of EA – Wilderness	Biological Resources, The Louis Berger Group
Josh Schnabel	Preparer of EA – Visitor Use and Experience; Section 2, Alternatives	Environmental Planner, The Louis Berger Group
Megan Blue-Sky	Preparer of EA – Section 1, Purpose and Need; Section 4, Consultation and Coordination; and as assigned	Environmental Scientist, The Louis Berger Group
John Hohmann	Field surveys – Saguaro, Coronado	Archeologist, The Louis Berger Group
Peg Davis-Hohmann	Field surveys – Saguaro, Coronado, Organ Pipe Cactus	Archeologist, The Louis Berger Group
Lia Peckman	Administrative record	Environmental Planner, The Louis Berger Group
Karst Solutions (Jerry Fant)	Development of closure designs and description of proposed actions	Subcontractor to the Louis Berger Group

Name	Contribution	Title/Affiliation
WestLand Resources (Jim Tress, Tom Strong, Scott Hart, Tom Lord)	Biological field surveys (except bat surveys) – Saguaro, Organ Pipe Cactus, Coronado Biological assessment for federally listed species, bats and other wildlife review	Subcontractor to the Louis Berger Group
JBR Environmental (Dave Worley)	Biological field surveys (except bat surveys) – Grand Canyon	Subcontractor to the Louis Berger Group
WestLand Resources (Avi Buckles)	Field Cultural Surveys – Saguaro	Subcontractor to the Louis Berger Group
Arizona Historical Research (Vincent Murray)	Mining History – all parks	Subcontractor to the Louis Berger Group
The Final Word (Juanita Barboa and Sherrie Bell)	Editing and document layout	Subcontractor to the Louis Berger Group

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Diamond, J. and S. Lowery (Arizona Game and Fish Department)

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Diamond, J. and V. Frary (Arizona Game and Fish Department)

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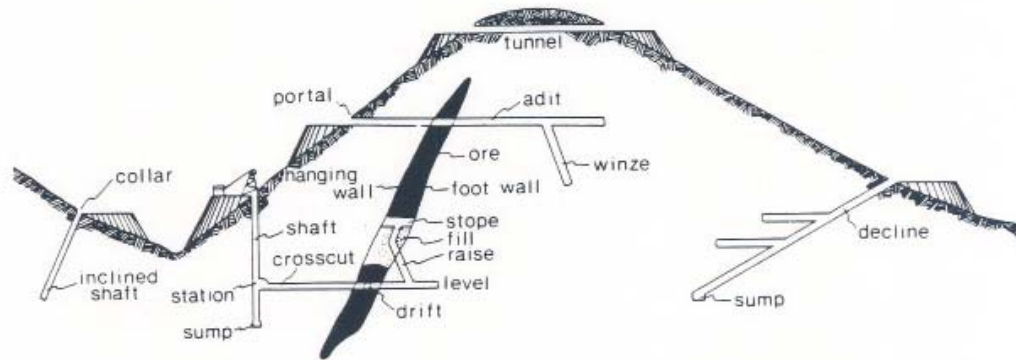
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GLOSSARY OF MINING TERMS



Abandoned—mineral lands are considered abandoned when no responsible party can be identified; therefore, the responsible party correcting resource and safety problems falls to NPS.

Abandoned Mineral Lands—includes the remains of any activity relating to the exploration or development for any mineral resource including hardrock minerals, mineral materials, industrial minerals, coal, oil shale, oil and gas, geothermal energy or topsoil. Abandoned mineral lands include mining or other extraction sites, mill and smelter sites, access roads, processing facilities, and associated disturbed land.

Alluvial—pertaining to alluvium, may be loose gravel or soil.

Adit—a horizontal or nearly horizontal passage driven from the surface for the working or dewatering of a mine. If driven through the hill or mountain to the surface on the opposite side, it would be a tunnel.

Antlion Collar—A shaft which has collapsed leaving a sloping unstable funnel at the surface.

Bore Hole—an exploratory or prospecting hole made by drilling.

Collar—the term applied to the timbering or concrete around the mouth or top of the shaft.

Drift—horizontal opening in or near an ore body and parallel to the course of the vein or long dimension of the ore body. An underground passage following a vein.

Dump—material deposited from a mine—usually waste material.

Muck—(1) (noun) rock broken in the process of mining; (2) (verb) to remove rock.

Ore—an aggregate of minerals which will yield a profit when mined and, if required, processed.

Overburden—material of any nature, consolidated or unconsolidated, that overlies a deposit of useful minerals, ores, or coal, especially those deposits that are mined from the surface by open cuts.

Portal—any nearly horizontal entrance to a mine.

Prospect Pit—a shallow exploratory depression.

Raise—a vertical or inclined opening driven upward from one mine level to connect with the level above, or to explore the ground above a level.

Shaft—a vertical or inclined opening, serving and providing access to various levels in a mine. Entry into and removal from a shaft of people, equipment, material and rock requires the use of mechanical hoisting equipment due to the steepness of the shaft.

Spoils—refuse mined material typically discarded near the entrance of a mine because it was not rich enough to process profitably.

Stope—an underground opening from which ore has been or is being extracted. Does not include shafts, drifts, crosscuts, levels, etc. Usually applied to highly- inclined veins. An overhand stope is made by working upward from a mine level to the next level above. An underhand stope is made by working downward beneath a mine level.

Tailings—refuse material resulting from the washing, concentration, beneficiation, or other treatment of crushed ore.

Tunnel—a horizontal or nearly horizontal underground passage open at both ends.

Waste Rock—refuse mined material typically discarded near the entrance of a mine because it was not rich enough to process profitably.

Winze—a vertical or inclined opening sunk downward from inside a mine for the purpose of connection with a lower level, or for exploring the ground below a level. In some mines, the opening when connected through, is called a raise no matter which direction it was driven originally.