Saguaro National Park

National Park Service
U.S. Department of the Interior

Saguaro National Park
Arizona

Environmental Assessment

Sandario / Kinney Roads Intersection Improvements
June 2004

ENVIRONMENTAL ASSESSMENT
Sandario / Kinney Roads Intersection Improvements

Prepared For:
National Park Service

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engineering-environmental Management, Inc.

Saguaro National Park
Arizona

U.S. Department of the Interior
National Park Service

Environmental Assessment
Sandario / Kinney Roads Intersection Improvements

Saguaro National Park
Pima County, Arizona

Summary

At Saguaro National Park, the National Park Service proposes to reconstruct a 500-linear foot portion of Sandario Road at the south approach to the intersection with Kinney Road. The purpose of the project is to eliminate a dip on Sandario Road, which functions as a low-water crossing. This action is needed to reduce the accident rate by providing better site distance and to allow park visitors to safely enjoy viewing the resources of Saguaro National Park.

This environmental assessment examines in detail two alternatives: no action and the National Park Service preferred alternative. The preferred alternative includes raising the grade of the road approximately 7 vertical feet from its present elevation, adding a box culvert with wingwalls to pass drainage beneath the road surface, and adding guardrails on both sides of Sandario Road for traffic safety.

The preferred alternative would have no or negligible impacts on cultural resources; air quality; wetlands; ecologically critical areas, wild and scenic rivers, and other unique natural areas; water quality; lightscapes; soundscapes; wetlands; special-status vegetation species; scenic resources; wilderness values; prime and unique farmland; land use; environmental justice; and Indian trust resources.

Short-term impacts to soils, vegetation, special-status wildlife species, floodplains, socioeconomic resources, and park operations would be minor and adverse, lasting only during the construction period. Short-term impacts to wildlife and public use and experience would be moderate and adverse. There would be no long-term impacts to special-status species or socioeconomic resources. Long-term impacts to vegetation and soils would be negligible and adverse. Long-term impacts to wildlife, park operations, and public use and experience would be minor and beneficial. Long-term impacts to floodplains would be minor and adverse.

Notes to Reviewers and Respondents

If you wish to comment on the environmental assessment, you may mail comments to the name and address below. Our practice is to make comments, including names and home addresses of respondents, available for public review during regular business hours. Individual respondents may request that we withhold their home address from the record, which we will honor to the extent allowable by law. *If you want us to withhold your name and address, you must state this prominently at the beginning of your comment.* We will make all submissions from organizations and businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, available for public inspection in their entirety.

Please address comments to:

Superintendent; Saguaro National Park; Attn: Sandario/Kinney Roads Intersection Improvements; 3693 South Old Spanish Trail; Tucson, Arizona 85730-5601.

E-mail: SAGU_planning@nps.gov

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ACRONYMS AND ABBREVIATIONS

CFR	Code of Federal Regulations
NEPA	National Environmental Policy Act of 1969
NPS	National Park Service
PL	Public Law
USC	United States Code

INTRODUCTION

PURPOSE AND NEED FOR ACTION

The National Park Service (NPS) proposes to reconstruct a 500-linear foot portion of Sandario Road at the south approach to the intersection with Kinney Road (figure 1). The reconstruction is necessary to eliminate a dip in the road and would be accomplished by raising the road approximately 7 vertical feet. The dip conveys an at-grade wash, and creates a limited sight distance for vehicles in the dip and the vehicles turning onto Sandario Road from Kinney Road, resulting in a high rate of accidents. This action is needed to provide safe and adequate transportation and allow safe viewing of resources within park boundaries. In addition, the Annual Performance Plan for 2003 sets as a goal accident reduction on Sandario Road and the proposed action would help to meet that goal.

An environmental assessment analyzes the preferred alternative and other alternatives and their potential impacts on the environment. This environmental assessment has been prepared in accordance with the National Environmental Policy Act of 1969 (NEPA), section 106 of the National Historic Preservation Act of 1966, as amended, regulations of the Council on Environmental Quality (40 *Code of Federal Regulations* (CFR) 1508.9), and National Park Service Director's Order – 12: *Conservation Planning, Environmental Impact Analysis, and Decision-making*.

PARK PURPOSE, SIGNIFICANCE, AND MISSION

An essential part of the planning process is understanding the purpose, significance, and mission of the park for which this environmental assessment is being prepared.

Park Purpose

Park purpose statements are based on national park legislation, legislative history, and National Park Service policies. The statements reaffirm the reasons for which the national park was set aside as a unit of the national park system, and provide the foundation for national park management and use.

On March 1, 1933, Presidential Proclamation No. 2032 established the portion of the park now known as the Rincon Mountain District of Saguaro National Monument. The proclamation states that the purpose of "reserving [the] land . . .as a national monument" was to preserve and protect " . . . the exceptional growth thereon of various species of cacti, including the so-called giant [saguaro] cactus." On November 15, 1961, Presidential Proclamation No. 3439 added lands in the Tucson Mountains to the monument. The first enlargement of the Tucson Mountain District occurred on October 21, 1976 (Public Law [PL] 94-578). Preservation of wilderness values was legislatively mandated on October 20, 1976 (PL 94-576), when 13,470 acres in the Tucson Mountain District and 57,930 acres in the Rincon Mountain District were formally designated as wilderness in accordance with the provisions of the Wilderness Act.

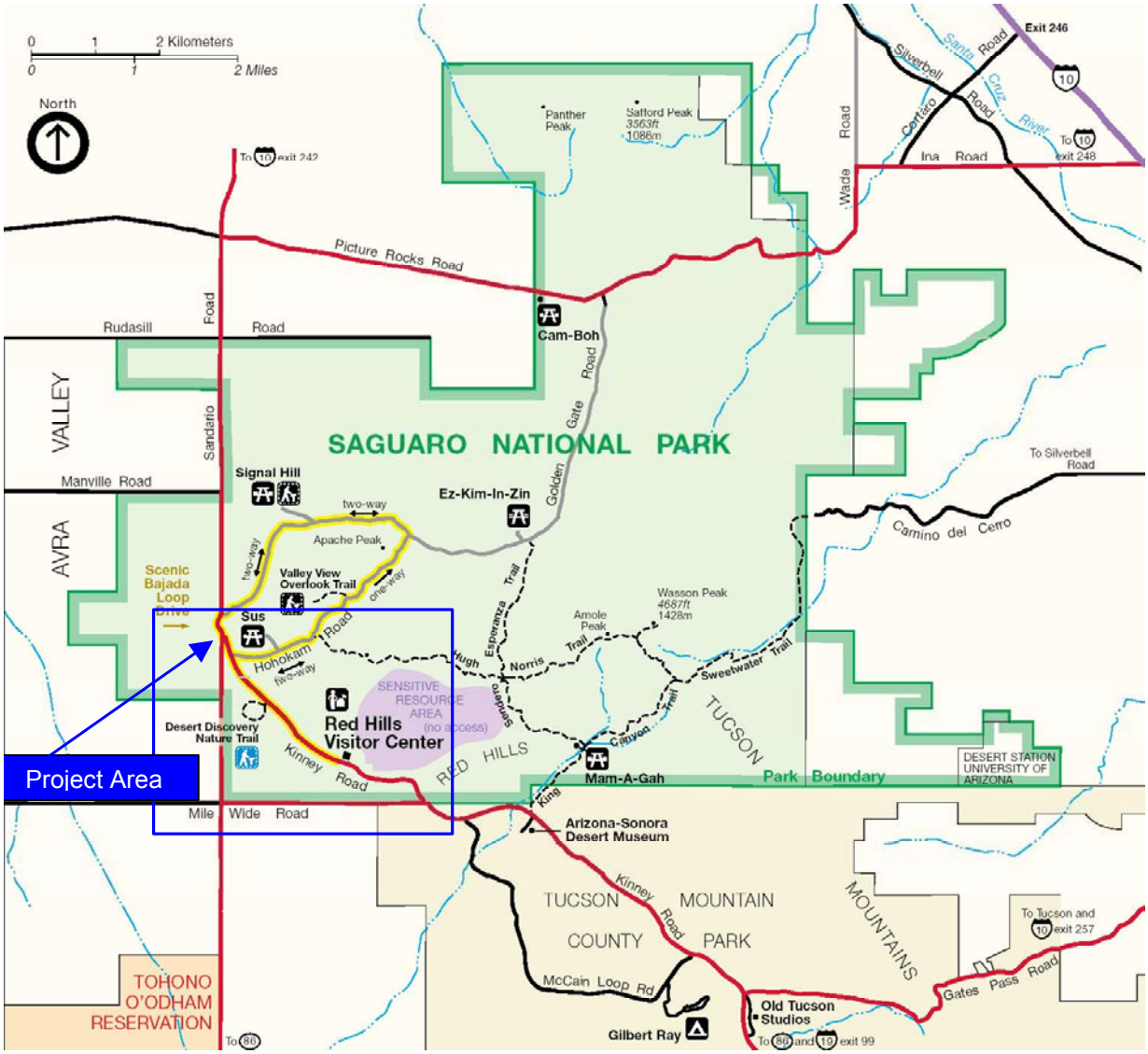

FIGURE 1. MAP OF PROJECT AREA

In 1994, legislation (PL 103-364) was signed into law that enlarged the boundaries of the monument and upgraded Saguaro from a national monument to a national park (NPS 2004).

The purpose of Saguaro National Park is defined in the first newsletter for the development of the *General Management Plan* in June of 2003, as follows:

- 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 the 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 (NPS 2003).

Park Statement of Significance

Park significance statements capture the essence of the national park's importance to the natural and cultural heritage of the United States of America. Significance statements do not inventory park resources; rather, they describe the park's distinctiveness and help place the park within the regional, national, and international context. Defining park significance helps managers make decisions that preserve the resources and values necessary to accomplish the purpose of the national park.

The following are significance statements for Saguaro National Park:

- 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 saguaro cacti.
- The saguaro is the tallest cactus in the United States, and its distinctive form is recognized worldwide as an icon of 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 that support extraordinary biodiversity within a small geographic area.
- The juxtaposition of Saguaro National Park and a large urban community provides for easily accessed wilderness experiences and extensive educational opportunities (NPS 2003).

Park Mission

Park purpose describes the specific reason the park was established. Park significance is the distinctive features that make the park different from any other. Together, purpose and significance lead to a concise statement—the mission of the park. Park mission statements describe conditions that exist when the legislative intent for the park is being met.

It is the mission of the National Park Service at Saguaro National Park to preserve, protect, and interpret the Sonoran Desert's many biotic communities; cultural features; and scientific, scenic, and wilderness values (NPS 2000).

PROJECT BACKGROUND, PREVIOUS PLANNING, AND SCOPING

Project Background

Sandario Road is a two-lane paved road running north-south and crossing through the Tucson Mountain District of Saguaro National Park on the park's western side. In some portions, the road forms the western boundary of the park (figure 1). The road is used by park visitors to access Kinney Road, the Red Hills Visitor Center, and various trails and picnic areas. The road is also used by commuters and nonpark-related traffic to access Interstate 10 and to reach Mile Wide Road that connects to Kinney Road and into the city of Tucson from western suburbs. The road also serves local traffic to residential and business properties in the area. The road is busy during commuting hours; an average of 2,100 vehicles use the road each day (Robert Peccia and Associates 1999). Sandario Road is posted with a speed limit of 50-miles per hour.

Kinney Road is a two-lane road that runs from the intersection with Sandario Road through the southwest corner of the Tucson Mountain District of the park, through the Tucson Mountain Park and terminates at Ajo Way on the outskirts of the city of Tucson. The road through the park is narrow and winding and is the only access to the Tucson Mountain District's Red Hills Visitor Center and various hiking and nature trails. Within the park, the posted speed limit on Kinney Road is 30-miles per hour. The portion of Kinney Road within the park boundaries is used primarily by park visitors. Most residential and commercial traffic bypass Kinney Road through the park to avoid the lower speed limits and use Sandario Road to Mile Wide Road. The intersection of Sandario Road and Kinney Road is a "T" intersection with the Kinney Road approach controlled by a stop sign (Robert Peccia and Associates 1999). Southbound Sandario Road traffic is prohibited from making left-hand turns onto Kinney Road, thereby crossing a lane of traffic.

Previous Planning

A traffic safety study was completed in 1999 by Robert Peccia and Associates under the direction of the National Park Service to assist the park with developing a park road system that conforms to nationally accepted traffic safety standards and signing practices (Robert Peccia and Associates 1999). The study focused on two areas where the accident rates were particularly high—Picture Rocks Road and the intersection of Kinney Road and Sandario Road. The study made recommendations for short-term improvements to the intersection with signage and removal of vegetation. The long-term recommendation was to reconstruct the road south of the intersection to remove the dip in the road.

Scoping

Scoping is the effort to involve agencies and citizens in identifying the nature and extent of issues to be addressed in this environmental assessment. Among other tasks, scoping identifies important issues and eliminates unimportant ones; allocates assignments among the inter-disciplinary team members and/or other participating agencies; identifies related projects and associated documents; identifies other permits, surveys, consultations etc., required by other

agencies; and creates a schedule that allows adequate time to prepare and distribute the environmental assessment for public review and comment before a final decision is made. Scoping includes any interested agency, or any agency with jurisdiction by law or expertise, and allows early input into the environmental assessment process.

To begin the planning process, staff of Saguaro National Park and resource professionals of the National Park Service – Denver Service Center, conducted internal scoping. This interdisciplinary process defined the purpose and need, identified potential actions to address the need, determined the likely issues and impact topics, and identified the relationship of the proposed action to other planning efforts at Saguaro National Park.

A press release initiating scoping and describing the proposed action was issued on December 19, 2003 (appendix A). Comments were solicited during a public scoping period. No comments were received on the project. The Arizona Game and Fish Department, American Indian groups traditionally associated with the lands of Saguaro National Park, and the public will also have an opportunity to review and comment on this environmental assessment.

IMPACT TOPICS

Issues and concerns affecting this proposal were identified from past National Park Service planning efforts, and input from the public, and state and federal agencies. The major issues relate to conformance of this plan with the Saguaro National Park *General Management Plan* and potential impacts to vegetation, wildlife, special-status species, soils, public use and experience, and park operations.

The issues were used to identify impact topics. Specific impact topics were developed for analysis and to allow comparison of the environmental consequences of each alternative. These impact topics were identified based on federal laws, regulations, and executive orders; 2001 *NPS Management Policies*; project issues; and National Park Service knowledge of limited or easily impacted resources. A brief rationale for the selection of each impact topic, including a discussion of potential issues associated with each impact topic, is given below, as well as the rationale for dismissing specific topics from further consideration.

IMPACT TOPICS SELECTED FOR DETAILED ANALYSIS

Vegetation

The policy of the National Park Service is to protect the components and processes of naturally occurring vegetative communities, including the natural abundance, diversity, and ecological integrity of plants (*NPS Management Policies 2001*). Because the preferred alternative would temporarily and permanently disturb vegetation in association with the construction activities, this topic is addressed in this environmental assessment.

Wildlife

As discussed above with vegetation, the policy of the National Park Service is to protect the components and processes of naturally occurring wildlife communities, including the natural abundance, diversity, and ecological integrity of animals (*NPS Management Policies 2001*). The alternatives have the potential to affect wildlife or their habitat. The no-action alternative would continue to result in the potential for injury or death to wildlife crossing Sandario Road and avoidance of the road area by wildlife due to noise. The preferred alternative would result in increased construction-related noise on Sandario Road and increased traffic on Kinney Road during construction activities, both potentially impacting wildlife species. Therefore, wildlife is addressed in this environmental assessment.

Special-Status Species (Threatened, Endangered, Species of Concern, and Designated Critical Habitat)

The Endangered Species Act (1973) requires an examination of the impacts on all federally listed threatened or endangered species. National Park Service policy also requires examination of the impacts on federal candidate species, as well as state-listed threatened, endangered, candidate, rare, declining, and sensitive species. Special-status species would continue to be affected in the no-action alternative by potential injury or death crossing Sandario Road and noise of traffic on the road. The preferred alternative would result in increased construction related noise and increased traffic on Kinney Road with the potential to affect special-status species. Therefore, special-status species are addressed in this environmental assessment.

Soils

The proposed action would include raising the road grade and installation of a box culvert with associated wingwalls, disturbing soils in the construction area. Because the proposed action would include soil-disturbing activities, soils are addressed as an impact topic in this environmental assessment.

Floodplains

Executive Order 11988 (*Floodplain Management*) requires an examination of impacts to floodplains and potential risk involved in placing facilities within floodplains. *NPS Management Policies,* Director's Order – 2: *Planning Guidelines*, and Director's Order-12: *Conservation Planning, Environmental Impact Analysis, and Decision-making* provide guidelines for proposed actions in floodplains. The preferred alternative proposes to install a 6-foot high by 12-foot wide box culvert and wingwalls in the floodplain of an unnamed tributary to Brawley Wash. Although this area is not within a floodplain as designated by the Department of Housing and Urban Development maps, the area is in a stream channel and subject to flooding. Therefore, this impact topic is addressed in the environmental assessment and a draft floodplain statement of findings has been prepared and is included as appendix B.

Socioeconomic Resources

The proposed action would have adverse effects on local businesses during the short period when the detour was in place and commercial traffic was rerouted around the area. Implementation of the proposed alternative could provide a short-term benefit due to local increases in employment opportunities for the construction work force. Therefore, this impact topic is addressed in the environmental assessment.

Public Use and Experience

Enjoyment of park resources and values by the people of the United States is part of the fundamental purpose of all national parks. Saguaro National Park's purpose, statement of significance, and mission reaffirm the importance of recreational values, public experience, and public understanding. The experience of the public could be affected by the no-action alternative through accidents as a result of the limited sight distance, and the preferred alternative through the use of Kinney Road to detour traffic during the road reconstruction. Therefore, public use and experience is addressed in this environmental assessment.

Park Operations

Sandario Road is used primarily as a commuter road. During construction, commuter traffic, excluding commercial vehicles, would be rerouted through the park via Kinney Road. Increased traffic through the park would require an increase in park personnel for law enforcement monitoring. Park personnel are also the first responders for an accident on the existing roadway. Park operations could be affected by the no-action and preferred alternatives. Therefore, park operations are addressed in this environmental assessment.

IMPACT TOPICS DISMISSED FROM DETAILED ANALYSIS

Cultural Resources

Section 106 of the National Historic Preservation Act of 1966, as amended, and National Park Service policy require that the effects of National Park Service actions on properties eligible for or listed on the National Register of Historic Places be considered, and that appropriate steps be taken to avoid, minimize, or mitigate these effects. In accordance with section 106 regulations, the cultural resource specialist at Saguaro National Park determined there would be no or negligible impacts to any of the five types of cultural resources recognized by the National Park Service (archeological resources, ethnographic resources, historic structures, cultural landscapes, or museum objects).

The National Park Service Western Archeological and Conservation Center reviewed previous archeological surveys and determined that no sites were located within 1,000 feet of the project area. An archeological clearance survey form was prepared and provided to the Arizona State Historic Preservation Office (appendix C) in accordance with established National Park

Service and Arizona State Historic Preservation Office compliance review procedures. Based on the determination that there would be no impacts to cultural resources, cultural resources was dismissed as an impact topic in this environmental assessment.

Air Quality

The 1963 Clean Air Act, as amended (42 *United States Code* (USC) 7401 *et seq.*), provides that the federal land manager (the assistant secretary for fish and wildlife and parks/monuments and the park superintendent) has a responsibility to protect the park's air quality-related values (including visibility, plants, animals, soils, water quality, cultural and historic resources and objects, and public health) from adverse air pollution impacts. Section 118 of the 1963 Clean Air Act requires the park to meet all federal, state, and local air pollution standards. Section 176(c) of the 1963 Clean Air Act requires all federal activities and projects to conform to state air quality implementation plans to attain and maintain national ambient air quality standards. *NPS Management Policies 2001* addresses the need to analyze potential impacts to air quality during park planning.

Saguaro National Park is classified as a Class I air quality area under the Clean Air Act, as amended. Should the preferred alternative be selected, local air quality would be temporarily affected by dust and vehicle emissions. Hauling material and operating equipment during the construction period would result in increased vehicle exhaust and emissions. Emissions would temporarily increase on Kinney Road as traffic is detoured onto the road. Based on typical air flow patterns, hydrocarbons, nitrogen oxide, and sulfur dioxide emissions would be dissipated.

Fugitive dust plumes from construction equipment would intermittently increase airborne particulates in the area near the project site, but loading rates are expected to be low. If fugitive dust becomes a problem due to dry weather, the site would be subjected to periodic water sprinkling to reduce dust.

Overall, there would be a slight and temporary degradation of local air quality due to dust generated from construction activities and emissions from construction equipment. These effects would last only as long as construction occurred and the park's Class I air quality would not be affected by the proposal; impacts would be negligible and short term. No long-term adverse impacts to air quality would occur from implementing this project. Therefore, air quality was dismissed as an impact topic in this environmental assessment.

Soundscapes

In accordance with *NPS Management Policies 2001* and Director's Order – 47: *Sound Preservation and Noise Management*, an important part of the National Park Service mission is preservation of natural soundscapes associated with national park units. Natural soundscapes exist in the absence of human-caused sound. The natural ambient soundscape is the aggregate of all the natural sounds that occur in park units, together with the physical capacity for transmitting natural sounds. Natural sounds occur within and beyond the range of sounds that humans can perceive and can be transmitted through air, water, or solid materials. The frequency, magnitude, and duration of human-caused sound considered acceptable varies

among National Park Service units, as well as potentially throughout each park unit, being generally greater in developed areas and less in undeveloped areas. Because public use and experience and wildlife would be affected by noise associated with road improvements under the preferred alternative, not only in the area of construction, but also the area of the traffic detour through the park, noise is discussed under the impact topics of wildlife and public use and experience and soundscapes is eliminated as a separate impact topic.

Wetlands

Executive Order 11990 (*Protection of Wetlands*) requires an examination of the impacts to wetlands. The *NPS Management Policies 2001*, Director's Order – 2: *Planning Guidelines*, and Director's Order – 12: *Conservation Planning, Environmental Impact Analysis, and Decision-making* provide guidelines for proposed actions in wetlands and floodplains.

The U.S. Army Corp of Engineers was contacted regarding the project and determined that there are no wetlands within the project area (appendix D). Therefore, wetlands was dismissed as an impact topic in this environmental assessment.

Ecologically Critical Areas, Wild and Scenic Rivers, Other Unique Natural Areas

No areas within the project have been designated as ecologically critical, nor are there any existing or potential wild and scenic rivers within the project area. Critical habitat designated under the Endangered Species Act of 1973, as amended, is considered with the threatened and endangered species and species of concern. Ecologically critical areas, wild and scenic rivers, and other unique natural areas were, therefore, dismissed from detailed analysis.

Water Quality

The 1972 Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977, is a national policy to restore and maintain the chemical, physical, and biological integrity of the nation's waters; to enhance the quality of water resources; and to prevent, control, and abate water pollution. *NPS Management Policies 2001* provide direction for the preservation, use, and quality of water in national park units. National Park Service policies require protection of water quality consistent with the Clean Water Act. Section 404 of the Clean Water Act authorizes the U.S. Army Corps of Engineers to prohibit or regulate, through a permitting process, discharge of dredge or fill material or excavation within the waters of the United States. A permit would be required through the U.S. Army Corps of Engineers for protection of waters of the United States during the road improvement work. With sediment control mitigation measures (see "Mitigation Measures" section), the preferred alternative would have a negligible effect on water quality. Therefore, water quality was dismissed as an impact topic.

Lightscapes

Should the preferred alternative be selected, nighttime construction could be implemented to reduce the potential of delaying the project's schedule. The Tucson Mountain District is

closed to overnight visitation; therefore, park visitors would not be affected. In the event of nighttime construction occurring, lighting would be necessary, but would be directed downward toward the construction activities. The closest residences to the project corridor are over one mile away. If residents were to be impacted, the impacts would be short term and negligible with no long-term, adverse impacts. Therefore, this topic was dismissed from further analysis.

Health and Safety

Traffic safety is currently affected by the short sight distance and accident potential at the intersection of Kinney and Sandario Roads. The preferred alternative would create a potential for increased accidents in the park while traffic is being detoured onto Kinney Road. Traffic safety would affect public use and experience within the park. Therefore, traffic safety is addressed under the discussion of public use and experience, and health and safety is dismissed as a separate impact topic.

Scenic Resources

Scenic resource impacts would occur during construction in areas close to Sandario and Kinney Roads. These impacts would be limited to views of the roads from specific vantage points within the park and from trails in the Tucson Mountains. Visitors may notice changes in traffic patterns and potentially will see movement of construction vehicles. This impact would be short term and negligible with no long-term, adverse impacts. The scenic views for which Saguaro National Park is renowned would not be affected by the proposed project. Therefore, scenic resources was dismissed as an impact topic in this environmental assessment.

Wilderness Values

The Wilderness Act of 1964 "established a National Wilderness Preservation System to be composed of federally owned areas designated by Congress as 'wilderness areas,' and these would be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness."

It is the policy of the National Park Service (*NPS Management Policies 2001*, Chapter 6: Wilderness Preservation and Management) to "take no action that would diminish the wilderness suitability of an area possessing wilderness characteristics until the legislative process of wilderness designation has been completed. Until that time, management decisions pertaining to lands qualifying as wilderness will be made in expectation of eventual wilderness designation."

Should the preferred alternative in this document be selected, project activities would be 0.125 mile from the nearest wilderness boundary; federally designated wilderness lands would be avoided during construction activities.

Construction activities at the project site would generate activity and noise that may be perceptibly different from typical traffic noise. Impacts to wilderness values from the construction activities associated with the proposed project, including increased traffic noise on Kinney Road, would be negligible and short term. Therefore, wilderness values were dismissed as an impact topic in this environmental assessment.

Prime and Unique Farmland

In August 1980, the Council on Environmental Quality directed that federal agencies assess the effects of their actions on farmland soils classified by the U.S. Department of Agriculture's Natural Resources Conservation Service as prime or unique. Prime or unique farmland is defined as soil which particularly produces general crops such as common foods, forage, fiber, and oil seed; unique farmland produces specialty crops such as fruits, vegetables, and nuts. The proposed project does not meet the requirements for prime or unique farmland (USDA 2003). Therefore, prime and unique farmlands was dismissed as an impact topic in this environmental assessment.

Land Use

The Sandario / Kinney Road intersection is located on the west side of the Tucson Mountain District (Saguaro West) of Saguaro National Park. Saguaro National Park directly borders the project area on all sides. The Tucson Mountain County Park lies to the southeast of the park boundary. Private lands surround the park boundary, except where the Tucson Mountain County Park lies adjacent to the park boundary. Neither the no-action nor preferred alternative would affect present or future park land use, or the use of surrounding lands. The proposed road improvements would not increase road traffic capacity or increase opportunities for commercialization in the surrounding areas. Therefore, land use was dismissed as an impact topic in this environmental assessment.

Environmental Justice

Executive Order 12898 (*General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*) requires all 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 minorities and low-income populations or communities. The alternatives would affect all populations equally. No alternative would have disproportionate health or environmental effects on minorities or low-income populations or communities as defined in the Council on Environmental Quality "Environmental Justice: Guidance Under the National Environmental Policy Act" (CEQ 1997); therefore, environmental justice was dismissed as an impact topic in this environmental assessment.

Indian Trust Resource

Secretarial Order 3175 requires that any anticipated impacts to Indian trust resources from a proposed project or action by Department of 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 Sates 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 in Saguaro National Park (Holden 2004). The land comprising the park is not held in trust by the Secretary of the Interior for the benefit of Indians due to their status as Indians. Therefore, Indian trust resources were dismissed as an impact topic in this environmental assessment.

ALTERNATIVES

INTRODUCTION

The alternatives section describes two management alternatives for the Sandario / Kinney Road intersection. Alternatives for this project were developed to resolve issues associated with traffic safety and allow park visitors to safely view park resources.

The no-action alternative describes the action of continuing the present management operation and condition. It does not imply or direct discontinuing the present action or removing existing uses, developments, or facilities. The no-action alternative provides a basis for comparing the management direction and environmental consequences of the preferred alternative. Should the no-action alternative be selected, the National Park Service would respond to future needs and conditions associated with the Sandario / Kinney Road intersection without major actions or changes in the present course.

The preferred alternative presents the National Park Service proposed action and defines the rationale for the action in terms of resource protection and management, public and operational use, costs, and other applicable factors.

Additional alternatives considered and dismissed from detailed analysis are also discussed in this section. A summary table comparing the environmental consequences of each alternative is presented at the end of the "Alternatives" section.

ALTERNATIVE A: NO-ACTION ALTERNATIVE

The no-action alternative would be a continuation of existing conditions at the Sandario / Kinney Road intersection at Saguaro National Park. The road dip and associated low-water crossing would limit visibility both for drivers of vehicles in the dip and for vehicles turning onto Sandario Road from Kinney Road. Left turns would be prohibited from Sandario Road onto Kinney Road.

Implementation of the no-action alternative means that overall improvements would not occur. With this alternative, the park would continue operations related to the road such as accident response. The no-action alternative would include short-term, minor repair or improvement activities for the road that would be part of routine maintenance for continuing operations.

ALTERNATIVE B: PREFERRED ALTERNATIVE

The preferred alternative presents the National Park Service proposed action and defines the rationale for the action in terms of resource protection and management, public and operational use costs, and other applicable factors. The preferred alternative meets the park's planning

objective of providing safe and adequate transportation. In addition, the Annual Performance Plan for 2003 sets accident reduction on Sandario Road as a goal. The preferred alternative would provide an opportunity to reduce accidents along that portion of the road (NPS 2002a).

The project would be conducted in partnership with the Pima County Department of Transportation. Pima County Department of Transportation would provide design services, contracting, construction engineering, and 50% of construction funds.

The preferred alternative would reconstruct a portion of Sandario Road, starting at the intersection of Kinney Road with Sandario Road and ending approximately 500-linear feet south on Sandario Road (figure 2). The reconstruction would reduce the occurrence of traffic accidents by improving poor sight distances. The project would include raising the grade of the road approximately 7-vertical feet from its present elevation to allow the drainage, an unnamed tributary to Brawley Wash, to be conveyed beneath the road. A box culvert with wingwalls would be constructed to convey the drainage beneath the road surface. Guardrails would be added on both sides of Sandario Road for traffic safety (figure 3). Construction limits are set at 30 feet from the road centerline and extend to approximately 50 feet from the centerline in the drainage.

The box culvert would be a reinforced concrete box culvert, with dimensions of 6-foot high by 12-foot wide. The box culvert would allow the quickest installation, thereby minimizing the time necessary for traffic detours during construction. The drainage culvert would be designed to handle peak flows from a 100-year, 24-hour storm event, although some water would back up at the culvert entrance raising the water surface elevation during a 100-year storm event by approximately 3.5 feet (Entranco 2003a). The design would prevent overtopping of the new roadway elevation or channelization of flows to the north or south, parallel to the roadway. The culvert inlet would be designed with wingwalls and the outlet would have both wingwalls and erosion protection in a designed scour hole to reduce velocities upon exiting the culvert and prevent additional downstream erosion (figures 2 and 4).

The U.S. Army Corps of Engineers was contacted and determined that the unnamed tributary to Brawley Wash is a jurisdictional water course of the United States and a permit would be required under section 404 of the Clean Water Act for any work in the wash. Appendix D contains a copy of the jurisdictional delineation letter from the U.S. Army Corps of Engineers. This permit would be obtained prior to commencement of construction.

During construction, all noncommercial traffic would be routed through the park via Kinney Road. Commercial traffic would be detoured on Interstate 10 to Highway 86 and would not be allowed onto Kinney Road through the park. Commercial traffic is defined as anything over two axles. Exceptions would be made for school buses, park deliveries, and emergency vehicles. Recreation vehicles traveling to the park would also be allowed. Pima County would be responsible for oversight of construction activities, while the National Park Service would maintain oversight and enforcement of the commercial vehicle ban and the speed limit on Kinney Road. Upon completion of construction on Sandario Road, Kinney Road may require repair or resurfacing due to damage caused by increased traffic. This work would be completed

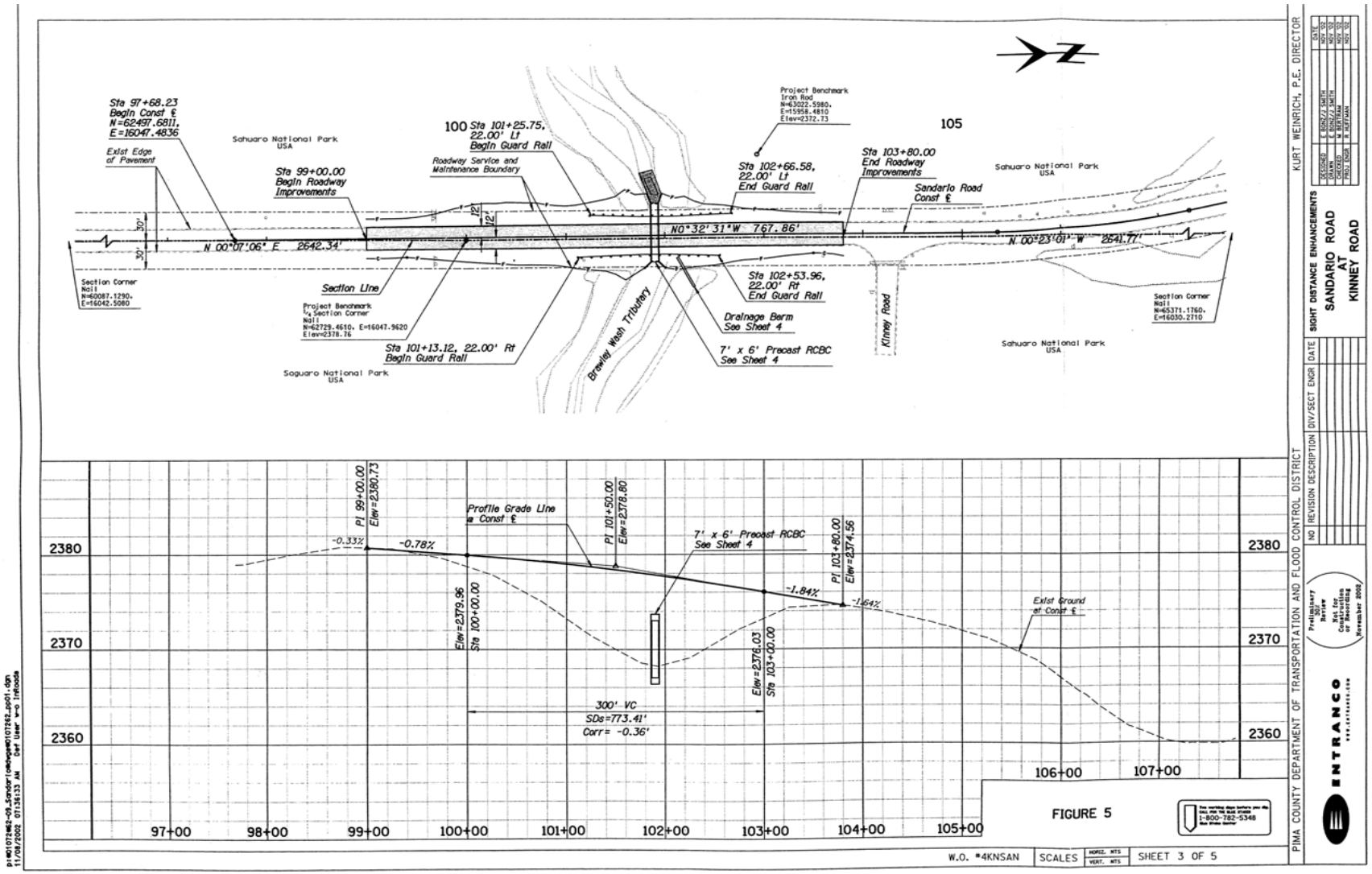

FIGURE 2. PROPOSED INTERSECTION IMPROVEMENTS

FIGURE 3. CURRENT DIP IN SANDARIO ROAD

FIGURE 4. UNNAMED TRIBUTARY TO BRAWLEY WASH (LOOKING DOWNSTREAM)

in a manner to minimize delays for park visitors. One lane of traffic would be open at all times, with delays of no longer than 20 minutes. As an alternative, portions of Kinney Road could be closed and traffic rerouted to access the Red Hills Visitor Center through the use of Sandario Road and/or Mile Wide Road.

The box culvert could improve conditions for wildlife by directing them beneath the road, providing an alternative to crossing the road. The box culvert would be lowered into the ground to prevent disturbance of the natural flow of the wash. The bottom of the scour hole would be layered with riprap and the voids filled with sand to maintain a natural substrate for wildlife. Following construction completion, Saguaro National Park staff would monitor the culvert and scour hole for wildlife use and to ensure the riprap remains filled with soil.

Approximately five to ten trees and shrubs would be removed or pruned as part of the construction effort. The park is responsible for salvaging particular species that would be replanted after project completion to preserve the integrity of the project site. Larger cacti, trees, and shrubs along the project site would be tagged and protected with construction fencing to ensure they are not disturbed. Upon completion of construction, topsoil would be replaced and the area revegetated, as appropriate.

Staging Area

Construction equipment would be staged in the project area and in designated turnouts or parking areas. Prior to any construction activities, orange construction flagging or construction fencing would be placed around the staging areas to delineate the area limits. Recommended staging areas are the northeast corner of Sandario and Mile Wide Roads (pump house area with gate and lock), the maintenance yard for the park (northeast of the visitor center accessed by service road), and the road shoulder near construction site (no disturbance outside of the county-maintained shoulder).

Sustainability

The National Park Service has adopted the concept of sustainable design as a guiding principle of facility planning and development. The objectives of sustainability are to design park facilities to minimize adverse effects on natural and cultural values, to reflect their environmental setting, and to maintain and encourage biodiversity; to construct and retrofit facilities using energy-efficient materials and building techniques; to operate and maintain facilities to promote their sustainability; and to illustrate and promote conservation principles and practices through sustainable design and ecologically sensitive use. Essentially, sustainability is living within the environment with the least impact on the environment. The preferred alternative subscribes to and supports the practice of sustainable planning, design, and development of Saguaro National Park.

ENVIRONMENTALLY PREFERRED ALTERNATIVE

In accordance with Director's Order – 12, the National Park Service is required to identify the environmentally preferred alternative in all environmental documents, including environmental assessments. The environmentally preferred alternative is determined by applying the criteria suggested in NEPA, which is guided by the Council on Environmental Quality. The Council on Environmental Quality provides direction that "[t]he environmentally preferable alternative is the alternative that will promote the national environmental policy as expressed in section 101 of NEPA, which considers:

1. fulfilling the responsibilities of each generation as trustee of the environment for succeeding generations
2. assuring for all generations safe, healthful, productive, and esthetically and culturally pleasing surroundings
3. attaining the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences
4. preserving important historic, cultural and natural aspects of our national heritage and maintaining, wherever possible, an environment that supports diversity and variety of individual choice
5. achieving a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities
6. enhancing the quality of renewable resources and approaching the maximum attainable recycling of depletable resources" (NEPA, section 101).

The no-action alternative is not the environmentally preferred alternative because it would not:

- address the sight obstruction for traffic that creates safety hazards for motorists and causes accidents to visitors and residents (criteria 2 and 3)

The National Park Service preferred alternative is the environmentally preferred alternative because it would:

- protect public health, safety, and welfare by reducing the number of motor vehicle accidents (criteria 2 and 3)
- minimize the loss of natural resources by reducing the potential for accidents causing motor vehicles to leave the road surface and destroying surrounding vegetation (criteria 1 and 4)
- allow continued safe use of the roadway by park visitors for viewing the resources of Saguaro National Park (criteria 5)

In short, the preferred alternative would provide protection of the public experience and improve traffic safety with minimal disturbance to natural and cultural resources.

Mitigation Measures of the Preferred Alternative

Mitigation measures were analyzed as part of the preferred alternative for reconstruction of Sandario Road. Mitigation measures discussed below have been prepared to lessen or eliminate any potential adverse effects of the preferred alternative. The roadway corridor has already been impacted by various human and natural activities. Construction would be primarily within these previously disturbed areas.

Resource Area	Mitigation Measures
General Considerations	Prior to commencement of work by the contractor, construction flagging or construction fencing would be installed to clearly delineate the project/disturbance limits, including the staging areas. The fence would be bright in color with mesh holes at least 4-inch x 4-inch to allow reptiles to pass through without being entangled.
	All protection measures would be clearly stated in the construction specifications and workers would be instructed to avoid conducting activities beyond the construction zone, as defined by the construction zone flagging or fencing.
	Prior to construction, a hazardous spill plan would be submitted, stating what actions would be taken in case of a spill. This plan would also incorporate preventive measures to be implemented such as the placement of refueling facilities, storage and handling of hazardous materials, and notification procedures for a spill, etc. The county would be immediately notified in the event of a spill of hazardous materials.
	Concrete and asphalt would be produced outside Saguaro National Park. No overnight storage of these materials would be permitted within park boundaries.
	Oil, hydraulic fluids, anti-freeze, or other chemicals would not be drained onto the ground within park boundaries.
	All equipment on the project would be maintained in a clean and well-functioning state to avoid or minimize contamination from automotive fluids, and to ensure noise controls are properly functioning, all equipment would be checked daily.
	All earth-moving equipment (including hauling vehicles) would be steam cleaned of mud and weed seed to the approval of the county prior to entering the park. Subsequent entries of hauling vehicles would not require cleaning unless requested.
	Vehicles or equipment would not be permitted outside the project limits, except as approved by the park.
	Construction equipment would be staged only in designated areas.
	All fill and aggregate material would be treated or certified free of non-native plants before coming into the park. Many of the highly invasive non-native plants that Saguaro National Park actively controls are not on the State of Arizona Noxious Weed List; therefore, the park would require that the fill material be free of non-native plants.

Resource Area	Mitigation Measures
	Paleontological remains and specimens, petroglyphs, artifacts, structural features, ceremonial, domestic, and archeological objects of any nature, historic or prehistoric, found within the construction area, are the property of the National Park Service. The contractor shall control the actions of its employees and subcontractors at the job site to ensure that any protected sites would not be disturbed or damaged. Should contractor's operations uncover or the contractor's employees find any archeological remains, all operations would be suspended and the park's project manager and the county would be notified immediately of the findings. The notification would include a brief statement of the location and details of the finding. After the findings have been evaluated by the National Park Service or its designated representatives, under section 106 of the National Historic Preservation Act, 36 CFR Part 800, and any necessary data recovery performed, work would resume upon notification by the park manager and the county.
	Should human remains or cultural items subject to the Native American Graves Protection and Repatriation Act of 1990 be discovered, all operations would be suspended. The National Park Service would follow the appropriate provisions of the act and its implementing regulations, 43 CFR Part 10.
	All tools, equipment, barricades, signs, surplus materials, and rubbish would be removed from the project work limits upon project completion. Any asphalt surfaces damaged due to work on the project would be repaired to original condition. All demolition debris would be removed from the project site, including all visible concrete and metal pieces.
	To control fugitive dust, water sprinkling would occur, as needed, on active work areas where dirt or fine particles are exposed.
Sediment Control	Best management practices for drainage and sediment control would be implemented to prevent or reduce nonpoint source pollution and minimize soil loss and sedimentation in drainage areas. Use of best management practices in the project area for drainage area protection would include all or some of the following actions, depending on site-specific requirements: ▪ keeping disturbed areas as small as practical to minimize exposed soil and the potential for erosion ▪ locating waste and excess excavated materials outside of drainages to avoid sedimentation ▪ installing silt fences, temporary earthen berms, temporary water bars, sediment traps, stone check dams, or other equivalent measures (including installing erosion-control measures around the perimeter of stockpiled fill material) prior to construction ▪ conducting regular site inspections during the construction period to ensure that erosion-control measures were properly installed and are functioning effectively ▪ storing, using, and disposing of chemicals, fuels, and other toxic materials in an appropriate manner ▪ revegetating disturbed areas as soon as possible after construction is completed
	During periods of heavy rainfall, work would be halted. During these work stoppage periods, project personnel would continue to check the silt fences and check dams, maintain the silt fences in effective condition, and remove accumulated sediment, if necessary.
Soils	No blasting would be allowed.
	Topsoil (upper 2–3 inches of the soil) would be removed from areas of construction and stored for later use in revegetation.
	The topsoil salvaged before construction would be redistributed in as near the original location as possible.
	Erosion and sediment control best management practices would be required (see "General Considerations").

Resource Area	Mitigation Measures
Vegetation	Revegetation would be carried out according to the revegetation plan set forth by the park's restoration ecologist.
	Larger cacti, trees, and shrubs along the project site would be tagged and protected with construction fencing to ensure they are not disturbed.
	The park's restoration crew would conduct pre-construction salvage work. All salvaged material would be placed in appropriate-sized containers and transferred to a holding area within park boundaries.
	All plant material not salvaged from the project area, but removed during the clearing and grubbing, would be left just outside the clearing limits so it can be used during the restoration work. When feasible, pruning shrubs to ground level is preferred over blading vegetation with heavy equipment. Some plant material may be hauled offsite completely, but that would be determined during clearing and grubbing by the restoration ecologist or a designee. The restoration ecologist (or designee) would be onsite and allowed to direct the contractor during the clearing and grubbing phase.
Wildlife	The contractor would be required to maintain strict garbage control so that scavengers (e.g., corvids) are not attracted to the project area. No food scraps would be discarded or fed to wildlife.
	Trenches would be covered or fenced to prevent wildlife from being trapped. Contractors would be expected to inspect trenches for wildlife just before refilling to avoid any burying of wildlife.
	Park employees would survey before and during construction for tortoises and other herpetological species.
Special-Status Species	If any special-status animal or plant species are discovered within or adjacent to the project area during construction, construction would be halted, consultation with the U.S. Fish and Wildlife Service would be initiated and appropriate mitigation measures would be implemented.
	Construction activities are anticipated to take place between October 1 and December 31 to avoid the cactus ferruginous pygmy-owl breeding season (February 1 through July 31).
Public Experience	A traffic management plan would be developed prior to start of construction. This plan would include information on how the public and local businesses would be notified of road construction and detours and signs to be placed to inform motorists.
	Local businesses would be notified one month in advance of the exact date of road closure and alternate routes for access to the area.
	Signs would be posted notifying visitors and commuters of expected delays and detours.

GENERAL CONSTRUCTION SCHEDULE AND COSTS

Construction for this project is expected to last approximately three months, starting in October of 2004; however, construction could be delayed by unforeseen events. The construction periods allow approximately one to two months for road detours, placement of the box culvert, and completion of work on Sandario Road, and one month for any repair work on Kinney Road in the event increased traffic causes road damage. The cost of this project would be approximately $400,000, which would be split equally between the National Park Service and Pima County.

ALTERNATIVES CONSIDERED BUT DISMISSED

Alternatives to the no-action and preferred alternatives were considered, including adding three-way stop signs at the intersection of Kinney Road with Sandario Road. This alternative was dismissed from further consideration because the stop sign would not meet the project need to reduce the accident rates at the intersection. Because of the lack of volume from Kinney Road approaching Sandario Road, and the high volume of traffic that travels on Sandario Road, safety specialists feared that local motorists, who are aware of the low volume of traffic on Kinney Road, would ignore the stop signs and as a result increase the probability of motor vehicle accidents. Also, there is a considerable curve on the north section of the intersection that would cause a sight obstruction of the stop sign that could result in increasing the accident rate. Therefore, this alternative was dismissed from further consideration.

Another alternative considered was to lower the grade of the road between at-grade wash crossings on Sandario Road, creating an extended dip that would run through the intersection with Kinney Road. This alternative would result in greatly increased disturbance and associated environmental impacts because the grade of Kinney Road would also need to be lowered at the intersection. Costs would be substantially higher, the construction period would be longer and the entrance to the park from this point would be closed during construction. This alternative was eliminated from further consideration.

Several options for accomplishing the water conveyance under the raised portion of the road were evaluated, including using circular concrete pipes and arch structures of concrete or steel instead of a box culvert. Both the circular concrete pipes and the arch structures of concrete or steel would duplicate the box culvert chosen as the preferred alternative; however, the arch structures cost more than the box culvert and increased the construction time and lengthened the construction-related environmental impacts. The circular culverts cost less than the box culvert, but would require longer construction time, increasing the construction-related environmental impacts and would not allow the passage of larger wildlife. Therefore, these alternatives were dismissed from further consideration.

Alternatives concerning the rerouting of traffic during construction were also considered, including diverting all traffic onto Kinney Road, adding an onsite detour lane through the wash on Sandario Road, and closing Sandario Road and Kinney Road to all traffic north of the visitor center during construction. Diverting all traffic onto Kinney Road was dismissed since this did not meet the project purpose of allowing park visitors to safely view the resources of the park. Kinney Road would be heavily impacted by the detouring of all traffic because the road was not engineered for heavy commercial traffic. The road conditions would deteriorate in the short term and the road would likely need to be rebuilt, causing construction-related environmental impacts.

Adding a detour lane through the wash on Sandario Road would increase the size of the construction footprint as well as increase the potential for environmental impacts. The alternative to close Sandario Road and Kinney Road north of the visitor center during construction was dismissed due to the number of residents in the area and visitors who access the park via Kinney Road.

ALTERNATIVE COMPARISON TABLE

TABLE 1. COMPARATIVE SUMMARY OF ALTERNATIVES

No-Action Alternative	Preferred Alternative
The no-action alternative would be a continuation of existing conditions at the Sandario / Kinney Road intersection at Saguaro National Park. The road dip and associated low-water crossing would limit visibility both for drivers of vehicles in the dip and for vehicles turning onto Sandario Road from Kinney Road. Left turns would be prohibited from Sandario Road onto Kinney Road.	The preferred alternative would reconstruct a portion of Sandario Road, starting at the intersection of Kinney Road with Sandario Road, and ending approximately 500-linear feet south on Sandario Road. The reconstruction would reduce the occurrence of traffic accidents and improve poor sight distances by raising the grade of the road approximately 7-vertical feet from its present elevation, Drainage flows would be conveyed by adding a box culvert drainage structure beneath the road surface. Guardrails would be installed on both sides of Sandario Road through this section for traffic safety.
Meets Project Objectives? **No.** Continuing the existing conditions does not protect the safety of visitors and local commuters due to the high accident rates at the intersection as a result of the poor sight distance. Also, the existing condition does not allow safe viewing of the resources of Saguaro National Park in this area.	Meets Project Objectives? **Yes.** The preferred alternative meets the park planning objective of providing safe and adequate transportation and allowing safe viewing within park boundaries. In addition, the Annual Performance Plan for 2003 sets as a goal accident reduction on Sandario Road. The preferred alternative would provide an opportunity to reduce the accidents along that portion of the road (NPS 2002a).

SUMMARY OF ENVIRONMENTAL CONSEQUENCES / IMPACT COMPARISON MATRIX

TABLE 2. COMPARATIVE SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS

Impact Topics	No-Action Alternative	Preferred Alternative
Vegetation	Under the no-action alternative, there would be no new ground-disturbing activities with the potential to affect vegetation and there would be no impacts to vegetation.	Impacts to vegetation from the preferred alternative would be local, short term, minor, and adverse. The long-term impacts would be negligible and adverse.
Wildlife	There would be no change to wildlife from the no-action alternative; however, the existing condition constitutes localized, short- and long-term, minor, adverse impacts to wildlife.	The impacts to wildlife from construction and traffic detours would be short term, moderate, and adverse. The long-term impacts to wildlife from the preferred alternative would be local, minor, and beneficial.
Special-Status Species	The no-action alternative would continue to create localized, short- and long-term, negligible, adverse impacts to special-status wildlife species. There would be no impact to special-status vegetation species from the no-action alternative.	Construction activities are anticipated to have local, short-term (for the duration of construction), minor, adverse impacts on special-status wildlife species. There would be no long-term impacts to special-status wildlife species. There would be no short- or long-term impacts to special-status vegetation species.
Soils	There would be no impact to soils from the no-action alternative.	The short-term impacts to soils would be local, minor, and adverse. Once revegetation occurs, the long-term impacts to soils would be negligible.
Floodplains	The no-action alternative would continue to have localized, short- and long-term, negligible, adverse impacts to the floodplain.	The preferred alternative would result in local, short- and long-term, minor, adverse impacts to floodplains.
Socioeconomics	There would be no socioeconomic impacts from the no-action alternative.	The socioeconomic impacts from the preferred alternative would be short term, minor, and adverse.
Public Use and Experience	There would be no change to public use and experience from the no-action alternative; however, the existing condition constitutes a short- and long-term, minor, adverse impact.	There would be short-term, moderate, adverse impacts to public use and experience and long-term, minor, beneficial impacts.
Park Operations	There would be no change to park operations; however, the existing condition represents a short- and long-term, minor, adverse impact to park operations as a result of responding to accidents at the intersection.	The preferred alternative would result in a short-term, minor, adverse impact to park operations as Sandario Road non-commercial traffic is detoured onto Kinney Road through the park. There would be long-term, minor, beneficial impacts to park operations.

AFFECTED ENVIRONMENT

A summary of the resources potentially affected by the project follows.

LOCATION AND GENERAL DESCRIPTION

Saguaro National Park consists of two districts—Saguaro West (Tucson Mountain unit), and Saguaro East (Rincon Mountain unit). Saguaro West is located in Pima County, Arizona, approximately 15 miles west of the city of Tucson. The project is located in Saguaro West. The north and west areas of the Tucson Mountain unit are generally flat, while the south and east becomes more mountainous, rising to an elevation of 4,687 feet. Saguaro West encompasses 24,034 acres of mountains and desert containing dense stands of saguaro cacti.

Vegetation

The dominant vegetation of the Tucson Mountain unit is characterized as Sonoran desertscrub. Sonoran desertscrub displays arboreal elements, truly large species of cacti, and a great variety of species of succulents in comparison to other deserts that are mainly dominated by low shrubs (NPS 2002b).

The project area lies within the Arizona Upland subdivision of the Sonoran desertscrub. The Arizona Upland possesses a multi-storied canopy of vegetation, including some of the most recognizable vegetation forms such as the saguaro cactus (*Carnegiea gigantea*) (NPS 2002b). The primary vegetative association dominating the project area is the paloverde–saguaro association. This association forms a montage of trees, shrubs, subshrubs, cacti, and grasses throughout the Tucson Mountains from an elevation of 2,133 feet to 4,475 feet (Rondeau 1991).

The dominant species within the project site are the saguaro cactus, desert ironwood (*Olneya tesota*), and little-leaf paloverde (*Parkinsonia microphylla*). Other notable species within the project include whitethorn acacia (*Acacia constricta*), ocotillo (*Fouquieria splendens*), and desert hackberry (*Celtis pallida*). Cacti are prevalent and diverse within the project site including barrel cactus (*Ferocactus wislizenii*), prickly pear (*Opuntia phaeacantha*), buckhorn cholla (*Opuntia acanthocarpa*), jumping cholla (*Opuntia fulgida*), and hedgehog cactus (*Echinocereus fasciculatus*) (Entranco 2003b).

Wildlife

Biological inventories of both districts of Saguaro National Park were conducted in 2001 and 2002. Researchers observed 69 species of birds, 26 species of mammals, 29 species of reptiles, and 4 species of amphibians in the Tucson Mountain District of Saguaro National Park (Powell et al. 2002, 2003).

Birds

Of the 69 species of birds observed in the district, 30 species were detected more frequently, at a rate of 10% or greater. The following species were observed during the 2001 inventory: white-throated swift (*Aeronautes saxatalis*), rufous-winged sparrow (*Aimophila carpalis*), Costa's hummingbird (*Calypte costae*), canyon wren (*Catherpes mexicanus*), lesser nighthawk (*Chordeiles acutipennis*), common raven (*Corvus corax*), Scott's oriole (*Icterus parisorum*), elf owl (*Micrathene whitneyi*), ladder-backed woodpecker (*Picoides scalaris*), and Brewer's sparrow (*Spizella breweri*). In the 2001 and 2002 inventories, the following species were observed: black-throated sparrow (*Amphispiza bilineata*), verdin (*Auriparus flaviceps*), great horned owl (*Bubo virginianus*), Gambel's quail (*Callipepla gambelii*), cactus wren (*Campylorhynchus brunneicapillus)*, pyrrhuloxia (*Cardinalis sinuatus),* house finch (*Carpodacus mexicanus*), gilded flicker (*Colaptes chrysoides*), Gila woodpecker (*Melanerpes uropygialis*), brown-headed cowbird (*Molothrus ater*), ash-throated flycatcher (*Myiarchus cinerascens*), brown-crested flycatcher (*Myiarchus tyrannulus*), western screech-owl (*Otus kennicottii*), common poorwill (*Phalaenoptilus nuttallii*), canyon towhee (*Pipilo fuscus*), black-tailed gnatcatcher (*Polioptila melanura*), purple martin (*Progne subis*), curve-billed thrasher (*Toxostoma curvirostre*), white-winged dove (*Zenaida asiatica*), and mourning dove (*Zenaida macroura*).

Mammals

Of the 26 species of mammals observed in the Tucson Mountain District, there were 9 species of small mammals, 15 species of medium and large mammals, and 3 species of bats. The small mammal species observed during the 2001 inventory include Harris' antelope ground squirrel (*Ammospermophilus harrisi*), Bailey's pocket mouse (*Chaetodipus baileyi*), desert pocket mouse (*Chaetodipus penicillatus*), rock pocket mouse (*Chaetodipus intermedius*), Merriam's kangaroo rat (*Dipodomys merriami*), white-throated woodrat (*Neotoma albigula*), Arizona pocket mouse (*Perognathus amplus*), brush mouse (*Peromyscus boylii*), and cactus mouse (*Peromyscus eremicus*). During the 2002 inventory, small mammal surveys were not conducted in the Tucson Mountain District.

The medium and large mammal species observed in the 2001 inventory include the feral dog (*Canis familiaris*), coyote (*Canis latrans*), mountain lion (*Felis concolor*), black-tailed jackrabbit (*Lepus californicus*), hooded skunk (*Mephitis macroura*), striped skunk (*Mephitis mephitis*), mule deer (*Odocoileus hemionus*), desert cottontail (*Sylvilagus audubonii*), and badger (*Taxidea taxus*). The 2001 and 2002 inventories observed the hog-nosed skunk (*Conepatus mesoleucus*), collared peccary (*Pecari tajacu*), western spotted skunk (*Spilogale gracilis*), and gray fox (*Urocyon cinereoargenteus*). In 2002, a bobcat (*Lynx rufus*) was also observed.

In 2001, the western pipistrelle bat (*Pipistrellus hesperus*) was observed in the Tucson Mountain District. In both the 2001 and 2002 inventories, the California leaf-nosed bat (*Macrotus californicus*) and cave bat (*Myotis velifer*) were observed in the district.

Reptiles

There are 29 species of reptiles reported for the Tucson Mountain District of Saguaro National Park. In the 2001 inventory the following species were observed: glossy snake (*Arizona elegans*), sidewinder (*Crotalus cerastes*), Mojave rattlesnake (*Crotalus scutulatus*), eastern collared lizard (*Crotaphytus collaris*), long-nosed leopard lizard (*Gambelia wislizenii*), gopher snake (*Pituophis catenifer*), and western patch-nosed snake (*Salvadora hexalepis*). In both the 2001 and 2002 inventories, the following species were observed: zebra-tailed lizard (*Callisaurus draconoides*), Sonoran spotted whiptail lizard (*Cnemidophorus sonorae*), tiger whiptail lizard (*Cnemidophorus tigris*), western banded gecko (*Coleonyx variegatus*), western diamondback rattlesnake (*Crotalus atrox*), black-tailed rattlesnake (*Crotalus molossus*), tiger rattlesnake (*Crotalus tigris*), desert iguana (*Dipsosaurus dorsalis*), Gila monster (*Heloderma suspectum*), common lesser earless lizard (*Holbrookia maculata*), nightsnake (*Hypsiglena torquata*), western threadsnake (*Leptotyphlops humilis*), coachwhip (*Masticophus flagellum*), regal horned lizard (*Phrynosoma solare*), long-nosed snake (*Rhinocheilus lecontei*), Clark's spiny lizard (*Sceloporus clarkii*), desert spiny lizard (*Sceloporus magister*), ornate tree lizard (*Urosaurus ornatus*), and common side-blotched lizard (*Uta stansburia*). The 2002 inventory observed three additional species including the Sonoran whipsnake (*Masticophis bilineatus*), Sonoran coral snake (*Micruroides euryxanthus*), and western lyre snake (*Trimorphodon biscutatus*).

Amphibians

There are four species of amphibians reported within the Tucson Mountain District of Saguaro National Park. In the 2001 inventory, the Great Plains toad (*Bufo cognatus*) and red-spotted toad (*Bufo punctatus*) were observed. In both the 2001 and 2002 inventories, the Colorado River toad (*Bufo alvarius*) and Couch's spadefoot toad (*Scaphiopus couchi*) were observed.

Special-Status Species

Under the Endangered Species Act of 1973, as amended, an endangered species is defined as any species in danger of extinction throughout all or a significant portion of its range. A threatened species is defined as any species likely to become an endangered species in the foreseeable future throughout all or a significant portion of its range.

The U.S. Fish and Wildlife Service was contacted for a list of special-status species and provided a Web site (http://arizonaes.fws.gov) containing a list of threatened and endangered species, species of concern, and designated critical habitats of Pima County that may be affected by the proposed action to improve the intersection of Kinney Road with Sandario Road in Saguaro National Park (appendix E) (USFWS 2003). The Arizona Game and Fish Department also provided a list of state special-status species potentially associated with the project area and documented to occur within a two-mile radius of the project area (appendix F).

Following analysis of potential habitat and species in the project area based on the lists provided by the U.S. Fish and Wildlife Service and the Arizona Game and Fish Department,

the cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*), lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*), Sonoran Desert tortoise (*Gopherus agassizii* pop 2), Pima Indian mallow (*Abutilon parishii*), Thornber's fishhook (*Mammillaria thornberi*), tumamoc globeberry (*Tumamoca macdougalii*), desert night-blooming cereus (*Peniocereus greggii* var. *greggii*), Mexican broomspurge (*Chamaesyce gracillima*), and kelvin cholla (*Opuntia X kelvinensis*) are the species that could potentially occur in the project area. These species are discussed below in further detail. The Saguaro National Park resources management staff conducted a special-status vegetation survey within the proposed disturbance area on October 23, 2003. No special-status vegetation species were observed (Holden 2004). Other species were eliminated due to the lack of habitat in the project area. Appendix E contains the full list of federal threatened, endangered, and special-status species and explains why some listed species were not considered further in this document.

Cactus Ferruginous Pygmy-Owl

The cactus ferruginous pygmy-owl was listed as endangered under the Endangered Species Act of 1973, as amended, on March 10, 1997 (62 *Federal Register* 10730). The species' range is limited, with resident birds occurring in south-central Arizona, south through northwestern Mexico to Michoacan, and southern Texas south to Nuevo Leon and Tamaulipas (NatureServe 2003b). In Arizona, the cactus ferruginous pygmy-owl is mainly associated with Sonoran desertscrub habitat, especially along washes with dense xeroriparian mesquite (*Prosopis velutina*), paloverde, desert ironwood, desert hackberry, and catclaw acacia (*Acacia greggii*). In the Tucson area, the species is found in low-density residential areas dominated by saguaro and foothill paloverde, ironwood, and velvet mesquite, often in areas augmented by irrigation and non-native vegetation. In the past, the cactus ferruginous pygmy-owl was more common in riparian cottonwood-willow forests (*Populus* spp. – *Salix* spp.) (NatureServe 2003b). The cactus ferruginous pygmy-owl breeding season occurs from February 1 through July 31. Clutch size ranges from two to five eggs (usually three to four). Female cactus ferruginous pygmy-owls incubate the eggs for about 28 to 30 days. Young are tended by both parents and can generally fly after approximately 27 to 30 days (NatureServe 2003b).

FIGURE 5. CACTUS FERRUGINOUS PYGMY-OWL

Decline of the cactus ferruginous pygmy-owl in the United States can be primarily attributed to the destruction and modification of riparian and desertscrub habitat from urban and agricultural encroachment, wood cutting, water diversion, channelization, livestock overgrazing, groundwater pumping, and hydrological changes resulting from land-use practices such as damming (i.e., the construction of dams has inundated potential habitat) (NatureServe 2003b, 59 *Federal Register* 63975).

Habitat for the cactus ferruginous pygmy-owl occurs throughout the Sandario/Kinney Road project area. SWCA Environmental Consultants, contracted by Pima County Department of Transportation, has completed the first year of cactus ferruginous pygmy-owl surveys for this project. Survey results indicated that although potential nest cavities were observed in saguaros in the upland areas within the project area, there were no cactus ferruginous pygmy-owls detected within or near the project area in 2003 (SWCA 2003). SWCA Environmental Consultants will complete the second year of surveys, recommended by the U.S. Fish and Wildlife Service, in the spring of 2004.

Lesser Long-Nosed Bat

The lesser long-nosed bat was listed as endangered under the Endangered Species Act of 1973, as amended, on September 30, 1988 (59 *Federal Register* 38456). The species is known to occur from Oaxaca and Veracruz, Mexico, to Baja California, Sonora, western Chihuahua, and Nuevo Leon, north to several localities in south-central and southeastern Arizona, including Saguaro National Park (NatureServe 2003d). The lesser-long nosed bat is associated with desertscrub and wooded mountain habitats. In the United States, it roosts in abandoned mines and caves at the base of mountains near vegetated alluvial fans that support agave, yucca, saguaro, and organ pipe cactus. Young are born primarily in large maternity colonies found in caves and mines. One pup is born in early May to late June, and most can fly by the end of June. Maternity colonies, which can number in the thousands, usually break up by the end of July. The lesser long-nosed bat is threatened by the disturbance of roosts, the loss of food sources through land clearing and human exploitation, and direct killing by humans (NatureServe 2003d).

FIGURE 6. LESSER LONG-NOSED BAT

The lesser long-nosed bat is known to occur in the Rincon Mountain District of Saguaro National Park (NatureServe 2003d). Foraging habitat for the species occurs in the Sandario / Kinney Road project area. The species has never been documented in the Tucson Mountain District; surveys for roosts were conducted in 1991 and 2003 (Sidner 1991, Wolf and Dalton 2003).

Sonoran Desert Tortoise

The Sonoran Desert tortoise is listed as a species of concern under the Endangered Species Act and a wildlife species of concern by the state of Arizona. Desert tortoises are distributed from southeastern California, southern Nevada, and extreme southwestern Utah, through western and southern Arizona and northern Mexico (NatureServe 2003c). In the Sonoran Desert, tortoises generally occupy a habitat of paloverde-mixed cactus or saguaro-ocotillo cacti associations and are often found on the north-northwest sides of upper bajadas and steeper slopes at an elevation of 2,700 to 4,000 feet (NatureServe 2003c). These Sonoran Desert tortoises often dwell within rock crevices and under boulders, rather than digging deep burrows and are more active during early spring through fall (NatureServe 2003c).

FIGURE 7. DESERT TORTOISE

The desert tortoise exhibits significant morphological and genetic variation throughout the range (NatureServe 2003c). The Sonoran Desert tortoise has a low domed, pear shaped carapace, with a narrower width in the front of the shell than the Mojave Desert tortoise (NatureServe 2003c). Tortoises of the Sonoran Desert also have large scales on the dorsum of the head and sharply wedge-shaped snouts (NatureServe 2003c). Sonoran Desert tortoises in Arizona typically lay a single egg clutch in late spring (NatureServe 2003c). Hatchlings of the Sonoran Desert morph are typically darker brown with smooth outer surfaces when compared to hatchlings of the Mojave Desert (NatureServe 2003c).

The primary vegetative association used by the Sonoran Desert tortoise is the paloverde–saguaro association. The project area exhibits this vegetative association; therefore, habitat for the Sonoran Desert tortoise lies within the project area.

Pima Indian Mallow

Pima Indian mallow is listed as a species of concern under the Endangered Species Act and a special-status species, salvage restricted under the Arizona Native Plant Law (1999) (appendix F). Salvage restricted means collection of the species is allowed only with a permit from the Arizona Department of Agriculture. Pima Indian mallow is a rare herbaceous perennial thought to be endemic to Arizona (Rondeau et al. 1996). In the Tucson Mountains, a few plants have been found on rocky slopes and in steep rocky drainages (Rondeau et al. 1996) between 2,500 to 4,850 feet (ARPC 2002). In a survey conducted by park staff, no plants of this species were found in the project area (Holden 2004).

Thornber's Fishhook Cactus

The Thornber's fishhook cactus is salvage restricted as defined by the Arizona Native Plant Law (1999) (appendix F). Thornber's fishhook cactus is an uncommon, small cactus found from 2,200 to 2,350 feet on fine-soiled lower bajadas (Rondeau et al. 1996), and is unusual in that its clumps are actually single non-branching stems. In a survey conducted by park staff, no plants of this species were found in the project area (Holden 2004).

Tumamoc Globeberry

The tumamoc globeberry is a special-status species of Arizona, salvage restricted. Tumamoc globeberry is an uncommon vine, scattered through the Tucson Mountains around 2,150 to 2,600 feet, but is easily missed because it climbs into trees and shrubs (Rondeau et al. 1996). In past surveys, this species has been found on western bajadas in the Tucson Mountain District

(ARPC 2002). In a survey conducted by park staff, no plants of this species were found in the project area (Holden 2004).

Desert Night-Blooming Cereus

The desert night-blooming cereus is a species of concern under the Endangered Species Act. Desert night-blooming cereus is a slow growing plant with a large rhizome and roots ranging from 5 to 15 pounds (NatureServe 2003e). This species is found on flats and in washes around 2,450 to 2,600 feet (Rondeau et al. 1996) and is difficult to locate because it grows into shrubs and resembles one of the stems of the plant. In a survey conducted by park staff, no plants of this species were found in the project area (Holden 2004).

Mexican Broomspurge

The Mexican broomspurge is a U.S. Forest Service sensitive species. Mexican broomspurge is found in the western Mexico desert from Jalisco through Sonora to central-southern Arizona in Pima County, occurring as a summer ephemeral on altered soils, streambanks, and gravelly or rocky slopes (NatureServe2003a). In Pima County, the species is found in the Tucson Mountains and Tohono O'odham Indian Reservation from 2,000 to 2,500 feet (Kearney and Peebles 1960). In a survey conducted by park staff, no plants of this species were found in the project area (Holden 2004).

Kelvin Cholla

Kelvin cholla is a hybrid cholla of *Opuntia fulgida* and *Opuntia spinosior.* This Arizona local stem succulent is uncommon, but can be found on rocky slopes and bajadas from 2,300 to 2,600 feet (Rondeau et al. 1996). The Kelvin cholla is salvage restricted as defined by the Arizona Native Plant Law (1999) (appendix F). In a survey conducted by park staff, no plants of this species were found in the project area (Holden 2004).

Soils

Soils of Saguaro West are classified as hyperthermic arid in the lower elevations and thermic semi-arid in the low to intermediate elevations. Most soils are deep, ranging from moderately fine to moderately coarse textured, nearly level to sloping soils (Hendricks 1985). A recent soil survey was conducted of the eastern portion of Pima County, Arizona, and the soil classifications within the project corridor are discussed below (USDA 2003).

Pinaleno Very Cobbly Sandy Loam

This soil type lies in the disturbance area for the proposed project and immediately adjacent to Sandario and Kinney Roads. This soil type is very deep and well drained with a typical surface cover of 30% cobble and stones and 20% gravel. This type occurs on gently sloping fan terraces with a slope ranging from 1% to 8%, at elevations of 2,200 to 3,450 feet. The permeability of this type is moderately slow and runoff is medium. The hazard of erosion is slight. The Pinaleno soil type is in capability subclass VIIs; defined as having severe limitations

that make the soil type unsuitable for cultivation with limitations stemming from the rooting zone of the soil (USDA 2003).

Saguaro-Rock Outcrop Complex

This soils type exists in rock outcroppings along the northeast side of Kinney Road, several hundred feet from the road. The surface cover of this complex is typically 45% Saguaro extremely gravelly fine sandy loam and 30% Rock outcrop. The Saguaro soil is very shallow and well drained. This complex is found on moderately-steep to steep mountains with a slope ranging from 15% to 45%, at elevations of 2,000 to 3,800 feet. The permeability of the Saguaro soil is moderately rapid and runoff is very rapid. The hazard of erosion is moderate to severe. The Saguaro soil is in capability subclass VIIe; defined as having severe limitations that make the soil type unsuitable for cultivation with limitations due to the soil type's susceptibility to erosion. The Rock outcrop is in capability class VIII; defined as having limitations precluding the type's use for commercial plant production and limiting use for recreation, wildlife, water supply, or esthetic purposes (USDA 2003).

Floodplains

Stormwater runoff from an unnamed tributary to Brawley Wash flows over Sandario Road just south of the intersection with Kinney Road. The wash is an ephemeral stream, typically dry, experiencing flows only in response to precipitation events. The wash has a drainage area of approximately 71 acres and is approximately 4,000 feet in length. The slope of the wash remains fairly constant throughout its length at 4.25%. The channel has a sandy bottom with some rock outcroppings and is lined with desert shrubs and trees. The peak discharge from the wash at Sandario Road was calculated to be approximately 415 cubic feet per second.

Socioeconomics

The site lies in Pima County, Arizona, outside the city of Tucson. Socioeconomic conditions in the area are favorable, with unemployment in Pima County in April of 2004 at 4.2%, compared to a national unemployment rate of 5.6% (Tucson Planning Department 2004). Approximately 18,828 businesses were listed in the county according to the 2001 census with 293,987 employees and annual payrolls totaling $8,326,773 (U.S. Census Bureau 2004). The average wage for employees is approximately $32,600.

Local businesses in the vicinity of Sandario Road number approximately 30 and include gift shops, a museum, realtors, convenience stores, hardware stores, grocers, a hair stylist, auto repair, gas station, restaurants, a fire department, a gravel and rock supplier, and a feed store.

Public Use and Experience

The National Park Service recorded a total of 642,457 recreational visitors for both districts of Saguaro National Park during the 2002 fiscal year. With the change in designation from national monument to national park in 1994, public use has expanded from primarily local and

regional residents to users from around the nation and world. Peak visitation to the park occurs during the months of January, February, and March (Hill 2003).

The Tucson Mountain District is a day use destination. The park is open from 7:00 A.M. to sunset. Popular recreational activities include auto touring, bird watching, hiking, nature walks, and wildlife viewing. The park also offers a number of educational programs to enhance public understanding and appreciation of the resource. Activities in the Tucson Mountain unit include guided hikes, nature walks, and talks. There are also a variety of educational brochures and books available at the Red Hills Visitor Center (NPS 2002b).

Red Hills Visitor Center is open year round from 9:00 A.M. to 5:00 P.M. The Red Hills Visitor Center recorded 170,719 visitors for the 12-month period from September 2002 through August 2003. The visitor center is located on Kinney Road. Kinney Road is narrow and winding with several opportunities to pull off the road and enjoy nature trails. Visitors driving the road typically are slow moving to allow opportunities to view the park and pull into designated parking areas. The Kinney Road traffic counter recorded 150,048 vehicles for the 12-month period from September 2002 through August 2003, for an average of 12,504 vehicles per month or approximately 417 vehicles per day.

Currently, visitors traveling southbound on Sandario Road cannot access the park from the intersection of Sandario Road and Kinney Road. There is a sign prohibiting left-hand turns onto Kinney Road. The signage indicating how to get to the Red Hills Visitor Center without making this turn is confusing and visitors may have difficulty determining the correct route for getting to the visitor center.

The average daily traffic on Sandario Road is 2,100 vehicles (Robert Peccia and Associates 1999). This number has steadily increased in recent years as the suburbs of the city of Tucson expand to surround the park. There is little variation in traffic volume during the year. A recent informal survey of average daily traffic on Sandario Road in the project vicinity indicated that the highest amount of vehicles (with 176 non-commercial vehicles and 43 commercial vehicles) commute along Sandario Road between 8:00 A.M. and 9:00 A.M. Traffic consists of park visitors and local commuters. Sight distance along the road is limited due to the presence of dips in the road.

During a three-year study of traffic safety in Saguaro National Park from 1996–1998, 16 accidents occurred at the intersection of Sandario and Kinney Roads. Eight of the accidents were injury accidents with a total of 24 injuries (Robert Peccia and Associates 1999).

Pima County traffic records of the Sandario / Kinney Roads intersection report that from January 2000 through December 2002, 18 traffic accidents occurred (Pima County DOT 2003). Park records for the same period of time indicate that of the 18 accidents, 11 occurred as collisions between two vehicles due to visibility problems associated with the dip in Sandario Road.

Traffic noise from roadway vehicles is generated by the engine, tire-roadway interaction, brakes, vehicle vibration, and air disturbance. Roadway traffic noise is influenced by vehicle speed, volume, auto-truck mix, and roadway grades. The effects of traffic noise on

surrounding areas depends on the noise levels generated, background noise levels, intervening terrain, and nature of land uses.

Ambient noise levels along Kinney Road in the project vicinity are generally low due to the light traffic volumes, the unpopulated nature of the park, and the lack of large vehicle traffic. However, noise would be noticeable closer to the project area, as Kinney Road and Sandario Road converge near the project area (about 500 feet apart). Visitors and wildlife may not notice or experience effects of background human-caused noise. Noise levels on Sandario Road are higher than on Kinney Road due to the higher volume of traffic. The traffic speeds are also higher on Sandario Road and there is more truck traffic; both conditions result in increased noise levels for Sandario Road.

Park Operations

Park operations include ranger patrols, guided walks, public information and orientation, resource management, building and infrastructure maintenance, and other activities. Park operations refer to the quality and effectiveness of the infrastructure and the ability to maintain the infrastructure used in the operation of the park in order to adequately protect and preserve vital resources and provide for a safe and enjoyable visit.

Saguaro National Park staff maintain Kinney Road, but Pima County Department of Transportation is responsible for maintaining Sandario Road. There are three full-time and one part-time rangers assigned to Saguaro West. These rangers patrol all of the roads, enforce the traffic laws, and respond to and investigate traffic accidents with the assistance of Pima County Sheriffs Department as needed. Saguaro West rangers are typically first responders to accidents on Kinney Road and Sandario Road.

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This section describes the environmental consequences associated with the alternatives. It is organized by impact topics, which bring together the issues and concerns into distinct topics for discussion analysis. These topics focus on the presentation of environmental consequences, and allow a standardized comparison between alternatives based on the most relevant topics. NEPA requires consideration of context, intensity, and duration of impacts; direct or indirect impacts; cumulative impacts; and measures to mitigate for impacts. National Park Service policy also requires that impairment of resources be evaluated in all environmental documents.

METHODOLOGY

Overall, the National Park Service based these impact analyses and conclusions on the review of existing literature and Saguaro National Park studies, information provided by experts within Saguaro National Park and other agencies, professional judgments and park staff insights, and public input.

The following definitions were used to evaluate the context, intensity, type, duration, and cumulative nature of impacts associated with project alternatives:

- *Context.* Context is the setting within which an impact is analyzed such as local, parkwide, or regional. The Council on Environmental Quality requires that impact analysis include discussions of context.

- *Impact Intensity*. Impact intensity is the degree to which a resource would be affected ranging from negligible, minor, moderate, to major. The criteria that were used to rate the intensity of the impacts for each resource topic are presented later in this section under each resource topic heading.

- *Type of Impact*. Impacts can be beneficial or adverse. Beneficial impacts would improve resource conditions while adverse impacts would deplete or negatively alter resources.

- *Duration.* The duration of the impacts in this analysis is defined as short term or long term. The duration for each resource topic is presented later in this section under each resource topic heading.

The following definitions of direct and indirect impacts are considered:

- direct – an effect that is caused by an action and occurs at the same time and place
- indirect – an effect that is caused by an action, but is later in time or farther removed in distance, but still reasonably foreseeable

IMPACT INTENSITY DEFINITIONS

Vegetation

Information on vegetation and vegetation communities potentially impacted in the park project area was compiled. Predictions about short- and long-term site impacts were based on previous projects with similar vegetation and recent studies. The thresholds of change for the intensity of an impact to vegetation are defined as follows:

Impact Intensity	Intensity Definition
Negligible	No native vegetation would be affected or some individual native plants could be affected as a result of the alternative, but there would be no effect on native species populations. The effects would be on a small scale.
Minor	The alternative would affect some individual native plants and would also affect a relatively limited portion of that species' population. Mitigation to offset adverse effects could be required and would be effective.
Moderate	The alternative would affect some individual native plants and would also affect a sizeable segment of the species' population over a relatively large area. Mitigation to offset adverse effects could be extensive, but would likely be successful.
Major	The alternative would have a considerable effect on native plant populations and affect a relatively large area in and out of the park. Mitigation measures to offset the adverse effects would be required, extensive, and success of the mitigation measures would not be guaranteed.

Duration of vegetation impacts is considered short term if the vegetation recovers in less than three years and long term if the vegetation takes longer than three years to recover.

Wildlife

The National Park Service Organic Act, which directs parks to conserve wildlife unimpaired for future generations, is interpreted by the agency to mean that native wildlife should be protected and perpetuated as part of the park's natural ecosystem. Natural processes are relied on to control populations of native species to the greatest extent possible; otherwise, they are protected from harvest, harassment, or harm by human activities. According to *NPS Management Policies 2001,* the restoration of native species is a high priority (sec. 4.1). Management goals for wildlife include maintaining components and processes of naturally evolving park ecosystems, including natural abundance, diversity, and the ecological integrity of plants and animals. Information on Saguaro National Park wildlife was taken from park documents and records. The Saguaro National Park natural resource management staff, the U.S. Fish and Wildlife Service, and the Arizona Game and Fish Department also provided wildlife information. The thresholds of change for the intensity of an impact to wildlife are defined as follows:

Impact Intensity	Intensity Definition
Negligible	There would be no observable or measurable impacts to native species, their habitats, or the natural processes sustaining them. Impacts would be well within natural fluctuations.
Minor	Impacts would be detectable, but they would not be expected to be outside the natural range of variability. Mitigation measures, if needed to offset adverse effects, would be simple and successful.
Moderate	The proposed project would occur during particularly vulnerable life stages such as migration or juvenile stages; mortality or interference with activities necessary for survival can be expected on an occasional basis, but is not expected to threaten the continued existence of the species in the park unit. Impacts on native species, their habitats, or the natural processes sustaining them would be detectable. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.
Major	The proposed project would occur during particularly vulnerable life stages such as migration or juvenile stages; mortality or interference with activities necessary for survival can be expected, and might threaten the continued existence of the species in the park unit. Impacts on native species, their habitats, or the natural processes sustaining them would be detectable. Loss of habitat might affect the viability of at least some native species. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.

The duration of wildlife impacts is considered short term if the recovery is less than one year and long term if the recovery is longer than one year.

Special-Status Species

The Endangered Species Act (16 USC 1531 *et seq.*) mandates that all federal agencies consider the potential effects of their actions on species listed as threatened or endangered. If the National Park Service determines that an action may affect a federally listed species, consultation with the U.S. Fish and Wildlife Service is required to ensure that the action will not jeopardize the species' continued existence or result in the destruction or adverse modification of critical habitat. *NPS Management Policies 2001* state that potential effects of agency actions will also be considered on state or locally listed species. The National Park Service is required to control access to critical habitat of such species, and to perpetuate the natural distribution and abundance of these species and the ecosystems upon which they depend. The U.S. Fish and Wildlife Service and Arizona Game and Fish Department were contacted for a list of special-status species and designated critical habitats that may be within the project area or affected by any of the alternatives (see appendices E and F, respectively). Information on possible threatened, endangered, candidate species, and species of special concern was gathered from published sources. Information from prior research at Saguaro National Park was also incorporated. Known impacts caused by development and human use were also considered. The thresholds of change for the intensity of an impact to special-status species are defined as follows:

Impact Intensity	Intensity Definition
Negligible	The action could result in a change to a population or individuals of a species or designated critical habitat, but the change would be so small that it would not be of any measurable or perceptible consequence and would be well within natural variability. This impact intensity equates to a U.S. Fish and Wildlife Service "may affect, not likely to adversely affect" determination.
Minor	The action could result in a change to a population or individuals of a species or designated critical habitat. The change would be measurable, but small and localized and of little consequence. Mitigation measures, if needed to offset the adverse effects, would be simple and successful. This impact intensity equates to a U.S. Fish and Wildlife Service "may affect, not likely to adversely affect" determination.
Moderate	Impacts on special-status species, their habitats, or the natural processes sustaining them would be detectable and occur over a large area. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful. This impact intensity equates to a U.S. Fish and Wildlife Service "may affect, likely to adversely affect" determination.
Major	The action would result in a noticeable effect to viability of a population or individuals of a species or resource or designated critical habitat. Impacts on a special-status species, critical habitat, or the natural processes sustaining them would be detectable, both in and out of the park. Loss of habitat might affect the viability of at least some special-status species. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed. This impact intensity equates to a U.S. Fish and Wildlife Service "may affect, likely to jeopardize the continued existence of a species or adversely modify critical habitat for a species" determination.

Special-status species' impacts are considered short term if the species recovers in less than one year and long term if it takes longer than one year for the species to recover.

Soils

Information on soils potentially impacted was compiled. Predictions about short- and long-term site impacts were based on previous projects with similar soils and recent studies. The thresholds of change for the intensity of an impact are defined as follows:

Impact Intensity	Intensity Definition
Negligible	Soils would not be affected or the effects to soils would be below or at the lower levels of detection. Any effects to soils would be slight and erosion would not be noticeable.
Minor	The effects to soils would be detectable. Effects to soil area, including soil disturbance and erosion, would be small and localized. Minimal soil loss would occur. Mitigation may be needed to offset adverse effects and would be relatively simple to implement and likely be successful.
Moderate	The effect on soils would be readily apparent and result in a change to the soil character over a relatively wide area, soil disturbance over a wide area or erosion that extends beyond the project limits and/or results in some soil loss. Mitigation measures would be necessary to offset adverse effects and likely be successful.
Major	The effect on soils would be readily apparent and substantially change the character of soils over a large area, substantial erosion would occur resulting in a large soil loss. Mitigation measures to offset adverse effects would be needed, extensive, and their success could not be guaranteed.

Soil impacts would be considered short term if the soils recover in less than three years and long term if the recovery takes longer than three years.

Floodplains

The National Park Service has adopted the policy of preserving floodplain values and minimizing potentially hazardous conditions associated with flooding (NPS *Floodplain Management Guideline* July 1, 1993). The thresholds of change for the intensity of an impact to floodplains are defined as follows:

Impact Intensity	Intensity Definition
Negligible	There would be no change in the ability of a floodplain to convey floodwaters or its values and functions. Project would not contribute to the flood.
Minor	Changes in the ability of a floodplain to convey floodwaters, or its values and functions, would be measurable and local, although the changes would be barely measurable. The project would not contribute to the flood. No mitigation would be needed.
Moderate	Changes in the ability of a floodplain to convey floodwaters, or its values and functions, would be measurable and local. The project could contribute to the flood. The impact could be mitigated by modification of proposed facilities in floodplains.
Major	Changes in the ability of a floodplain to convey floodwaters, or its values and functions, would be measurable and widespread. The project would contribute to the flood. The impact could not be mitigated by modification of proposed facilities in floodplains.

Impacts would be considered short term if they are only measurable during construction and long term if impacts remain after construction.

Socioeconomics

Potential socioeconomic issues were identified through discussion with park staff and the local business survey, focusing primarily on the potential effects to local businesses as a result of the Sandario Road closure and Kinney Road detour. The thresholds for evaluating socioeconomic impacts are defined as follows.

Impact Intensity	Intensity Definition
Negligible	No effects would occur to socioeconomic conditions or effects would be below the level of detection.
Minor	The effects to socioeconomic conditions would be detectable, although small. Mitigation to offset potential adverse effects, if needed, would be simple and successful.
Moderate	The effects to socioeconomic conditions would be readily apparent and result in changes to socioeconomics on a small scale. If mitigation is needed to offset potential adverse effects, it could be extensive, but would likely be successful.

Major	The effects to socioeconomic conditions would be readily apparent and would cause substantial changes to socioeconomic conditions in the region. Mitigation measures to offset potential adverse effects would be extensive and their success could not be guaranteed.

Socioeconomic impacts are considered short term if they last for the duration of the project and long term if they last beyond the duration of the project.

Public Use and Experience

NPS Management Policies 2001 state that the enjoyment of park resources and values by the people of the United States is part of the fundamental purpose of all parks and that the National Park Service is committed to providing appropriate, high-quality opportunities for visitors to enjoy the parks.

Part of the purpose of Saguaro National Park is to offer opportunities for recreation, education, inspiration, and enjoyment. Consequently, one of the park's management goals is to ensure that visitors safely enjoy and are satisfied with the availability, accessibility, diversity, and quality of park facilities, services, and appropriate recreational opportunities.

The impact on the ability of the public to experience the full range of Saguaro National Park resources was analyzed by examining resources and objectives presented in the park significance statement. The potential for change in public use and experience proposed by the alternatives was evaluated by identifying projected increases or decreases in using Sandario and Kinney Roads and other public uses, and determining whether or how these projected changes would affect the desired public experience and to what degree and for how long. The thresholds of change for the intensity of an impact to public experience are defined as follows:

Impact Intensity	Intensity Definition
Negligible	The public would not be affected or changes in public use and/or experience would be below or at the level of detection. The public would not likely be aware of the effects associated with the alternative.
Minor	Changes in public use and/or experience would be detectable, although the changes would be slight. Some of the public would be aware of the effects associated with the alternative, but the effects would be slight and not noticeable by most visitors.
Moderate	Changes in public use and/or experience would be readily apparent to most of the public. The public would be aware of the effects associated with the alternative and might express an opinion about the changes. Mitigation to offset impacts could be easily implemented and there are alternatives available for the public use and experience.
Major	Changes in public use and/or experience would be readily apparent to all of the public, severely adverse or exceptionally beneficial. The public would be aware of the effects associated with the alternative and would likely express a strong opinion about the changes. Mitigation measures for adverse effects would be required and extensive. No alternatives are available for public use and experience.

Impacts to public use and experience are considered short term if the effects last only as long as the construction period. Impacts are considered long term if the effects last longer than the construction period.

Park Operations

Park operations, for the purpose of this analysis, refers to the quality and effectiveness of Sandario and Kinney Roads, and the ability to maintain the roads used in the operation of the park in order to adequately protect and preserve vital resources and provide for an effective public experience. This includes an analysis of the condition and usefulness of the facilities such as road intersections, turnouts, parking areas, and safety features.

Park staff knowledgeable of these issues were members of the planning team that evaluated the impacts of each alternative. Impact analysis is based on the current description of park operations presented in the "Affected Environment" section of this document. The thresholds of change for the intensity of an impact to park operations are defined as follows:

Impact Intensity	Intensity Definition
Negligible	Park operations would not be affected, or the effects would be at low levels of detection and would not have an appreciable effect on park operations.
Minor	The effect would be detectable, but would be of a magnitude that would not have an appreciable effect on park operations. If mitigation was needed to offset adverse effects, it would be simple and likely successful.
Moderate	The effects would be readily apparent and would result in a substantial change in park operations in a manner noticeable to park staff and the public. Mitigation measures would be necessary to offset adverse effects and would likely be successful.
Major	The effects would be readily apparent and would result in a substantial change in park operation in a manner noticeable to park staff and the public and be markedly different from existing operations. Mitigation measures to offset adverse effects would be needed, would be extensive, and their success could not be guaranteed.

The effects to park operations would be considered short term if they last only as long as construction activities and long term if they last longer than construction activities.

CUMULATIVE EFFECTS

The Council on Environmental Quality regulations that implement NEPA, require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative effects are the impacts on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative effects can result from individually minor, but collectively major, actions taking place over a period of time (40 CFR 1508.7).

Cumulative impacts are considered for all alternatives and are presented at the end of each impact topic discussion analysis.

Projects That Make Up The Cumulative Impact Scenario

To determine potential cumulative impacts, projects in the area surrounding Saguaro National Park were identified. Potential projects identified as cumulative actions included any planning or development activity that was currently being implemented or that would be implemented in the reasonably foreseeable future.

These cumulative actions are evaluated in the cumulative impact analysis in conjunction with the impacts of each alternative to determine if they would have any additive effects on a particular natural resource, cultural resource, public use, or the socioeconomic environment.

Since the Tucson Mountain District is located in an area close to the city of Tucson, cumulative effects were evaluated based on past, present, and reasonably foreseeable future actions associated with growth of the Tucson metropolitan area and planning projects within Pima County in the vicinity of the park. A search yielded no new development projects in the vicinity of the proposed project. Past, present, and reasonably foreseeable future activities associated with park planning were also evaluated. Only one project was identified by park staff. Following is a list of the past, present, and reasonably foreseeable future projects with the potential to provide cumulative effects.

- *Land use changes in response to population growth in the Tucson metropolitan area.* The greater Tucson metropolitan area has a population of approximately 885,000 and is projected to grow to 1,000,000 by the year 2009 (Tucson Planning Department 2001). The metro area occupies the 30 miles that separate both districts of the park and has largely restricted natural open spaces near both districts. Urban and suburban development would continue to bring in a greater number of residents closer to park boundaries. These developments adjacent to the park will, in turn, put more stress on park resources such as wildlife that migrate across park boundaries or vegetation communities that may be affected by escaped ornamental plants. As the population of Tucson continues to grow and open spaces continue to diminish, the park would likely experience more visitation and crowding in developed areas.

- *The Sonoran Desert Conservation Plan.* The Sonoran Desert Conservation Plan is being developed by Pima County to create a process that encompasses all of the independent natural resource planning and protection activities associated with development into one document and create one comprehensive system for completing planning and development for future growth in the county based on a concept that natural resource assessment planning should be a first step in determining urban form. The plan is not about stopping development, but rather evaluates where development should occur based on natural, historic, and cultural values (Huckelberry 2002). The plan has not been completed, adopted, or implemented by the county, but it is reasonable to predict that the plan will be adopted and implemented in the future. Since the plan has not been completed, adopted, or implemented actual beneficial or adverse effects of the plan are not fully known.

- *Chip Seal Kinney Road.* The pavement on Kinney Road consists of successive layers of chip seal. The roadway does not have a supporting substrate of aggregate base and

asphalt concrete paving. Therefore, it is essential that the seal coat be renewed on a 7-year cycle to maintain the surface in sound condition. This project consists of general construction of a variety of pavement related work on existing pavement. The work is to be performed on Kinney Road, and all paved roadside turnouts, parking areas, visitor center parking lot, residential / maintenance area access road, and parking areas. The work will include chip sealing (both conventional and polymer modified "Polychip") pavement patching and pavement striping. The project is scheduled for the summer of 2004 and would be completed before construction begins on the Sandario / Kinney Roads intersection.

Impairment of Resources or Values

In addition to determining the environmental consequences of the preferred and other alternatives, the 2001 *NPS Management Policie*s and Director's Order – 12, require analysis of potential effects to determine if actions would impair Saguaro National Park resources.

The fundamental purpose of the national park system, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. National Park Service managers must always seek ways to avoid, or minimize to the greatest degree practicable, adverse impacts on park resources and values. However, the laws do give National Park Service management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given National Park Service management discretion to allow certain impacts within parks, that discretion is limited by statutory requirement that the National Park Service must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise. The prohibited impairment is an impact that, in the professional judgment of the responsible National Park Service manager, would harm the integrity of park resources or values, including opportunities that otherwise would be present for the enjoyment of those resources or values. An impact to any park resource or value may constitute an impairment. However, an impact would more likely constitute an impairment to the extent it affects a resource or value whose conservation is:

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park
- key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park
- identified as a goal in the Saguaro National Park's *General Management Plan* or other relevant National Park Service planning documents

Impairment may result from National Park Service activities in managing the park, public activities, or activities undertaken by concessioners, contractors, and others operating in the park. In this "Environmental Consequences" section, a determination on impairment is made in the conclusion statement of each impact topic for each alternative. The National Park Service does not analyze public experience (unless impacts are resource based), traffic safety, or park operations for impairment.

ALTERNATIVE A: NO-ACTION ALTERNATIVE

Vegetation

Under the no-action alternative there would be no new ground-disturbing activities with the potential to affect vegetation and there would be no impacts to vegetation.

Cumulative Impacts. Impacts to vegetation from the past, present, and reasonably foreseeable future projects would include short- and long-term, moderate, adverse impacts from growth in the Tucson metropolitan area. The Sonoran Desert Conservation Plan, when adopted and implemented, could provide long-term beneficial impacts to native vegetation; however, these impacts cannot be quantified until the plan is completed and implemented. The cumulative effects of these past, present, and reasonably foreseeable future actions would have short- and long-term, moderate, adverse impacts; however, the no-action alternative would not contribute to these cumulative effects.

Conclusion. Under the no-action alternative there would be no new ground-disturbing activities with the potential to affect vegetation and there would be no impacts to vegetation. The cumulative effects of these past, present, and reasonably foreseeable future actions would have short- and long-term, moderate, adverse impacts; however, the preferred alternative would not contribute to these cumulative effects.

Impairment. 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 park's establishing legislation, (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 National Park Service planning documents, there would be no impairment of park resources or values related to vegetation from implementation of the no-action alternative at Saguaro National Park.

Wildlife

Under the no-action alternative, impacts to wildlife associated with the existing Sandario / Kinney Road intersection would continue without change from the current situation. Impacts would result from continued traffic on the roadway. Wildlife species crossing the roadway would continue to be subject to injury or death due to collision with vehicles. Species sensitive to human disturbance may continue to avoid the roadway due to vehicle noise and traffic or may only pass through the area when traffic had abated. In conclusion, there would be no change to wildlife from the no-action alternative; however, there would continue to be localized, short- and long-term, minor, and adverse effects to wildlife. The wildlife effects would be minor because these effects are detectable, but localized to the area of the Sandario / Kinney Roads intersection, do not affect overall species populations, and are within natural fluctuations.

Cumulative Impacts. Past, present, and reasonably foreseeable future urban and suburban development in the Tucson basin would continue to impact wildlife and its habitat. The increasing presence of humans within open space and public lands would continue to displace wildlife from their habitat, resulting in a short- and long-term, moderate, adverse impact. The Sonoran Desert Conservation Plan, when adopted and implemented, could provide long-term beneficial impacts to wildlife; however, these impacts cannot be quantified until the plan is completed and implemented. The cumulative effects of these past, present, and reasonably foreseeable future actions would have short-term and long-term, moderate, adverse impacts, potentially somewhat, but not fully, offset by the beneficial impacts of the Sonoran Desert Conservation Plan. Alternative A would result in a short- and long-term, minor, and adverse impact to wildlife. The overall impacts to wildlife from the no-action alternative, in combination with past, present, and reasonably foreseeable future actions, would be short term and long term, moderate, and adverse, with the potential of the Sonoran Desert Conservation Plan, when completed and adopted, to provide some offset to the regional adverse impacts.

Conclusion. There would be no change to wildlife from the no-action alternative; however, there would continue to be a localized, long-term, minor, and adverse effect to wildlife. The overall impacts to wildlife from the no-action alternative, in combination with past, present, and reasonably foreseeable future actions, would be short- and long-term, moderate, adverse, cumulative impacts.

Impairment. 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 park's establishing legislation, (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 National Park Service planning documents, there would be no impairment of park resources or values related to wildlife from implementation of the no-action alternative at Saguaro National Park.

Special-Status Species

Under the no-action alternative, there would be no new activities that have the potential to change the current status of the special-status species whose habitat is known to occur throughout the Sandario / Kinney Road project area. There would be no new ground-disturbing activities with the potential to impact individuals or habitat for these species. Disturbances associated with traffic noise (e.g., displacement or disruption) could continue to create localized, short- and long-term, negligible, adverse impacts to special-status wildlife species (the cactus ferruginous pygmy-owl, lesser long-nosed bat, and Sonoran Desert tortoise), although some adaptation to noise could occur. There would be no impacts to special-status vegetation species from the no-action alternative.

Cumulative Impacts. Special-status wildlife species are affected by urban and suburban development as a result of habitat destruction and fragmentation. These impacts would be short and long term, moderate, and adverse. When adopted and implemented, the Sonoran Desert Conservation Plan could provide beneficial impacts for special-status species and habitats in the long term; however, these impacts cannot be quantified until the plan is

completed and implemented. The cumulative impacts would be short term and long term, moderate, and adverse, potentially offset by potential beneficial impacts of the Sonoran Desert Conservation Plan. The no-action alternative would provide negligible contributions to these impacts and the overall cumulative impacts to the special-status wildlife species (including the no-action alternative) would be short term and long term, moderate, and adverse. The potential of the Sonoran Desert Conservation Plan, when completed and adopted, could provide some offset to regional adverse impacts. There are no cumulative impacts to special-status vegetation species as a result of the no-action alternative.

Conclusion. Disturbances associated with traffic noise (e.g., displacement or disruption) would continue to create localized, short- and long-term, negligible, adverse impacts to special-status wildlife species (the cactus ferruginous pygmy-owl, lesser long-nosed bat, and Sonoran Desert tortoise), although some adaptation to noise could occur. There would be no impacts to special-status vegetation species from the no-action alternative. The no-action alternative would provide negligible contributions to the wildlife impacts and the overall cumulative impacts to the special-status wildlife species, including the no-action alternative, would be short and long term, moderate, adverse. There are no cumulative impacts to special-status vegetation species as a result of the no-action alternative.

Impairment. 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 park's establishing legislation, (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 National Park Service planning documents, there would be no impairment of park resources or values related to special-status species from implementation of the no-action alternative at Saguaro National Park.

Soils

The no-action alternative would leave the roadway in its current condition. There would be no impact to soils from the no-action alternative.

Cumulative Impacts. Past, present, and reasonably foreseeable future urban and suburban development in the Tucson basin would continue to impact soils. Soils would be disturbed through grading and building construction. Some soils would be covered with concrete or asphalt while other areas would be restored through landscaping. The Sonoran Desert Conservation Plan, when adopted, would provide some future protection to soils. The cumulative effects of these past, present, and reasonably foreseeable future actions would have short- and long-term, moderate, adverse impacts; however, the no-action alternative would not contribute to these cumulative effects.

Conclusion. There would be no change to soils from the no-action alternative. The cumulative effects of these past, present, and reasonably foreseeable future actions would have short- and long-term, moderate, adverse impacts; however, the no-action alternative would not contribute to these cumulative effects.

Impairment. 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 park's establishing legislation, (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 National Park Service planning documents, there would be no impairment of park resources or values related to soils from implementation of the no-action alternative at Saguaro National Park.

Floodplains

The no-action alternative would not change the current impacts to floodplains from the at-grade wash crossing on Sandario Road. The presence of a less pervious road surface and the minimal change in flow patterns over the relatively short distance across the road creates a negligible impact to the floodplain and to flood flows. The no-action alternative would continue to have localized, short- and long-term, negligible, adverse impacts to the floodplain.

Cumulative Impacts. Cumulative impacts that would affect floodplains include the land-use changes in response to growth in the Tucson metropolitan area and the Sonoran Desert Conservation Plan. The growth in the Tucson metropolitan area has impacted floodplains by changing runoff and drainage patterns in floodplains throughout the area; however, the floodplain of the tributary to Brawley Wash has not been affected. The Sonoran Desert Conservation Plan would provide some protection to floodplains; however, changes in runoff and in drainage patterns would continue in developed areas outside the floodplains and would continue to affect floodplains. The cumulative effects of continued growth and the Sonoran Desert Conservation Plan would be short and long term, moderate, and adverse for floodplains. The localized impacts to floodplains from the no-action alternative would contribute negligibly to the overall cumulative impacts and the overall cumulative impacts to floodplains would be short and long term, moderate, and adverse.

Conclusion. The no-action alternative would have short- and long-term, negligible, adverse impacts to the floodplain. The localized impacts to floodplains from the no-action alternative would contribute negligibly to the overall cumulative impacts and the overall cumulative impacts to floodplains would be short and long term, moderate, and adverse.

Impairment. 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 park's establishing legislation, (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 National Park Service planning documents, there would be no impairment of park resources or values related to floodplains from implementation of the no-action alternative at Saguaro National Park.

Socioeconomics

There would be no work performed on Sandario Road and no road closures or detours under the no-action alternative. Therefore, there would be no effects to socioeconomic conditions.

Cumulative Impacts. Cumulative impacts that would affect socioeconomics include growth in the Tucson metropolitan area. The growth in the Tucson metropolitan area has impacted and would continue to impact socioeconomics of the region. Growth-related jobs such as construction would continue to provide socioeconomic benefits to the region. The cumulative effects of the continued growth would be short and long term, moderate, and beneficial for socioeconomic conditions; however, the no-action alternative would not contribute to the cumulative socioeconomic conditions.

Conclusion. There would be no impacts to socioeconomic conditions under the no-action alternative. The cumulative effects of the continued growth would be short and long term, moderate, and beneficial for socioeconomic conditions; however, the no-action alternative would not contribute to cumulative socioeconomic conditions.

Public Use and Experience

There would be no improvements to Sandario Road under the no-action alternative. The public would continue to have limited sight distance for vehicles traveling northbound on Sandario Road as they emerge from the intersection of Kinney Road and Sandario Road. The existing Sandario Road conditions would continue to promote accidents at a higher than normal rate affecting traffic safety; those accidents would likely see some increase as traffic increases on the road. The inability to make a left-hand turn onto Kinney Road while traveling southbound on Sandario Road would continue to cause public confusion regarding the location of the park entrance. There would be no change to public use and experience from the no-action alternative; however, the existing condition constitutes a short- and long-term, minor, adverse impact.

Cumulative Impacts. Cumulative impacts that could affect public use and experience relate to the growth in the Tucson metropolitan area and increases in traffic on Sandario Road, as well as the planned chip sealing of Kinney Road in 2004. Increased traffic would result in a greater potential for visitors to have a traffic accident or the decreased ability to view the scenery due to the higher speed limit on Sandario Road. The chip sealing activities would cause some traffic delays. The cumulative effects of these past, present, and reasonably foreseeable future actions would have short-term, minor, adverse impacts and long-term, negligible, adverse impacts on public use and experience. Because the no-action alternative would have short- and long-term, minor, adverse impacts to public use and experience, the overall cumulative impacts, including the no-action alternative, would be short and long term, minor, and adverse.

Conclusion. There would be no change to public use and experience from the no-action alternative; however, the existing condition constitutes a short- and long-term, minor, adverse impact. The cumulative effects of these past, present, and reasonably foreseeable future actions would have short-term, minor, adverse impacts and long-term, negligible, adverse impacts on public use and experience. Because the no-action alternative would have short- and long-term, minor, adverse impacts to public use and experience, the overall cumulative impacts, including the no-action alternative, would be short and long term, minor, and adverse.

Park Operations

The no-action alternative would result in no changes to current park operations. The park rangers would continue to patrol park roads and respond to and investigate accidents occurring on park roads. They would continue to be first responders to accidents at the intersection of Kinney and Sandario Roads. The existing condition represents a short- and long-term, minor, adverse impact to park operations as a result of responding to accidents at the intersection.

Cumulative Impacts. The other past, present, and reasonably foreseeable future action that would affect park operations is the chip sealing activities on Kinney Road. Additional park staff might be required to oversee the chip sealing process and ensure traffic is controlled, but these activities would be short term, lasting only during the extent of chip sealing operations. The chip sealing would have short-term, negligible, adverse impacts to park operations. The no-action alternative would contribute short-term, minor, adverse impacts to the cumulative impacts resulting in cumulative impacts to park operations that are short term, minor and adverse.

Conclusion. The no-action alternative would not change park operations along Sandario Road. The existing condition represents a short- and long-term, minor, adverse impact to park operations as a result of responding to accidents at the intersection. The no-action alternative would contribute short-term, minor, adverse impacts to the cumulative impacts resulting in cumulative impacts to park operations that are short term, minor, and adverse.

ALTERNATIVE B: PREFERRED ALTERNATIVE

Vegetation

Under the preferred alternative, impacts to vegetation would occur as a result of the installation of the box culvert and reconstruction of a 500-foot section of Sandario Road. Disturbance limits would be 30 feet from the road centerline in the approaches to the wash and 50 feet from the centerline within the wash. The estimated area of construction would be approximately one acre with most of the construction occurring within the already disturbed road surface and shoulders. Disturbance outside the current road maintenance and service area (i.e., the roadway and shoulders) is estimated at approximately 0.2 acre. Approximately five to ten trees and shrubs would be removed or pruned. Larger cacti, trees, and shrubs along the project site would be tagged and protected with construction fencing to ensure they are not disturbed. Impacts to vegetation from the preferred alternative would be local, short term, minor, and adverse. In the longer term, the site would be revegetated and, although the vegetation of the site may differ from the existing vegetation in size and type distribution, the long-term impacts to vegetation would be negligible and adverse.

Cumulative Impacts. Impacts to vegetation from the past, present, and reasonably foreseeable future projects would include short- and long-term, moderate, adverse impacts from growth in the Tucson metropolitan area. The Sonoran Desert Conservation Plan, when adopted and

implemented, could provide long-term beneficial impacts to native vegetation; however, these impacts cannot be quantified until the plan is completed and implemented. The cumulative effects of these past, present, and reasonably foreseeable future actions would have short- and long-term, moderate, adverse impacts; however, the preferred alternative would provide only a minimal contribution to the overall short-term cumulative impacts, and a negligible contribution to overall long-term cumulative impacts.

Conclusion. Impacts to vegetation from the preferred alternative would be local, short term, minor, and adverse. In the longer term, the site would be revegetated and there would be no long-term impacts. The preferred alternative, in association with the other past, present, and reasonably foreseeable future projects, would provide short- and long-term, moderate, and adverse impacts; however, the preferred alternative would provide only minimal short-term contributions, and negligible long-term contributions.

Impairment. 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 park's establishing legislation, (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 National Park Service planning documents, there would be no impairment of park resources or values related to vegetation from implementation of the preferred alternative at Saguaro National Park.

Wildlife

Under the preferred alternative, impacts to wildlife would be primarily associated with the construction of the box culvert and associated traffic detours onto Kinney Road. The construction work on Sandario Road would likely cause wildlife in the area to be temporarily displaced. Wildlife that use the wash as a travel route would likely avoid it during the period of construction. Noise associated with construction equipment and increased human activities would also displace wildlife in the Sandario Road project area.

Impacts would also result from the increase in traffic and associated noise on Kinney Road during the traffic detour. The traffic would be expected to increase an estimated four times over normal Kinney Road traffic through the park. (Actual traffic counts presented earlier would be somewhat decreased as some traffic would be commercial and detoured elsewhere and some commuters would seek other routes.) Traffic increases on Kinney Road would impact wildlife through increased encounters with vehicles and the associated noise would likely cause some displacement of wildlife from the area. Wildlife would have difficulty crossing Kinney Road during heavy commuter hours (primarily daylight hours) to access watering holes on the opposite side of the road. At least one watering hole located in close proximity to Kinney Road is known to be used by wildlife. Construction associated with repairs or repaving Kinney Road would also cause displacement of wildlife from the area.

The time period for these impacts would be short term and expected to last no more than three months. The impacts to wildlife from construction and traffic detours would be short term, moderate, and adverse because the impacts would be detectable and road traffic and noise could disrupt wildlife foraging and reproduction and interfere with activities necessary

for survival, such as access to water. Project impacts during construction are expected to be outside the natural range of variability; however, the activities are short term and not expected to impact the continued existence of any species population within the park. Project impacts would be short term, moderate, and adverse.

In the long term, traffic volumes on Kinney Road would return to pre-construction levels. On Sandario Road, wildlife would have an alternative to crossing the road, as the box culvert would be designed to allow wildlife passage beneath the road. The long-term impacts to wildlife from the preferred alternative would be local, minor, and beneficial.

Cumulative Impacts. Past, present, and reasonably foreseeable future urban and suburban development in the Tucson basin would continue to impact wildlife and their habitats. The increasing presence of humans within open space and public lands would continue to displace wildlife from their habitats resulting in a short- and long-term, moderate, adverse impact. The Sonoran Desert Conservation Plan, when adopted and implemented, could provide long-term beneficial impacts to wildlife; however, these impacts cannot be quantified until the plan is completed and implemented. The cumulative effects of these past, present, and reasonably foreseeable future actions would have short- and long-term, moderate, adverse impacts, potentially offset by the beneficial impacts of the Sonoran Desert Conservation Plan. The cumulative effects of these past, present, and reasonably foreseeable future actions would have short- and long-term, moderate, adverse impacts for wildlife. The overall impacts to wildlife from the preferred alternative, in combination with past, present, and reasonably foreseeable future actions, would be short term and long term, moderate, and adverse.

Conclusion. The impacts to wildlife from the preferred alternative would be short term, moderate, and adverse. The long-term impacts to wildlife from the preferred alternative would be local, minor, and beneficial. The overall impacts to wildlife from the preferred alternative, in combination with past, present, and reasonably foreseeable future actions, would be short and long term, moderate, and adverse.

Impairment. 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 park's establishing legislation, (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 National Park Service planning documents, there would be no impairment of park resources or values related to wildlife from implementation of the preferred alternative at Saguaro National Park.

Special-Status Species

Under the preferred alternative, approximately 0.2 acre of habitat potentially suitable for the cactus ferruginous pygmy-owl and lesser long-nosed bat could be lost during construction. All but a small portion of this disturbance (0.02 acres) would be reclaimed. However, larger saguaro cacti, which provide important habitat components for these species, would not be removed. During construction, some harassment would occur from increased levels of human activity, noise, and the ground vibrations produced by vehicles and heavy equipment in the construction zone. Of these, the noise from construction is anticipated to have the greatest

potential to disturb cactus ferruginous pygmy-owls, lesser long-nosed bats, and Sonoran Desert tortoises.

The traffic diversion onto Kinney Road would create increased noise levels for Kinney Road that would disturb any cactus ferruginous pygmy-owls, lesser long-nosed bats, and Sonoran Desert tortoises that might be present. Although special-status wildlife species would be accustomed to some noise and human presence during the traffic detours, the levels would be increased above those currently experienced. The repairs or repaving of Kinney Road would also provide additional noise impacts to special-status wildlife species along Kinney Road for the duration of the repair work. As a result, construction activities and traffic detours are anticipated to have local short-term, minor, adverse impacts on special-status wildlife species.

When construction is complete, all disturbed soil areas would be restored and revegetated with native species, and measures would be taken to minimize invasion by non-native species. There would be no long-term impacts to special-status wildlife species. A biological assessment has been prepared for this project to initiate section 7 consultation under the Endangered Species Act of 1973, as amended. This consultation would also identify mitigation measures that may reduce short-term adverse impacts or increase long-term, beneficial impacts for federally listed, endangered species. A copy of the biological assessment is included as appendix G.

There would be no short- or long-term impact to special-status vegetation species, as none have been found in the project area.

Cumulative Impacts. Special-status species are affected by urban and suburban development as a result of habitat destruction and fragmentation. These impacts would be short and long term, moderate, and adverse. When adopted and implemented, the Sonoran Desert Conservation Plan could provide beneficial impacts for special-status species and habitats in the long term; however, these impacts cannot be quantified until the plan is completed and implemented. The cumulative impacts would be short term and long term, moderate, and adverse, potentially offset by the beneficial impacts of the Sonoran Desert Conservation Plan. The cumulative impacts would be short and long term, moderate, and adverse. The preferred alternative would provide minor contributions to these impacts and the overall cumulative impacts to special-status wildlife species, including the preferred alternative, would be short and long term, moderate, and adverse.

Conclusion. Construction activities are anticipated to have local, short-term (for the duration of construction), minor, adverse impacts on threatened and endangered wildlife species or wildlife species of concern. There would be no long-term impacts to special-status wildlife species. There would be no short or long term impacts to special-status vegetation species. The preferred alternative would provide minor contributions to cumulative impacts to special-status wildlife species and the overall cumulative impacts to the special-status wildlife species, including the preferred alternative, would be short and long term, moderate, and adverse.

Impairment. 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 park's establishing legislation, (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 National Park Service planning documents, there would be no impairment of park resources or values related to special-status species from implementation of the preferred alternative at Saguaro National Park.

Soils

The preferred alternative would result in impacts to soils during construction activities. The estimated area of disturbance is approximately one acre; however, most of the area is existing road surface and shoulders and soils are already heavily disturbed in these areas. Soils present in the construction area are only slightly erosive, but once disturbed, the erosion potential would likely increase. During construction, disturbed soils would be subject to erosion and associated soil loss, although these impacts would be mitigated through appropriate stockpiling of soils and sediment control measures. The box culvert structure would be designed with an energy dissipating structure at the outlet to minimize downgradient soil erosion from the velocity of flows exiting the box culvert. Inflows to the culvert would create some backup during design flows and associated sedimentation. The sedimentation would be minimal based on the limited amount of backup expected and would not affect the function of the culvert or create a large sediment load on the upgradient side of the culvert. Upon completion of construction, restoration would occur and soils would be stabilized. The short-term impacts to soils would be local, minor, and adverse. The effects to soils would be detectable, but small and localized and mitigation would be relatively simple to implement and likely be successful. Once restoration occurs, the long-term impacts to soils would be negligible.

Cumulative Impacts. Past, present, and reasonably foreseeable future urban and suburban development in the Tucson basin would continue to impact soils. Soils would be disturbed through grading and building construction. Some soils would be covered with concrete or asphalt while other areas would be restored through landscaping. The Sonoran Desert Conservation Plan, when adopted, would provide some future protection to soils. The cumulative effects of these past, present, and reasonably foreseeable future actions would have short- and long-term, moderate, adverse impacts. The overall impacts to soils from the preferred alternative, in combination with past, present, and reasonably foreseeable future actions, would be short term, minor to moderate, and adverse. The preferred alternative would provide negligible contributions to long-term cumulative impacts.

Conclusion. The short-term impacts to soils would be local, minor, and adverse. Once restoration occurs, the long-term impacts to soils would be negligible. The overall impacts to soils from the preferred alternative, in combination with past, present, and reasonably foreseeable future actions, would be short term, minor to moderate, and adverse. The preferred alternative would provide negligible contributions to long-term cumulative impacts.

Impairment. 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 park's establishing legislation, (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 National Park Service planning documents, there would be no impairment of

park resources or values related to soils from implementation of the preferred alternative at Saguaro National Park.

Floodplains

The preferred alternative would result in alteration of the floodplain at the point where the wash crosses the road. The box culvert would be designed to handle the 100-year, 24-hour storm event, but the culvert would create alterations to the existing drainage patterns, detaining flows and lessening the peak flow. Placement of the box culvert would create a constriction in the drainage channel that would cause flows to back up against the culvert. During peak design flows, the upgradient water surface elevation would be increased approximately 3.5 feet and would temporarily flood upgradient areas to that depth (Entranco 2003a). The length of the temporary upgradient flooding would depend on the size and length of time of the storm event. Because there are measurable local changes to the ability of the floodplain to convey floodwaters, the preferred alternative would result in local, short- and long-term, minor, adverse impacts to floodplains. Such impacts would not require mitigation and the proposed project would not affect the overall runoff contributions. A draft floodplain statement of findings has been prepared and is included as appendix B.

Cumulative Impacts. Cumulative impacts that would affect floodplains include the land-use changes in response to growth in the Tucson metropolitan area and the Sonoran Desert Conservation Plan. Growth in the Tucson metropolitan area has impacted floodplains by changing runoff and drainage patterns in floodplains throughout the area; however, the floodplain of the tributary to Brawley Wash has not been affected. The Sonoran Desert Conservation Plan could provide some protection to floodplains; however, changes in runoff and drainage patterns would continue in developed areas outside of the floodplains and would continue to affect floodplains. The cumulative effects of continued growth and the Sonoran Desert Conservation Plan would be short and long term, moderate, and adverse for floodplains. The localized impacts to floodplains from the preferred alternative would provide minor contributions to the overall cumulative impacts to floodplains and the overall cumulative impacts would be short and long term, moderate, and adverse.

Conclusion. The preferred alternative would result in local, long-term, minor, adverse impacts to floodplains. The localized impacts to floodplains from the preferred alternative would provide minor contributions to the overall cumulative impacts to floodplains and the overall cumulative impacts would be short and long term, moderate, and adverse.

Impairment. 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 park's establishing legislation, (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 National Park Service planning documents, there would be no impairment of park resources or values related to floodplains from implementation of the preferred alternative at Saguaro National Park.

Socioeconomics

The preferred alternative would result in closure of Sandario Road for approximately one to two months to allow placement of the box culvert. During construction, all noncommercial traffic would be routed through the park via Kinney Road. Commercial traffic would be detoured on Interstate-10 to Highway 86 and would not be allowed onto Kinney Road through the park. Commercial traffic is defined as anything over two axles.

Local businesses were surveyed to determine the level of impact that the proposed action would have on businesses that rely on local or regional transportation for shipment or supply of goods or services. Approximately 30 businesses were contacted for the survey and of those businesses, four reported that they have large commercial traffic that would be affected by the road closure and detours. The large majority of the businesses in the area do not receive deliveries from large commercial vehicles and would not be affected by the temporary closure of Sandario Road. The local businesses that receive deliveries from large commercial traffic stated that their deliveries could be rerouted with appropriate notification and did not express concerns with the project or the proposed road closure. Notification will be given to local businesses one month in advance of the closure to allow sufficient time for businesses to reroute commercial traffic. The proposed action would have short-term, minor, adverse impacts on local businesses. The employment of a local workforce for construction activities could have a short-term, negligible, beneficial impact on the local socioeconomics. The overall socioeconomic impacts from the proposed alternative would be short-term, minor, and adverse.

Cumulative Impacts. Cumulative impacts that would affect socioeconomics include growth in the Tucson metropolitan area. The growth in the Tucson metropolitan area has impacted and would continue to impact socioeconomics of the region. Growth-related jobs such as construction would continue to provide socioeconomic benefits to the region. The cumulative effects of the continued growth would be short and long term, moderate, and beneficial for socioeconomic conditions. The preferred alternative would provide short-term, minor, adverse contributions to the cumulative impacts; however, the overall cumulative impacts would continue to be short and long term, moderate, and beneficial.

Conclusion. The overall socioeconomic impacts from the proposed alternative would be short-term, minor, and adverse. The preferred alternative would provide short-term, minor, adverse contributions to the cumulative impacts; however, the overall cumulative impacts would continue to be short and long term, moderate, and beneficial.

Public Use and Experience

The preferred alternative would result in short-term impacts to public use and experience as a result of traffic detours onto Kinney Road, potential delays or detours if repairs or repaving of Kinney Road would be necessary, and increases in noise for areas in proximity to Kinney Road. During the detour, commuters and local traffic would likely be traveling at much higher rates of speed than park visitors, even though the speed limit on Kinney Road is posted at 30-miles per hour. Traffic safety concerns would also exist for park visitors and local commuters

as they navigate the narrow and winding Kinney Road detour. It would also be expected that the accident rate on Kinney Road would increase as commuters travel at higher speeds and attempt to pass turning or slow-moving park vehicles and visitors attempt to access turnouts by making left-hand turns into oncoming traffic. Visitors may experience delays making left-hand turns from Kinney Road into the Red Hills Visitor Center parking lot or other park turnouts. Visitors using the Desert Discovery Nature Trail would experience noise generated from the nearby traffic. In general, the ability of the public to enjoy the solitude and scenery of Saguaro West near the project area would be affected. The majority of the public would be aware of the changes and would likely express an opinion about the changes. However, alternatives to the detour exist for local commuters, and park visitors can travel to Saguaro East. Relatively easy mitigation measures would be implemented including strict speed limit enforcement and posting of notices of the detours. In the short term, impacts to public use and experience would be moderate and adverse. Although mitigation such as law enforcement for speeding vehicles and adequate signage would reduce some impacts, the overall impacts from the fourfold increase in traffic and associated noise could not be mitigated.

In the long term, construction would be completed and traffic patterns would return to normal. Public use and experience would benefit from the improvements as traffic accidents decrease for that stretch of Sandario Road. Long-term impacts from the road improvements to the public use and experience would be minor and beneficial.

Cumulative Impacts. As visitation and commuter traffic increases in response to population growth of the Tucson metropolitan area, the potential for accidents and injuries to the public would be expected to increase. Increased traffic on Sandario Road would increase the probability of traffic accidents with park visitors unaware of the dangerous road conditions and between local commuters traveling too fast on the road and park visitors traveling more slowly to observe the scenery. The chip sealing activities would cause some traffic delays through the park during the short period of time that chip sealing activities were occurring, resulting in minor adverse impacts to public use and experience. The cumulative effects of these past, present, and reasonably foreseeable future actions would have short-term, minor, adverse impacts on public use and experience due to traffic increases and associated impacts discussed above. Long-term cumulative impacts would be negligible to minor and adverse due to growth of the Tucson metropolitan area and increased traffic overall. Because the preferred alternative would contribute a short-term, moderate, adverse impact to public use and experience and a long-term, minor, beneficial impact, there would be an overall short-term, moderate, adverse impact to public use and experience and a long-term, negligible to minor, adverse, cumulative impact in association with the preferred alternative.

Conclusion. In general, the ability of the public to enjoy the solitude and scenery of Saguaro West would experience short-term, moderate, adverse impacts. Accidents as a result of the poor sight distance on Sandario Road would be eliminated, resulting in a long-term, minor, beneficial impact to public use and experience. Because the preferred alternative would contribute a short-term, moderate, adverse impact to public use and experience and a long-term, minor, beneficial impact, there would be an overall short-term, moderate, adverse impact to public use and experience and a long-term, negligible to minor, adverse, cumulative impact in association with the preferred alternative.

Park Operations

The preferred alternative would result in a short-term increase in the need for park ranger patrols during the construction detour period. The park rangers would be responsible for law enforcement on Kinney Road, including enforcement of the ban on commercial vehicles and enforcement of the 30-mile per hour speed limit. The enforcement activities would be expected to take time away from other routine activities unless additional park rangers are added. Park rangers would also respond to and investigate any accidents on Kinney Road. The potential for accidents would be expected to increase due to the increased traffic and the potential conflicts between local commuter vehicles and slow-moving park vehicles. Once construction is completed and original traffic patterns are re-established, there would be no construction-related impacts to park operations; however, long-term improvements in traffic safety would result in less time spent by park rangers in responding to accidents. The preferred alternative would result in a short-term, minor, adverse impact to park operations. There would be long-term, minor, beneficial impacts to park operations.

Cumulative Impacts. The other past, present, and reasonably foreseeable future action that would affect park operations is the chip sealing activities on Kinney Road. Additional park staff might be required to oversee the chip sealing activities and ensure traffic is controlled, but these activities would be short term, lasting only during the extent of the chip sealing operations. The chip sealing would have short-term, negligible, adverse impacts to park operations. The preferred alternative would contribute short-term, minor, adverse impacts and the overall cumulative impacts would be short term, minor, and adverse. There would be no long-term cumulative impacts.

Conclusion. The preferred alternative would result in a short-term, minor, adverse impact to park operations. The overall cumulative impacts would be short term, minor, and adverse. There would be no long-term cumulative impacts.

CONSULTATION AND COORDINATION

The U.S. Fish and Wildlife Service was consulted on the potential threatened and endangered species and species of concern that may be present in the project area. The species list received from the U.S. Fish and Wildlife Service is included in appendix E and potential impacts to these species are discussed in this environmental assessment.

The Arizona Game and Fish Department was consulted for a list of state special-status species that may be present within the project area. The Arizona Game and Fish Department responded with a list of special-status species that have been observed within a two-mile radius of the project area. The list is included in appendix F and potential impacts to these species are discussed in this environmental assessment.

The National Park Service determined that there would be no impact to cultural resources from the project. Sue Wells, archeologist for the Western Archeological and Conservation Center, Tucson, Arizona, consulted previous archeological surveys/projects and found the project area was surveyed in 1984 and 1995. No archeological sites were located within 1,000 feet of the project area. The cultural resource specialist at the park determined through consultation and best professional judgment that no or negligible impacts would occur to ethnographic, cultural landscapes, or museum objects as a result of implementing the preferred alternative. The Arizona State Historic Preservation Office has been contacted to provide concurrence on this determination (appendix C).

Other agencies and organizations contacted for information or that assisted in identifying important issues, developing alternatives, or that will be given an opportunity to review and comment on this environmental assessment, include the following:

Federal Agencies

Natural Resources Conservation Service, Tucson Field Office
U.S. Army Corps of Engineers
U.S. Fish and Wildlife Service

State and Local Agencies and Legislators of Arizona

Arizona Game and Fish Department
Arizona State Historic Preservation Office

American Indian Tribes, Organizations, and Individuals

Ak Chin Indian Community
Fort McDowell Yavapai Nation
Gila River Indian Community
Hopi Tribe
Pascua Yaqui Tribe
Salt River Pima – Maricopa Indian Community
Tohono O'Odham Nation
Zuni Pueblo

COMPLIANCE WITH FEDERAL AND STATE REGULATIONS

Prior to implementation, the National Park Service preferred alternative would require a permit from or authorization/approval by:

- The U.S. Army Corps of Engineers would require a permit under section 404 of the Clean Water Act.

- The U.S. Fish and Wildlife Service would require consultation under the Endangered Species Act for potential impacts to threatened or endangered species or habitat in the project area. The National Park Service is preparing a biological assessment to submit to the U.S. Fish and Wildlife Service. The biological assessment would outline potential impacts and mitigation measures to be taken.

- The Arizona State Historic Preservation Office has been notified of the project and the determination that no cultural resources would be affected by the project. Should unanticipated cultural resources be discovered during construction, the National Park Service would stop work in the area of the find and follow section 106 procedures for post-review discoveries and/or Native American Graves Protection and Repatriation Act procedures for inadvertent discoveries, as appropriate.

LIST OF PREPARERS

This environmental assessment was prepared by engineering-environmental Management, Inc., under the direction of the National Park Service. Denver Service Center, Saguaro National Park staff, and Pima County Department of Transportation staff provided invaluable assistance in the development and technical review of this environmental assessment. Individuals who provided information include:

Denver Service Center

Kim Hartwig, Natural Resource Specialist
David Hayes, Cultural Resource Specialist
Patrick Walsh, Cultural Resource Specialist

Saguaro National Park

Natasha Kline, Resource Management Specialist
Mark Holden, Biologist
Sandy Wolf, Biologist
Danielle Foster, Ecologist
Bob Love, Chief Ranger
Robert Stinson, Supervisory Park Ranger
Richard Hill, Interpretation/Public Use
Sarah Craighead, Park Superintendent
Meg Weesner, Chief of Science and Resource Management
Armando Ramos, District Maintenance Supervisor

Pima County Department of Transportation

Bob Roggenthen, Safety Engineer
Becky Pearson, Safety Engineer

The preparers of this document are listed below:

Anne Baldrige, Environmental Conservation/Planning Project Manager
Sarah Boyes, Natural Resources Specialist
Wanda Gray Lafferty, Technical Publications Specialist

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APPENDIX A

SCOPING PRESS RELEASE

APPENDIX A

National Park Service
U.S. Department of the Interior

Saguaro National Park

3693 S. Old Spanish Trail
Tucson, AZ 85730

520-733-5100 phone
520-733-5183 fax

SAGUARO NATIONAL PARK News Release

For Immediate Release
Contact : Sarah Craighead at 520-733-5100

SAGUARO NATIONAL PARK PLANS TO IMPROVE SAFETY AT SANDARIO/KINNEY ROADS INTERSECTION

Superintendent Sarah Craighead announced that Saguaro National Park, in partnership with Pima County, proposes to improve the safety conditions at the Sandario and Kinney Roads intersection during the fall of 2004. Plans involve reconstructing approximately 600 feet of roadway on Sandario Road, south of Kinney, and installing box culverts to raise the roadway 7 feet, and out of the wash. The project will significantly improve visibility at this intersection. The project site will be closed to all traffic during construction. The closure is anticipated to be four weeks. Non-commercial traffic will be routed onto Kinney Road through the Park; commercial traffic will be detoured away from the site.

Construction is anticipated to begin in September 2004 and continue through December 2004. The public is invited to direct concerns or comments regarding this project to Superintendent Craighead by sending an email message to SAGU_Planning@nps.gov, or by writing to Saguaro National Park, 3693 South Spanish Trail, Tucson, AZ 85730.

04-05 NPS December 19, 2003

EXPERIENCE YOUR AMERICA
The National Park Service cares for special places saved by the American people so that all may experience our heritage.

APPENDIX A

APPENDIX B

DRAFT FLOODPLAIN STATEMENT OF FINDINGS

APPENDIX B

DRAFT

FLOODPLAIN STATEMENT OF FINDINGS FOR SANDARIO / KINNEY ROADS INTERSECTION IMPROVEMENTS

Saguaro National Park
Pima County, Arizona
U.S. Department of the Interior
National Park Service

INTRODUCTION

Description of the Proposed Action

The National Park Service (NPS) proposes to reconstruct a 500-linear foot portion of Sandario Road at the south approach to the intersection with Kinney Road. The reconstruction is necessary to eliminate a low-water crossing in the road and would be accomplished by raising the road approximately 7 vertical feet. The low-water crossing conveys an at-grade wash and creates a limited sight distance for vehicles in the crossing relative to vehicles turning onto Sandario Road from Kinney Road, resulting in a high rate of accidents. This action is needed to reduce the accident rate by providing better site distances and to allow park visitors to safely enjoy viewing the resources of Saguaro National Park.

Sandario Road is a two-lane paved road oriented north-south and crossing through the Tucson Mountain District of Saguaro National Park on the park's western side. The road is used by park visitors to access Kinney Road, the Red Hills Visitor Center, and various trails and picnic areas. The road is also used by commuters and non park-related traffic to access Interstate 10 and to reach Mile Wide Road that connects to Kinney Road and into the city of Tucson from western suburbs. The road serves local traffic to residential and business properties in the area.

Kinney Road is a two-lane road that runs from the intersection with Sandario Road through the southwest corner of the Tucson Mountain District of the park, through Tucson Mountain Park and terminates at Ajo Way on the outskirts of the city of Tucson. The road through the park is narrow and winding and is the only access to the Tucson Mountain District's Red Hills Visitor Center and various hiking and nature trails. The portion of Kinney Road within park boundaries is used primarily by park visitors. Most residential and commercial traffic use Sandario Road to Mile Wide Road and join Kinney Road outside park boundaries to bypass the lower speed limits through the park.

Under the preferred alternative, a portion of Sandario Road, beginning at the intersection of Kinney Road with Sandario Road and ending approximately 500-linear feet south on Sandario Road, would be reconstructed. The project would include constructing a box culvert with wingwalls, raising the grade of the road approximately 7-vertical feet from its present elevation to allow the drainage (an unnamed tributary to Brawley Wash) to be conveyed beneath the road. The box culvert would be a reinforced concrete box culvert 6-feet high by 12-feet wide.

Guardrails would be added on both sides of Sandario Road for traffic safety. Construction limits are set at 30 feet from the road centerline and extend to approximately 50 feet from the centerline in the drainage.

The box culvert would allow the quickest installation, thereby minimizing the time necessary for traffic detours during construction. The drainage culvert would be designed to handle peak flows from a 100-year storm event, although some water would back up at the culvert entrance, raising the water surface elevation during a 100-year storm event by approximately 3.5 feet (Entranco 2003a). The design would prevent overtopping of the new roadway elevation or channelization of flows to the north or south, parallel to the roadway. The culvert inlet would be designed with wingwalls and the outlet would have both wingwalls and erosion protection in a designed riprap-lined scour hole to reduce flow velocity upon exiting the culvert and prevent additional downstream erosion.

The box culvert would be lowered into the ground to prevent disturbance of the natural flow of the wash. The bottom of the scour hole would be layered with riprap and the voids filled with sand to replicate a natural substrate for wildlife. Following construction completion, Saguaro National Park staff would monitor the culvert and scour hole for wildlife use and to ensure the riprap remains filled with soil.

Site Description

Saguaro National Park consists of two districts—Saguaro West (Tucson Mountain unit), and Saguaro East (Rincon Mountain unit). The project is located in Saguaro West in Pima County, Arizona, approximately 15 miles west of the city of Tucson. The north and west areas of the Tucson Mountain unit are generally flat, while the south and east becomes more mountainous, rising to an elevation of 4,687 feet. Saguaro West encompasses 24,034 acres.

Stormwater runoff from an unnamed tributary to Brawley Wash flows over Sandario Road just south of the intersection with Kinney Road. The wash is an ephemeral stream, typically dry, experiencing flows only in response to large precipitation events. The wash has a drainage area of approximately 71 acres and is approximately 4,000 feet in length. The slope of the wash remains fairly constant throughout its length at 4.25%. The channel has a sandy bottom with some rock outcroppings and the banks are lined with desert shrubs and trees. The peak discharge from the unnamed wash during a 100-year, 24-hour storm event was calculated to be approximately 415-cubic feet per second at Sandario Road.

The dominant vegetation of the Tucson Mountain unit is characterized as the Arizona Upland subdivision of the Sonoran desertscrub. The Arizona Upland possesses a multi-storied canopy of vegetation, including some of the most recognizable vegetation species such as the saguaro cactus. The primary plant association dominating the project area is the paloverde-saguaro association. This association occurs as mixed stands of trees, shrubs, subshrubs, cacti, and grasses throughout the Tucson Mountains. The dominant species within the project site are the saguaro cactus, desert ironwood, and little-leaf paloverde. Other notable species within the project include whitethorn acacia, ocotillo, desert hackberry, barrel cactus, prickly pear, buckhorn cholla, jumping cholla, and hedgehog cactus.

Two major soil types have been identified in the project corridor. These soil types include Pinaleno very cobbly sandy loam and Saguaro-rock outcrop complex. The Pinaleno soil is very deep and well drained with a typical surface cover of cobble, stones, and gravel. This type occurs on gently sloping fan terraces and is the soil type present in the construction area. The permeability of this type is moderately slow, runoff is medium, and the hazard of erosion is slight. The Saguaro-rock outcrop complex surface cover is typically extremely gravelly fine sandy loam and rock outcrop. The Saguaro complex soil is very shallow and well drained. This complex is found on moderately steep to steep slopes and does not occur in the construction zone area. The permeability of the Saguaro soil is moderately rapid, runoff is very rapid, and the hazard of erosion is moderate to severe.

General Characterization of the Nature of Flooding in the Area

The unnamed tributary to Brawley Wash is typically dry, flowing in response to large storm events. Flash flooding is possible and during high flows the low-water crossing may become unsafe for use by vehicles. There is no evidence of flows being impeded by the low-water crossing or of erosion occurring as water flows cross the pavement and re-enters the channel.

Human-made structures that impede the flood flows are not present, either upstream or downstream of the low water crossing. Flood flows do not slow or back up as they progress through the low-water crossing.

JUSTIFICATION FOR USE OF THE FLOODPLAIN

Why the Proposed Action Must be Located in Floodplain

As discussed previously, this project is designed to eliminate safety risks associated with the dip in Sandario Road. Park visitors use Sandario Road to access Kinney Road, the Red Hills Visitor Center, and various trails and picnic areas. Commuters and other non park-related traffic also use Sandario Road. Because Sandario Road serves as a primary route, it is imperative that the roadway is safe and operational. Eliminating the low-water crossing is necessary to improve safety for all drivers and prevent road closures during storm events.

Investigation of Alternative Sites

The National Park Service has determined that reconstruction of this section of Sandario Road in the same location with elimination of the low-water crossing would have the least impact to the environment. Rerouting the road to avoid the drainage would create a large amount of new disturbance and was not considered a viable option.

An alternative was considered to lower the grade of the road between at-grade wash crossings on Sandario Road, creating an extended dip that would run through the intersection with Kinney Road. This alternative would result in greatly increased disturbance and associated environmental impacts. The work would also have greater impacts to the floodplain area as it would essentially link two currently separated floodplains. This alternative was eliminated from further consideration.

DESCRIPTION OF SITE-SPECIFIC FLOOD RISK

Recurrence Interval of Flooding at the Site

There are no records of flooding at the site or road closures. The design was based on a 100-year storm event.

Hydraulics of Flooding at the Site

The 100-year storm event peak flows are estimated at 415-cubic feet per second. Flooding occurs as a result of sudden, localized rainstorms that cause unpredictable flash flooding.

Time Required for Flooding to Occur

The time required for flooding to occur is not known, but is expected to be relatively sudden, given the small size of the drainage area.

Opportunity for Evacuation of the Site in the Event of Flooding

The opportunity to evacuate the low-water crossing to higher ground is excellent. The Sandario Road approaches to the low-water crossing are higher and the general area surrounding the unnamed tributary to Brawley Wash is also higher, open ground.

Geomorphic Considerations

The channel is somewhat incised and not expected to move laterally. Soils in the area are only slightly erosive and there is no evidence of large amounts of erosion occurring at the site during flood events.

DESCRIPTION OF HOW THE ACTION WILL BE DESIGNED OR MODIFIED TO MINIMIZE HARM TO FLOODPLAIN VALUES OR RISK TO LIFE OR PROPERTY

The drainage culvert would be designed to handle peak flows from a 100-year storm event, although some water would back up at the culvert entrance raising the water surface elevation by approximately 3.5 feet. The design would prevent overtopping of the new roadway elevation or channelization of flows to the north or south, parallel to the roadway. The culvert inlet would be designed with wingwalls and the outlet would have both wingwalls and erosion protection in a designed riprap-lined scour hole to reduce flow velocity upon exiting the culvert and prevent additional downstream erosion. The box culvert would be lowered into the ground to prevent disturbance of the natural flow of the wash.

SUMMARY

The proposed alternative to reconstruct a 500-linear foot portion of Sandario Road at the south approach to the intersection with Kinney Road would raise the grade of the road approximately 7-vertical feet from its present elevation to allow the drainage, an unnamed tributary to Brawley Wash, to be conveyed beneath the road. Because Sandario Road serves as a primary route, it is imperative that the roadway is safe and operational. Eliminating the low-water crossing south of the intersection of Sandario and Kinney Roads is necessary to improve the safety of all drivers. The possibility of improving the sight distance at the intersection of Sandario and Kinney Roads outside of this jurisdictional watercourse without creating a large amount of additional disturbance to natural resources does not exist and; therefore, no other alternative sites were considered.

The proposed alternative would have a potential long-term, minor, beneficial impact to wildlife by allowing wildlife passage through the culvert beneath the road. The long-term impacts to public safety and visitor experience would be minor and beneficial. The adverse impacts to the public associated with traffic accidents on this stretch of road as a result of the limited site distances created by the low-water crossing would be reduced. The long-term impacts to floodplains would be minor and adverse; however, there are no practical alternatives to development in the floodplain. Therefore, the National Park Service finds the proposed action to be acceptable under Executive Order 11988 for the protection of floodplains.

Recommended:

Superintendent, Saguaro National Park Date

Certification of Technical Adequacy and Servicewide Consistency:

Chief Water Resources Division Date

Approved:

Regional Director Intermountain Region, National Park Service Date

APPENDIX B

APPENDIX C
LETTER TO ARIZONA STATE HISTORIC PRESERVATION OFFICE AND ARCHEOLOGICAL CLEARANCE SURVEY FORM

APPENDIX C

United States Department of the Interior

NATIONAL PARK SERVICE
Saguaro National Park
3693 S. Old Spanish Trail
Tucson, Arizona 85730

IN REPLY REFER TO:

H4217

February 10, 2004

Mr. James W. Garrison, SHPO
Arizona State Parks
1300 West Washington
Phoenix, AZ. 85007

Dear Mr. Garrison:

Reference: Improvements to the Sandario/Kinney Road Intersection in Saguaro National Park
Subject: Compliance with Section 106 of the National Historic Preservation Act and the National Environmental Policy Act

The National Park Service proposes to reconstruct approximately 600 linear feet of Sandario Road at the south approach to the intersection with Kinney Road in the Tucson Mountain District of Saguaro National Park. The project is to be a partnership with the Pima County Department of Transportation which is concerned about the accident rate at the project site and has agreed to provide design services, contracting, construction engineering, and 50% of construction funds. The work is to be done by contract in 2005, and includes elimination of a dip in the roadway that severely limits sight distance and causes accidents. The project includes raising the grade of the roadway approximately seven vertical feet from its present elevation as recommended in the Saguaro National Park Traffic Safety Study prepared by Robert Peccia & Associates under contract with the Federal Highway Administration and released in May, 1999.

The park will prepare an environmental assessment (EA) for the Proposed Project in order to meet the requirements of the National Environmental Policy Act. However, Section 106 compliance is covered by the attached NO EFFECT Clearance prepared by archeologists at the Western Archeological Conservation Center. If you have any questions or concerns about this project, please contact Susan Wells by telephone at 520/670-6501 x238.

Sincerely,

Margaret W Weesner

Sarah Craighead
Superintendent

cc: Meg Weesner, Saguaro National Park, Chief, Resource Management
Jane Crisler, Advisory Council on Historic Preservation
David Hayes, Environmental Compliance Coordinator, Denver Service Center

Attachment: Archeological Clearance Survey Form

TAKE PRIDE IN AMERICA

WACC PROJECT NO. SAGU 1984 B
SAGU 1995 A

CLEARANCE NO.
REPORT DATE: 10/10/03
AUTHOR: Susan J. Wells

ARCHEOLOGICAL CLEARANCE SURVEY FORM

1. PROJECT: Improvements to the Sandario/Kinney Raod Intersection, Tucson Mountain District, Saguaro National Monument, Arizona.

2. PACKAGE NO.: None.

3. CONSTRUCTION PROJECT DESCRIPTION: Reconstruct approximately 600 linear feet of Sandario Road at the south approach to the intersection of Kinney Road. Elimination of a dip in the roadway by raising the grade of the roadway approximately seven vertical feet.

4. CONSTRUCTION PROJECT LOCATION: The wash intersects Sandario Road about 250 feet south of the Kinney Road intersection.

5. SURVEY AREA SIZE (a) AND BOUNDARIES (b):
SAGU 1984 B a) 2,560 acres b) Locations along Sandario Road
SAGU 1995 A a) 730 acres b) Developed areas in the District

6. DATE(S) OF SURVEY:
SAGU 1984 B February and May, 1984
SAGU 1995 A April 25-May 24, 1995

7. SURVEYOR(S):
SAGU 1984 B Susan Wells, Mark Elson, Lisa Eppley, Martha Hueglin, Barbara Macneider, Michael Sullivan, Jill Lorenzini and John Madsen
SAGU 1995 A Susan Wells, Joe Svinarich, Erica Young, Jenny Waters

8. NUMBER OF PERSON-DAYS IN SURVEY:
SAGU 1984 B 105
SAGU 1995 A 48

9. DESCRIPTION OF AREA SURVEYED: Saguaro-Palo Verde association with good ground visibility

10. SURVEY PROCEDURE: 100% on foot. In accordance with the Arizona State Historic Preservation Office's *Draft Guideline for Undertakings Involving Archaeological Surveys Over Ten Years Old* (November 2001), archeologists at the Western Archeological and Conservation Center have reviewed the documentation for the archeological survey project, WACC project number SAGU 1984 B. They have taken into consideration new archeological and geomorphological knowledge of the project area and assert that this survey project meets contemporary archeological survey standards, as well as those of the Arizona SHPO and National Park Service.

11. DESCRIPTION OF CULTURAL RESOURCES LOCATED:
SAGU 1984 B: 4 archeological sites
SAGU 1995 A: 24 archeological sites

Revised: October 2, 1996

12. EVALUATION OF CULTURAL RESOURCES LOCATED: All sites recorded are potentially significant under criterion d, however, none of them are located within 1,000 feet of the proposed project area.

PROJECT NO. SAGU 1984 B
SAGU 1995 A

CLEARANCE NO.

13a. NATIONAL REGISTER STATUS:

__ On Register:
__ In Process of Nomination:
__ Eligibility Determination in Process:
XX No Action Yet
__ Does Not Meet Criteria
__ Not applicable (N/A)

13b. Other SHPO Consultation:
XX No __ Yes:

14. EFFECT OF PROJECT ON CULTURAL RESOURCES: None. No sites were recorded within 1,000 feet of the proposed project area.

15a. RECOMMENDATIONS:
__ Clearance Not Recommended
XX Clearance Recommended with the Following Condition(s):
1. If concealed archeological resources are encountered during project activities, all necessary steps will be taken to protect them and to notify the park consulting archeologist.

15b. XX This archeological clearance constitutes Section 106 documentation for this undertaking.
__ This clearance must be included with other Section 106 documentation (e.g. Triple X Form) prior to SHPO or ACHP distribution.

16. ENCLOSURES:
1 USGS Map(s): Avra, AZ 7.5' 1992
1 Project Map(s):
__ Project Design Data:
__ Site Record(s): AZ BB:14:642(ASM)

17. NATIVE AMERICAN CONSULTATION or Traditional Cultural Property (TCP) Survey: N/A

18. REFERENCES:

Wells, Susan J and Stacie A. Reutter
1997 Cultural Resources of the Tucson Mountain District, Saguaro National Park. WACC Publications in Anthropology 69. Tucson.

Revised: October 2, 1996

APPENDIX C

APPENDIX D

U.S. ARMY CORPS OF ENGINEERS LETTER

APPENDIX D

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
ARIZONA-NEVADA AREA OFFICE
3636 NORTH CENTRAL AVENUE, SUITE 900
PHOENIX, ARIZONA 85012-1939

REPLY TO
Office of the Chief
Regulatory Branch

September 16, 2003

Becky Sayre Pearson, PE, RLS
Pima County Department of Transportation and Flood Control District
201 North Stone Avenue, Third Floor
Tucson, Arizona 85701-1207

File Number: 2003-00330-RJD

Dear Ms. Pearson:

Reference is made to your letter of December 26, 2002 in which you inquired as to the jurisdictional limits of Section 404 of the Clean Water Act for the unnamed wash that crosses Sandario Road just south of the intersection of Sandario Road and Kinney Road (Sections 27 & 28, T13S, R11E), Avra, Pima County, Arizona.

The enclosed aerial photograph or map delineates the waters of the United States, including wetlands, regulated by Section 404 of the Clean Water Act. This approved jurisdictional determination will remain in effect for five years from the date of this letter unless an unusual flood event occurs. After this five-year period or after an unusual flood event alters stream conditions, the Corps of Engineers reserves the authority to retain the original jurisdictional limits or to establish new jurisdictional limits as conditions warrant.

Each water of the United States herein delineated is a water that is tributary to an interstate water. The Section 404 jurisdictional limit for a water of the United States is defined at 33 CFR Part 328. The jurisdictional limit for a non-tidal water of the United States is determined by the jurisdictional wetland boundary and/or the ordinary high water mark. The jurisdictional limit of a wetland is determined in accordance with the Corps of Engineers 1987 Wetlands Delineation Manual. Otherwise, presence of the indicators stated in the definition of ordinary high mark (33CFR 328.3(e)) are used to establish the jurisdictional limit of a water of the United States. The basis of this jurisdictional determination is shown on the enclosed checklist.

Construction of a box culvert at this location may affect the endangered cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*). Therefore, when submitting your permit application for this box culvert please include either a biological assessment that addresses the impacts of the proposed project to the cactus ferruginous pygmy-owl and its proposed critical habitat or a letter from U.S. Fish and Wildlife Service which states that the project impacts are insignificant or discountable.

Any discharge of dredged or fill material within the designated jurisdictional area requires a Section 404 permit from the Corps of Engineers. The Corps of Engineers emphasizes avoidance of the delineated jurisdictional area. Please review this delineation and evaluate your proposed activity to ensure that avoidance of the jurisdictional area is given full consideration in your design. If all discharges of dredged or fill material occur outside the designated jurisdictional area, no Section 404 permit is required. If avoidance is not practicable, please reference File Number 2003-00330-RJD when submitting your Section 404 permit application to the Corps of Engineers. Please be advised that your application needs to substantiate that avoidance of designated jurisdictional areas is not practicable and substantiate that impacts to waters of the United States have been minimized.

Furthermore, you are hereby advised that the Corps of Engineers has established an Administrative Appeal Process for jurisdictional determinations which is fully described at 33 CFR Part 331. The Administrative Appeal Process for jurisdictional determinations is diagrammed on the enclosed Appendix C. If you decide not to accept this approved jurisdictional determination and wish to provide new information please send the information to this office. If you do not supply additional information you may appeal this approved jurisdictional determination by completing the attached "Notification of Administrative Appeal Options and Process and Request for Appeal" form and submitting it directly to the Appeal Review Officer at the address provided on the form.

The receipt of your letter is appreciated. If you have questions, please contact Robert J. Dummer at (602) 640-5385 x 224.

Sincerely,

Cindy Lester

Cindy Lester P.E.
Chief, Arizona Section
Regulatory Branch

Enclosure(s)

Basis of Jurisdictional Determination

Date of field visit: September 15, 2003

Indicators observed during site visit:

__✓__ Destruction of terrestrial vegetation
__✓__ Changes in soil characteristics (e.g. sandy channel bottoms)
_____ Impression of water line on bank
__✓__ Shelving or cut banks
__✓__ Presence of litter/debris
__✓__ Sediment deposits
_____ Water stains
__✓__ Exposed roots
__✓__ Presence of manmade drainage features/scour protection
__✓__ Other

Supporting documentation:

__✓__ Applicant's proposed jurisdictional determination
_____ Wetland delineation following 1987 Corps Wetland Delineation Manual
__✓__ Aerial photography interpretation
__✓__ Ground photographs/videotape of site
_____ Topographic map interpretation
_____ Review of historical records and/or aerial photography
_____ Comparison of previously accepted delineations of the area
__✓__ USGS map(s)
_____ Flow data (drainage reports, modeled flows, USGS gage data, or other sources)
_____ Floodplain maps
_____ Soil Maps
_____ Environmental Assessment/ Environmental Impact Statement
_____ National Wetland Inventory Maps
__✓__ Staff knowledge of precipitation and fluvial dynamics of the region
_____ Biological resource reports
__✓__ Other

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL		
Applicant: Pima County Department of Transportation and Flood Control District	File Number: 2003-00330-RJD	Date: September 16, 2003
Attached is:		See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
	PERMIT DENIAL	C
X	APPROVED JURISDICTIONAL DETERMINATION	D
	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://usace.army.mil/inet/functions/cw/cecwo/reg or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the DISTRICT engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the DISTRICT engineer. Your objections must be received by the DISTRICT engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the DISTRICT engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the DISTRICT engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the DIVISION (not district) engineer (address on reverse). This form must be received by the DIVISION (not district) engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the DIVISION (not district) engineer (address on reverse) engineer. This form must be received by the DIVISION (not district) engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the DIVISION (not district) engineer (address on reverse) engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL OF PROFFERED PERMIT, PERMIT DENIAL, OR APPROVED JD TO DIVISION ENGINEER or SUBMITTAL OF OBJECTIONS TO AN INITIAL PROFFERED PERMIT or NEW INFORMATION FOR APPEAL OF APPROVED JURISDICTIONAL DETERMINATION TO DISTRICT ENGINEER

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

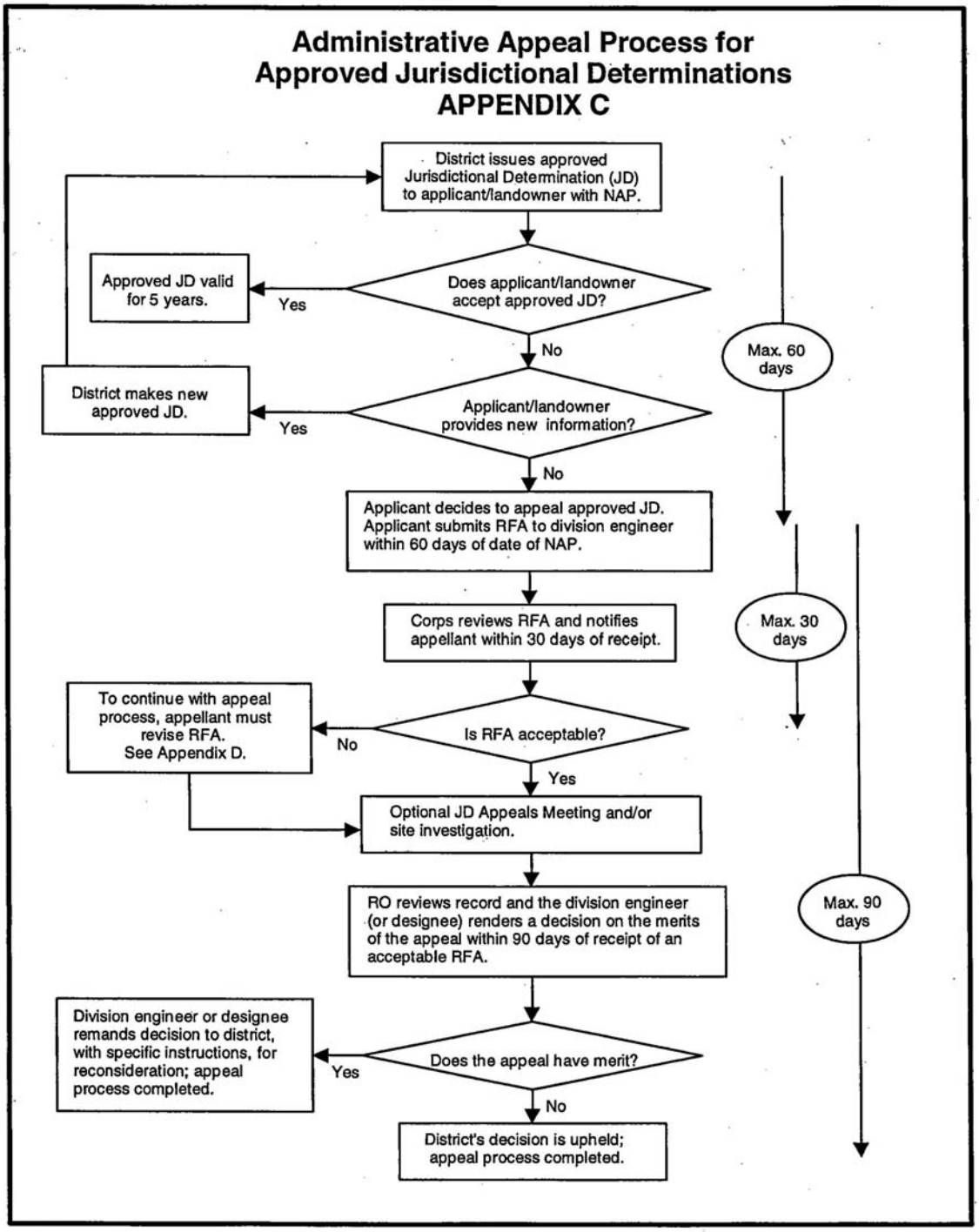
ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

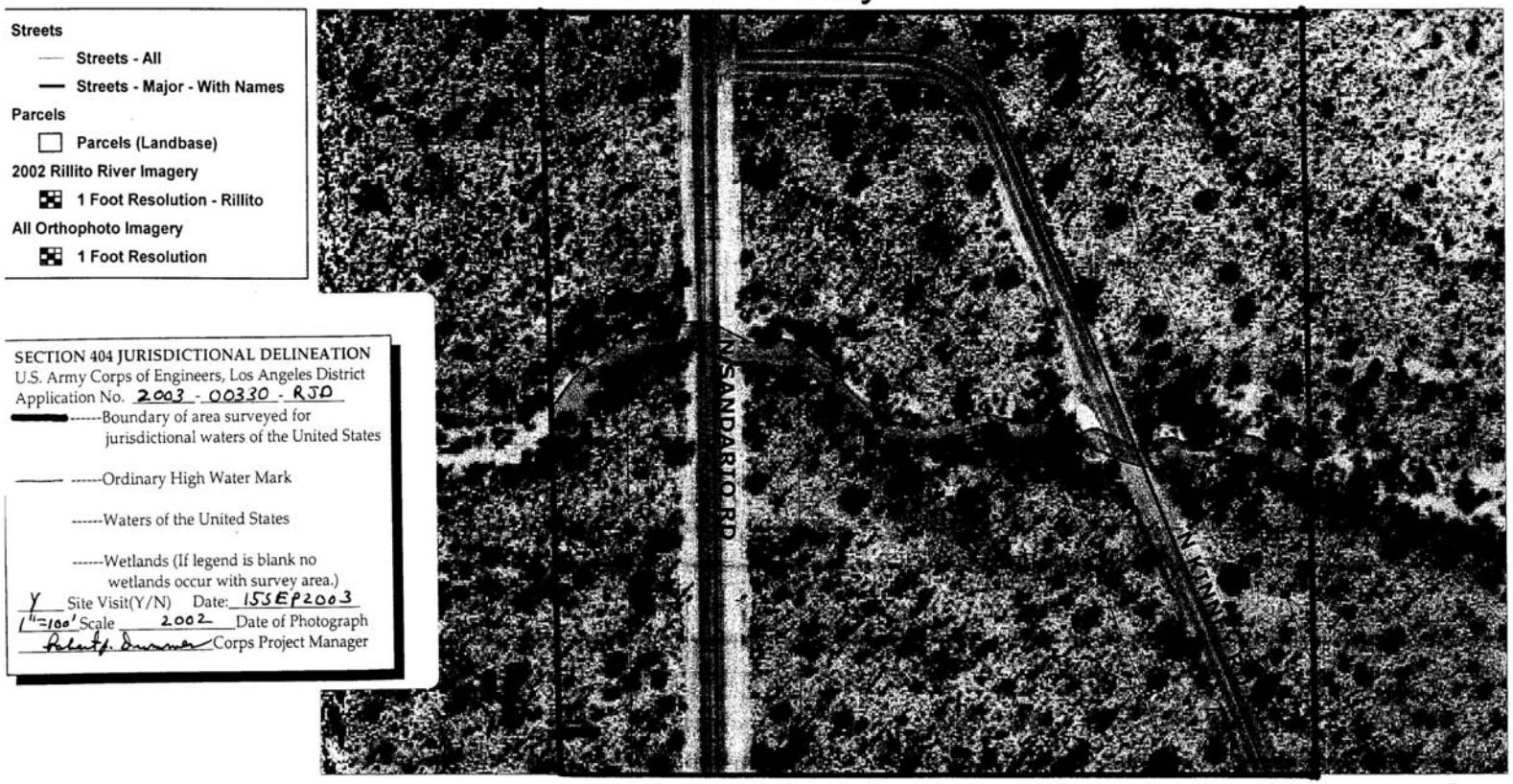
If you have questions regarding this decision and/or the appeal process you may contact:	If you only have questions regarding the appeal process you may also contact:
DISTRICT ENGINEER Los Angeles District, Corps of Engineers Attn: Chief, Regulatory Branch PO Box 532711 Los Angeles, CA 90053 (213-452-3425)	DIVISION ENGINEER Army Engineer Division, South Pacific, CESPD-CM-O Attn: Doug Pomeroy Administrative Appeal Review Officer 333 Market Street San Francisco, CA 94015 (415-977-8035)

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

	Date:	Telephone number:
_____ Signature of appellant or agent.		


Administrative Appeal Process for
Approved Jurisdictional Determinations
APPENDIX C
District issues approved Jurisdictional Determination (JD) to applicant/landowner with NAP.
Does applicant/landowner accept approved JD?
Yes
Approved JD valid for 5 years.
No
Applicant/landowner provides new information?
Yes
District makes new approved JD.
No
Max. 60 days
Applicant decides to appeal approved JD. Applicant submits RFA to division engineer within 60 days of date of NAP.
Corps reviews RFA and notifies appellant within 30 days of receipt.
Max. 30 days
Is RFA acceptable?
No
To continue with appeal process, appellant must revise RFA. See Appendix D.
Yes
Optional JD Appeals Meeting and/or site investigation.
RO reviews record and the division engineer (or designee) renders a decision on the merits of the appeal within 90 days of receipt of an acceptable RFA.
Max. 90 days
Does the appeal have merit?
Yes
Division engineer or designee remands decision to district, with specific instructions, for reconsideration; appeal process completed.
No
District's decision is upheld; appeal process completed.

Pima County



http://www.dot.co.pima.az.us/gis/maps/mapguide/dotmap5.mwf

Tuesday, September 16, 2003 2:06 PM

APPENDIX D

APPENDIX E

U.S. FISH AND WILDLIFE SERVICE SPECIES LIST

United States Department of the Interior
U.S. Fish and Wildlife Service
Arizona Ecological Services Field Office
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 Fax: (602) 242-2513

In Reply Refer to:
AESO/SE
02-21-03-I-0216

April 23, 2003

Ms. Priscilla Titus
SWCA
Tucson Office
343 South Scott Avenue
Tucson, Arizona 85701

RE: Sandario Road Improvements Project

Dear Ms. Titus:

Thank you for your recent request for information on threatened or endangered species, or those that are proposed to be listed as such under the Endangered Species Act of 1973, as amended (Act), which may occur in your project area. The Arizona Ecological Service Field Office has posted lists of the endangered, threatened, proposed, and candidate species occurring in each of Arizona's 15 counties on the Internet. Please refer to the following web page for species information in the county where your project occurs: **http://arizonaes.fws.gov**

If you do not have access to the Internet or have difficulty obtaining a list, please contact our office and we will mail or fax you a list as soon as possible.

After opening the web page, find Arizona County/Species List on the main page. Then click on the county of interest. The arrows on the left will guide you through information on species that are listed, proposed, candidates, or have conservation agreements. Here you will find information on the species' status, a physical description, all counties where the species occurs, habitat, elevation, and some general comments. Additional information can be obtained by going back to the main page. On the left side of the screen, click on Document Library, then click on Documents by Species, then click on the name of the species of interest to obtain General Species Information, or other documents that may be available. Click on the "Cactus" icon to view the desired document.

Please note that your project area may not necessarily include all or any of these species. The information provided includes general descriptions, habitat requirements, and other information for each species on the list. Under the General Species Information, citations for the Federal Register (FR) are included for each listed and proposed species. The FR is available at most public libraries. This information should assist you in determining which species may or may not

Ms. Priscilla Titus

occur within your project area. Site-specific surveys could also be helpful and may be needed to verify the presence or absence of a species or its habitat as required for the evaluation of proposed project-related impacts.

Endangered and threatened species are protected by Federal law and must be considered prior to project development. If the action agency determines that listed species or critical habitat may be adversely affected by a federally funded, permitted, or authorized activity, the action agency will need to request formal consultation with us. If the action agency determines that the planned action may jeopardize a proposed species or destroy or adversely modify proposed critical habitat, the action agency will need to enter into a section 7 conference. The county list may also contain candidate species. Candidate species are those for which there is sufficient information to support a proposal for listing. Although candidate species have no legal protection under the Act, we recommend that they be considered in the planning process in the event that they become listed or proposed for listing prior to project completion.

If any proposed action occurs in or near areas with trees and shrubs growing along watercourses, known as riparian habitat, we recommend the protection of these areas. Riparian areas are critical to biological community diversity and provide linear corridors important to migratory species. In addition, if the project will result in the deposition of dredged or fill materials into waterways, we recommend you contact the Army Corps of Engineers which regulates these activities under Section 404 of the Clean Water Act.

The State of Arizona and some of the Native American Tribes protect some plant and animal species not protected by Federal law. We recommend you contact the Arizona Game and Fish Department and the Arizona Department of Agriculture for State-listed or sensitive species, or contact the appropriate Native American Tribe to determine if sensitive species are protected by Tribal governments in your project area. We further recommend that you invite the Arizona Game and Fish Department and any Native American Tribes in or near your project area to participate in your informal or formal Section 7 Consultation process. We further recommend that you invite the Arizona Game and Fish Department and any Native American Tribes in or near your project area to participate in your informal or formal Section 7 Consultation process.

Specific guidance information regarding the cactus ferruginous pygmy-owl on private land can also be found on our web page under Document Library. From there, click on Documents by Species, then click on cactus ferruginous pygmy-owl, then click on the document titled "Recommended Guidance for Private Landowners Concerning the Cactus Ferruginous Pygmy-owl."

For future projects, you do not need to contact our office to obtain a species list for a new project. However, for additional communications regarding this project, please refer to consultation

number 02-21-03-I-0216. We appreciate your efforts to identify and avoid impacts to listed and sensitive species in your project area. If we may be of further assistance, please feel free to contact Tom Gatz for projects in northern Arizona or along the Colorado River (x240) or Sherry Barrett for projects in southern Arizona.

Sincerely,

for Steven L. Spangle
Field Supervisor

cc: Regional Supervisor, Arizona Game and Fish Department, Tucson, AZ
Assistant Field Supervisor, Fish and Wildlife Service, Tucson, AZ

O:\Species List Letters\Generic Ltrs\generictucsonspecieslist.pinal pima.wpd/ij

APPENDIX É

SPECIES	STATUS	HABITAT	COMMENTS	SPECIES CONSIDERED?	REASON FOR EXCLUSION/INCLUSION
Bald Eagle *Haliaeetus leucocephalus*	Threatened	Large trees or cliffs near water (reservoirs, rivers, and streams) with abundant prey	Some birds are nesting residents while a larger number winters along rivers and reservoirs. An estimated 200 to 300 birds winter in Arizona. Once endangered (32 FR 4001, 03-11-1967; 43 FR 6233, 02-14-78) because of reproductive failures from pesticide poisoning and loss of habitat, this species was down listed to threatened on August 11, 1995. Illegal shooting, disturbance, and loss of habitat continues to be a problem. Species has been proposed for delisting (64 FR 36454), but still receives full protection under the Endangered Species Act.	No	No habitat for this species exists in the project area
Cactus ferruginous pygmy-owl *Glaucidium brasilianum cactorum*	Endangered	Mature cottonwood/willow, mesquite bosques and Sonoran desertscrub	Range limit in Arizona is from New River (North) to Gila Box (East) to Cabeza Prieta Mountains (West). Only a few documented sites where this species persists are known, additional surveys are needed. Proposed critical habitat occurs in Pima and Pinal Counties (67 FR71032; 11-27-02).	Yes	Habitat for this species exists in the project area
California Brown pelican *Pelecanus occidentalis californicus*	Endangered	Coastal land and islands; species found around many Arizona lakes and rivers	Subspecies is found on Pacific Coast and is endangered due to pesticides. It is an uncommon transient in Arizona on many Arizona lakes and rivers. Individuals wander up from Mexico in summer and fall. No breeding records in Arizona.	No	No habitat for this species exists in the project area
Chiricahua leopard frog *Rana chiricahuensis*	Threatened	Streams, rivers, backwaters, ponds, and stock tanks that are mostly free from introduced fish, crayfish, and bullfrogs	Require permanent or nearly permanent water sources. Populations north of the Gila River may be closely related, but distinct, undescribed species. A special rule allows take of frogs due to operation and maintenance of livestock tanks on state and private lands.	No	No habitat for this species exists in the project area
Desert pupfish *Cyprinodon macularius*	Endangered	Shallow springs, small streams, and marshes—tolerates saline and warm water	Critical habitat includes Quitobaquito Springs, Pima County, portions of San Felipe Creek, Carrizo Wash, and Fish Creek Wash, Imperial County, California. Two subspecies are recognized: Desert pupfish (C.m.macularis) and Quitobaquito Pupfish (C.m.eremus).	No	No habitat for this species exists in the project area
Gila topminnow *Poeciliopsis occidentalis occidentalis*	Endangered	Small streams, springs, and cienegas vegetated shallows	Species historically occurred in backwaters of large rivers, but is currently isolated to small streams and springs.	No	No habitat for this species exists in the project area
Huachuca water umbel *Lilaeopsis schaffneriana* ssp. *recurva*	Endangered	Cienegas, perennial low gradient streams, wetlands	Populations occur adjacent Sonora, Mexico, west of the continental divide. Populations also on Fort Huachuca Military Reservation. Critical habitat in Cochise and Santa Cruz Counties (64 FR 37441, July 12, 1999).	No	No habitat for this species exists in the project area
Jaguar *Panthera onca*	Endangered	Found in Sonoran desertscrub up through subalpine conifer forest	Also occurs in New Mexico. A jaguar conservation team is being formed that is being led by Arizona and New Mexico state entities along with private organizations.	No	No habitat for this species exists in the project area

SPECIES	STATUS	HABITAT	COMMENTS	SPECIES CONSIDERED?	REASON FOR EXCLUSION/INCLUSION
Kearney blue star *Amsonia kearneyana*	Endangered	West-facing drainages in the Baboquivari Mountains	Plants grow in stable, partially shaded, coarse alluvium along a dry wash in the Baboquivari Mountains. Range is extremely limited. Protected by Arizona Native Plant Law.	No	No habitat for this species exists in the project area
Lesser long-nosed bat *Leptonycteris curasoae yerbabuenae*	Endangered	Desert scrub habitat with agave and columnar cacti present as food plants	Day roosts in caves and abandoned tunnels. Forages at night on nectar, pollen, and fruit of paniculate agaves and columnar cacti. This species is migratory and is present in Arizona, usually from April to September, and south of the border the remainder of the year.	Yes	Habitat for this species exists in the project area
Loach minnow *Tiaroga cobitis*	Threatened	Benthic species of small to large perennial streams with swift shallow water over cobble and gravel. Recurrent flooding and natural hydrograph important.	Presently found in Aravaipa Creek, Blue River, Campbell Blue Creek, San Francisco River, Dry Blue River, and the main stem upper Gila River. Critical habitat was removed March 1998; but re-proposed December 1999 and finalized April 2000. Species also found in Cattron, Grant, and Hidalgo Counties in New Mexico. Counties with critical habitat presently contain no known existing populations of loach minnow.	No	No habitat for this species exists in the project area
Masked bobwhite *Colinus virginianus ridgewayi*	Endangered	Desert grasslands with diversity of dense native grasses, forbs, and brush	Species is closely associated with Acacia angustissima. Formerly occurred in Altar and Santa Cruz Valleys, as well as Sonora, Mexico. Presently only known from reintroduced populations on Buenos Aires.	No	No habitat for this species exists in the project area
Mexican gray wolf *Canis lupus baileyi*	Endangered	Chaparral, woodland, and forested areas. May cross desert areas	Historic range is considered to be larger than the counties listed above. Unconfirmed reports of individuals in the southern part of the state (Cochise, Pima, Santa Cruz) continue to be received. Individuals may still persist in Mexico. Experimental nonessential population introduced in the Blue Primitive Area of Greenlee, Apache, and Coconino Counties.	No	Species has been reintroduced in Arizona, but is not known to occur in the project area
Mexican spotted owl *Strix occidentalis lucida*	Threatened	Nests in canyons and dense forests with multi-layered foliage structure	Generally nests in older forests of mixed conifer or ponderosa pine/Gambel's oak type, in canyons, and use variety of habitats for foraging. Sites with cool microclimates appear to be of importance or are preferred. Critical habitat was removed in 1998, but re-proposed in July 2000 and finalized in February 2001 for Apache, Cochise, Coconino, Graham, Mohave, Pima Counties; Also in New Mexico, Utah, and Colorado.	No	No habitat for this species exists in the project area
Nichol Turk's head cactus *Echinocactus horizonthalonius var. nicholii*	Endangered	Sonoran desertscrub	Found in unshaded microsites in Sonoran desertscrub on dissected alluvial fans at the foot of limestone mountains and on inclined terraces and saddles on limestone mountainsides.	No	No habitat for this species exists in the project area

SPECIES	STATUS	HABITAT	COMMENTS	SPECIES CONSIDERED?	REASON FOR EXCLUSION/INCLUSION
Ocelot *Leopardus (=Felis) pardalis*	Endangered	Humid tropical and sub-tropical forests, savannahs, and semi-arid thorn scrub	May persist in partially cleared forests, second-growth woodland, and abandoned cultivation reverted to brush. Universal component is presence of dense cover. Unconfirmed reports of individuals in the southern part of the state continue to be received.	No	Species is possibly extirpated from Arizona
Pima pineapple cactus *Coryphantha scheeri var. robustispina*	Endangered	Sonoran desertscrub or semi-desert grassland communities	Occurs in alluvial valleys or on hillsides in rocky to sandy or silty soils between 2,800–3,500 feet. This species can be confused with juvenile barrel cactus (Ferocactus). However, the spines of the later are flattened, in contrast with the round cross-section of the Coryphantha spines. Also, the aeroles (spine clusters) of Coryphantha are on tubercles (bumps), while the areoles of Ferocactus are on ridges (ribs) and 80% to 90% of individuals occur on state and private land.	No	No habitat for this species exists in the project area
Sonoran pronghorn *Antilocapra americana sonoriensis*	Endangered	Broad intermountain alluvial valleys with creosote-bursage and paloverde-mixed cacti associations	Typically, bajadas are used as fawning areas and sandy dune areas provide food seasonally. Historic range was probably larger than exists today. This subspecies also occurs in Mexico.	No	No habitat for this species exists in the project area
Southwestern willow flycatcher *Empidonax traillii extimus*	Endangered	Cottonwood/willow and tamarisk vegetation communities along rivers and streams	Migratory riparian obligate species that occupy breeding habitat from late April to September. Distribution within its range is restricted to riparian corridors. Difficult to distinguish from other members of the Empidonax complex by sight alone. Training seminar required for those conducting flycatcher surveys. Critical habitat was set aside by the 10th Circuit Court of Appeals (May 17, 2001).	No	No habitat for this species exists in the project area
Spikedace *Meda fulgida*	Threatened	Moderate to large perennial streams with gravel cobble substrates and moderate to swift velocities over sand and gravel substrates. Recurrent flooding and natural hydrograph important.	Presently found in Aravaipa Creek, Eagle Creek, Verde River, East-West-Main and Middle Forks of the Gila River in New Mexico, and Gila River from San Pedro River to Ashurst Hayden Dam. Critical habitat was removed in March 1998, but re-proposed December 1999 and finalized in April 2000. Species also found in Catron, Grant, and Hidalgo Counties in New Mexico. Counties with critical habitat presently contain no known existing populations of spikedace.	No	No habitat for this species exists in the project area
Gila chub *Gila intermedia*	Proposed Endangered	Pools, springs, cienegas, and streams	Multiple private landowners, including The Nature Conservancy, Audubon Society, and others. Also Fort Huachuca. Species also found in Sonora, Mexico. Proposed critical habitat occurs in Cochise, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, and Yavapai Counties.	No	No habitat for this species exists in the project area

SPECIES	STATUS	HABITAT	COMMENTS	SPECIES CONSIDERED?	REASON FOR EXCLUSION/INCLUSION
Acuna cactus *Echinomastus erectocentrus var. acunensis*	Candidate	Well drained knolls and gravel ridges in Sonoran desertscrub	Immature plants distinctly different from mature plants. They are disc-shaped or spherical and have no central spines until they are about 1.5 inches. Radial spines are dirty white with maroon tips.	No	No habitat for this species exists in the project area
Sonoyta mud turtle *Kinosternon sonoriense longifemorale*	Candidate	Ponds and streams	Species also found in Rio Sonoyta, Sonora, Mexico.	No	No habitat for this species exists in the project area
Yellow-billed cuckoo *Coccyzus americanus*	Candidate	Large blocks of riparian woodlands (Cottonwood, willow, or tamarisk galleries)	Species was found warranted, but precluded for listing as a distinct vertebrate population segment in the western U.S. on July 25, 2001. This finding indicates that the USFWS has sufficient information to list the bird, but other, higher priority listing actions prevent the USFWS from addressing the listing of the cuckoo at this time.	No	No habitat for this species exists in the project area
Gooddings onion *Allium goodingii*	Conservation Agreement	Forested drainage bottoms and on moist north facing slopes of mixed conifer and spruce fir forests	Conservation agreement between the USFWS and the U.S. Forest Service signed in February 1998. In New Mexico on the Lincoln and Gila National Forests.	No	No habitat for this species exists in the project area
San Xavier talussnail *Sonorella eremita*	Conservation Agreement	Deep, limestone rockslide with outcrops of limestone and decomposed granite	Conservation agreement signed by the USFWS, Arizona Game and Fish Department, El Paso Natural Gas Company, and Arizona Electric Power Cooperative, Inc., in September 1998.	No	No habitat for this species exists in the project area

APPENDIX F

ARIZONA GAME AND FISH DEPARTMENT SPECIES LIST

APPENDIX F

THE STATE OF ARIZONA
GAME AND FISH DEPARTMENT
2221 WEST GREENWAY ROAD, PHOENIX, AZ 85023-4399
(602) 942-3000 • AZGFD.COM

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May 1, 2003

Ms. Priscilla Titus
SWCA
343 S. Scott Ave.
Tucson, AZ 85701

Re: Special Status Species Information for **Township 13 South, Range 11 East, Section Line of 27 and 28; Proposed Sandario Road Improvements Project.**

Dear Ms. Titus:

The Arizona Game and Fish Department (Department) has reviewed your request, dated April 22, 2003, regarding special status species information associated with the above-referenced project area. The Department's Heritage Data Management System (HDMS) has been accessed and current records show that the special status species listed on the attachment have been documented as occurring in the project area (2-mile buffer). In addition, this project occurs within proposed Critical Habitat for the cactus ferruginous pygmy-owl.

The Department's HDMS data are not intended to include potential distribution of special status species. Arizona is large and diverse with plants, animals, and environmental conditions that are ever changing. Consequently, many areas may contain species that biologists do not know about or species previously noted in a particular area may no longer occur there. Not all of Arizona has been surveyed for special status species, and surveys that have been conducted have varied greatly in scope and intensity.

Making available this information does not substitute for the Department's review of project proposals, and should not decrease our opportunities to review and evaluate new project proposals and sites. The Department is also concerned about other resource values, such as other wildlife, including game species, and wildlife-related recreation. The Department would appreciate the opportunity to provide an evaluation of impacts to wildlife or wildlife habitats associated with project activities occurring in the subject area, when specific details become available.

Ms. Priscilla Titus
May 1, 2003
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If you have any questions regarding the attached species list, please contact me at (602) 789-3618. General status information, state-wide and county distribution lists, and abstracts for some special status species are also available on our web site at: http://www.azgfd.com/hdms.

Sincerely,

Sabra S. Schwartz
Heritage Data Management System, Coordinator

SSS:ss

Attachment

cc: Bob Broscheid, Project Evaluation Program Supervisor
Russ Haughey, Habitat Program Manager, Region VI

AGFD #04-23-03(19)

Special Status Species within 2 Miles of T13S,R11E Section Line: 27, 28

Arizona Game and Fish Department, Heritage Data Management System

May 1, 2003

Scientific Name	Common Name	ESA	USFS	BLM	WSCA	NPL
ABUTILON PARISHII	PIMA INDIAN MALLOW	SC	S			SR
EUPHORBIA GRACILLIMA	MEXICAN BROOMSPURGE		S			
GOPHERUS AGASSIZII (SONORAN POPULATION)	SONORAN DESERT TORTOISE	SC			WSC	
MAMMILLARIA THORNBERI	THORNBER FISHHOOK CACTUS					SR
OPUNTIA KELVINENSIS	KELVIN CHOLLA					SR
TUMAMOCA MACDOUGALII	TUMAMOC GLOBEBERRY		S	S		SR

Proposed Critical Habitat for the cactus ferruginous pygmy-owl within project area. AGFD #04-23-03(19), Sandario Road Improvements Project.

GUIDELINES FOR HANDLING SONORAN DESERT TORTOISES
ENCOUNTERED ON DEVELOPMENT PROJECTS
Arizona Game and Fish Department
Revised January 17, 1997

The Arizona Game and Fish Department (Department) has developed the following guidelines to reduce potential impacts to desert tortoises, and to promote the continued existence of tortoises throughout the state. These guidelines apply to short-term and/or small-scale projects, depending on the number of affected tortoises and specific type of project.

Desert tortoises of the Sonoran population are those occurring south and east of the Colorado River. Tortoises encountered in the open should be moved out of harm's way to adjacent appropriate habitat. If an occupied burrow is determined to be in jeopardy of destruction, the tortoise should be relocated to the nearest appropriate alternate burrow or other appropriate shelter, as determined by a qualified biologist. Tortoises should be moved less than 48 hours in advance of the habitat disturbance so they do not return to the area in the interim. Tortoises should be moved quickly, kept in an upright position at all times and placed in the shade. Separate disposable gloves should be worn for each tortoise handled to avoid potential transfer of disease between tortoises. Tortoises must not be moved if the ambient air temperature exceeds 105 degrees Fahrenheit unless an alternate burrow is available or the tortoise is in imminent danger.

A tortoise may be moved up to two miles, but no further than necessary from its original location. If a release site, or alternate burrow, is unavailable within this distance, and ambient air temperature exceeds 105 degrees Fahrenheit, the Department should be contacted to place the tortoise into a Department-regulated desert tortoise adoption program. Tortoises salvaged from projects which result in substantial permanent habitat loss (e.g. housing and highway projects), or those requiring removal during long-term (longer than one week) construction projects, will also be placed in desert tortoise adoption programs. *Managers of projects likely to affect desert tortoises should obtain a scientific collecting permit from the Department to facilitate temporary possession of tortoises.* Likewise, if large numbers of tortoises (>5) are expected to be displaced by a project, the project manager should contact the Department for guidance and/or assistance.

Please keep in mind the following points:

- These guidelines do not apply to the Mohave population of desert tortoises (north and west of the Colorado River). Mohave desert tortoises are specifically protected under the Endangered Species Act, as administered by the U.S. Fish and Wildlife Service.

- These guidelines are subject to revision at the discretion of the Department. We recommend that the Department be contacted during the planning stages of any project that may affect desert tortoises.

- Take, possession, or harassment of wild desert tortoises is prohibited by state law. Unless specifically authorized by the Department, or as noted above, project personnel should avoid disturbing any tortoise.

RAC:NLO:rc

STATUS DEFINITIONS

ARIZONA GAME AND FISH DEPARTMENT (AGFD)
HERITAGE DATA MANAGEMENT SYSTEM (HDMS)

FEDERAL US STATUS

ESA **Endangered Species Act** (1973 as amended)
US Department of Interior, Fish and Wildlife Service (http://arizonaes.fws.gov)

Listed

- **LE** Listed Endangered: imminent jeopardy of extinction.
- **LT** Listed Threatened: imminent jeopardy of becoming Endangered.
- **XN** Experimental Nonessential population.

Proposed for Listing

- **PE** Proposed Endangered.
- **PT** Proposed Threatened.

Candidate (Notice of Review: 1999)

- **C** Candidate. Species for which USFWS has sufficient information on biological vulnerability and threats to support proposals to list as Endangered or Threatened under ESA. However, proposed rules have not yet been issued because such actions are precluded at present by other listing activity.
- **SC** Species of Concern. The terms "Species of Concern" or "Species at Risk" should be considered as terms-of-art that describe the entire realm of taxa whose conservation status may be of concern to the US Fish and Wildlife Service, but neither term has official status (currently all former C2 species).

Critical Habitat (check with state or regional USFWS office for location details)

- **Y** Yes: Critical Habitat has been designated.
- **P** Proposed: Critical Habitat has been proposed.

[**\N** No Status: certain populations of this taxon do not have designated status (check with state or regional USFWS office for details about which populations have designated status)**]**.

USFS **US Forest Service** (1999 Animals, 1999 Plants: corrected 2000)
US Department of Agriculture, Forest Service, Region 3 (http://www.fs.fed.us/r3/)

- **S** Sensitive: those taxa occurring on National Forests in Arizona which are considered sensitive by the Regional Forester.

BLM **US Bureau of Land Management** (2000 Animals, 2000 Plants)
US Department of Interior, Bureau of Land Management, Arizona State Office (http://azwww.az.blm.gov)

- **S** Sensitive: those taxa occurring on BLM Field Office Lands in Arizona which are considered sensitive by the Arizona State Office.
- **P** Population: only those populations of Banded Gila monster (*Heloderma suspectum cinctum*) that occur north and west of the Colorado River, are considered sensitive by the Arizona State Office.

STATE STATUS

NPL **Arizona Native Plant Law** (1999)
Arizona Department of Agriculture (http://agriculture.state.az.us/PSD/nativeplants.htm)

- **HS** Highly Safeguarded: no collection allowed.
- **SR** Salvage Restricted: collection only with permit.
- **ER** Export Restricted: transport out of State prohibited.
- **SA** Salvage Assessed: permits required to remove live trees.
- **HR** Harvest Restricted: permits required to remove plant by-products.

WSCA **Wildlife of Special Concern in Arizona** (in prep)
Arizona Game and Fish Department (http://www.azgfd.com)

- **WSC** Wildlife of Special Concern in Arizona. Species whose occurrence in Arizona is or may be in jeopardy, or with known or perceived threats or population declines, as described by the Arizona Game and Fish Department's listing of Wildlife of Special Concern in Arizona (WSCA, in prep). Species indicated on printouts as WSC are currently the same as those in **Threatened Native Wildlife in Arizona** (1988).

Revised 8/14/02, AGFD HDMS
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APPENDIX G

BIOLOGICAL ASSESSMENT

APPENDIX G

BIOLOGICAL ASSESSMENT

OF THE

SANDARIO/KINNEY ROADS INTERSECTION IMPROVEMENT

TUCSON MOUNTAIN DISTRICT

SAGUARO NATIONAL PARK

Pima County, Arizona
Township 13 South, Range 11 East, Section 27/28
USGS Avra Quadrangle

SAGUARO NATIONAL PARK

3693 S. Old Spanish Trail
Tucson, Arizona 85730

Sandy Wolf
520-733-5171

April 2004

EXECUTIVE SUMMARY

This Biological Assessment was written to supplement Saguaro National Park's EA for Sandario/Kinney Roads Intersection Improvements. It is meant to assist Saguaro National Park with planning and implementing the road intersection improvements proposed for fall 2004. It also provides the Arizona Ecological Service's Field Office of the U.S. Fish & Wildlife Service with assessments of how the road intersection improvements are expected to affect federally threatened and endangered species. This document contains a list of the federally listed species and critical habitats considered in this document, consultations to date, a description of the proposed action, a description of the affected environment, species accounts and determinations of the effects of the proposed project on relevant federally listed species, and references for literature cited.

In October and November, 2004, Saguaro National Park plans to reconstruct a portion of road in its Tucson Mountain District. A portion of Sandario Road would be reconstructed starting at the intersection of Kinney Road with Sandario and ending approximately 500 linear feet south on Sandario Road. The reconstruction is necessary to reduce the occurrence of traffic accidents by improving poor sight distances. The project would include raising the grade of the road approximately seven vertical feet from its present elevation, adding a box culvert with wingwalls to convey drainage beneath the road surface, and adding guardrails on both sides of Sandario Road above the culvert.

The improvements to the intersection are expected to result in a reduction in accidents, because sight distance for vehicles will be increased. Potential damage to vegetation along the roadside from accidents also will be reduced. Visitors to the Park traveling south on Sandario Road will be able to turn left onto Kinney Road to access the Visitor Center, trails, and pullouts. This will eliminate the current necessity for a longer, potentially confusing route to these sites. Wildlife traveling along the wash may use the box culvert to cross under Sandario Road rather than cross the road. This may result in fewer animals killed by vehicles.

Of 26 federally listed, candidate, or conservation agreement species of special status in Pima County, two species are considered in this document. Although there are no records of occurrence of the lesser long-nosed bat in the Tucson Mountain District, habitat is present in the project area. There is one confirmed detection of a cactus ferruginous pygmy-owl in the vicinity of the project area; this detection occurred in King Canyon prior to 1990, over three miles from the Sandario/Kinney Roads intersection. The Tucson Mountain District is designated as proposed Critical Habitat for the cactus ferruginous pygmy-owl. In addition, the American peregrine falcon, occasionally sighted in the Tucson Mountain District, has recently been delisted, but is being monitored. This document includes species accounts for these three species, and provides additional discussion of issues related to cactus ferruginous pygmy-owls and their critical habitat.

The Park has determined that the proposed action will have no effect on the American peregrine falcon, the lesser long-nosed bat, or their habitats. The proposed action may affect, but is not likely to adversely affect, the cactus ferruginous pygmy-owl and cactus ferruginous pygmy-owl critical habitat.

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INTRODUCTION

This Biological Assessment (BA) was written to supplement Saguaro National Park's Environmental Assessment (engineering-environmental Management, Inc. 2004) for the Sandario/Kinney Roads Intersection Improvements. It is meant to assist Saguaro National Park with planning and implementing this road construction project, which is designed to increase visitor safety and reduce accidents at the intersection of Sandario and Kinney Roads. It also provides the Arizona Ecological Service's Field Office of the U.S. Fish and Wildlife Service (USFWS) with assessments of how the project is expected to affect federally threatened and endangered species. This document contains a list of the federally listed species and critical habitats considered in this document, consultations to date, a description of the proposed action, a description of the affected environment, species accounts and determinations of the effects of the proposed project on relevant federally listed species, and references for literature cited.

The species considered in this document are:

THREATENED AND ENDANGERED SPECIES

American peregrine falcon (*Falco peregrinus anatum*) delisted but being monitored
Lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*) **E**
Cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*) **E**

CRITICAL HABITAT

The action addressed within this biological assessment falls within proposed Critical Habitat for the cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*). The proposed rule was established by USFWS on November 27, 2002 (U.S. Fish and Wildlife Service 2003).

CONSULTATION TO DATE

On November 21, 2002, Natasha Kline, Biologist at Saguaro National Park, spoke with Scott Richardson, Biologist, Tucson Field Office, Arizona Ecological Services, USFWS, for an informal consultation. It was determined that a site visit was warranted because the project area was within proposed Critical Habitat for the cactus ferruginous pygmy-owl (CFPO) and involved some removal of vegetation.

On December 11, 2002, Scott Richardson and Greg Johnson, Facility Manager at Saguaro, met at the site and evaluated the project and area. It was determined that a Biological Assessment would be necessary, as well as two years of compliance surveys for CFPO.

In August, September, and October, 2003 Natasha Kline and Scott Richardson exchanged emails discussing the scope of the project, its possible effects on pygmy-owl habitat, and ways to reduce and mitigate effects on habitat.

DESCRIPTION OF THE PROPOSED ACTION

In fall 2004, Saguaro National Park plans to reconstruct a portion of road in its Tucson Mountain District. A portion of Sandario Road would be reconstructed starting at the intersection of Kinney Road with Sandario and ending approximately 500 linear feet south on Sandario Road. The reconstruction would reduce the occurrence of traffic accidents, improve poor sight distances, and improve drainage conditions. The project would include raising the grade of the road approximately seven vertical feet from its present elevation, adding a box culvert with wingwalls to convey drainage beneath the road surface, and adding guardrails on both sides of Sandario Road over the culvert. The box culvert is designed to facilitate most wildlife crossing the road.

It is the mandate of the Park to preserve and protect all natural and cultural resources and systems and to keep them intact for the enjoyment of future generations. The Park, therefore, has planned and will implement this project in a manner consistent with this mandate.

Purpose/Need

The National Park Service (NPS), in cooperation with Pima County Department of Transportation, proposes to reconstruct a 500-linear foot portion of Sandario Road at the south approach to the intersection with Kinney Road. The reconstruction is necessary to eliminate a dip in the road and would be accomplished by raising the road approximately seven vertical feet. The purpose of the project is to improve traffic safety; sight distance must be improved to reduce accidents (Robert Peccia and Associates 1999). The dip conveys an at-grade wash, and limits sight distance for vehicles in the dip and vehicles turning onto Sandario Road from Kinney Road, resulting in a high rate of accidents. The roadway is also subjected to periodic closure as a result of flooding during storm water runoff. This action is needed to reduce the accident rate by providing better site distance, to prevent periodic road closure due to flooding, and to allow safe viewing of the resources of Saguaro National Park.

Sandario Road is a two-lane paved road running north-south and crossing through the Tucson Mountain District of Saguaro National Park on the Park's western side. In some portions, the road forms the western boundary of the Park. Traffic consists of Park visitors, local commuters, and commercial traffic. The road is used by Park visitors to access Kinney Road, the Red Hills Visitor Center, and various trails and picnic areas. Sight distance along the road is limited due to the presence of dips in the road. Posted speed limit is 50 miles per hour. Average daily traffic on Sandario Road is 2,100 vehicles (Robert Peccia and Associates 1999). This number has steadily increased in recent years as the suburbs of the city of Tucson expand to surround the Park. There is little variation in traffic volume during the year. A recent informal survey of average daily traffic on Sandario Road in the project vicinity indicated that the highest amount of vehicles (176 non-commercial vehicles and 43 commercial vehicles) commute along Sandario Road between 8:00 A.M. and 9:00 A.M.

Kinney Road is a two-lane road that runs from the intersection with Sandario Road through the southwest corner of the Tucson Mountain District of the Park and terminates at Ajo Way on the outskirts of the city of Tucson. The road through the Park is narrow and winding and is the only

access to the Tucson Mountain District's Red Hills Visitor Center and various hiking and nature trails. The posted speed limit is 30 miles per hour. The Kinney Road traffic counter recorded 150,048 vehicles for the 12-month period from September 2002 through August 2003, for an average of 12,504 vehicles per month, or approximately 417 vehicles per day.

The intersection of Sandario Road and Kinney Road is a "T" intersection with the Kinney Road approach controlled by a stop sign. In an attempt to reduce accidents at the intersection of Sandario and Kinney Roads until permanent improvements could be made, Pima County, with the Park's concurrence, placed a sign prohibiting vehicles traveling south on Sandario Road from making left-hand turns onto Kinney Road to access the Park and visitor center. The signage indicating how to get to the Red Hills Visitor Center without making this turn is confusing and visitors have difficulty determining the correct route.

A traffic safety study in 1999 assisted the Park with developing a park road system that conforms to nationally accepted traffic safety standards and signing practices (Robert Peccia and Associates 1999). There have been numerous accidents at this location over the years. During a three-year study of traffic safety in Saguaro National Park, 16 accidents occurred at the intersection of Sandario and Kinney Roads. Eight of the accidents were injury accidents with a total of 24 injuries (Robert Peccia and Associates 1999). Pima County traffic records of the Sandario/Kinney Roads intersection report that from January 2000 through December 2002, 18 traffic accidents occurred (Pima County DOT 2003 data). Park records for the same period of time indicate that of the 18 accidents, 11 were collisions between two vehicles due to visibility problems associated with the dip in Sandario Road.

The main recommendation from the safety study is to improve the site distance south of the intersection. According to the study, vehicles turning left onto Kinney from the north and vehicles accessing Sandario from the east cannot see a vehicle approaching from the south. To correct this problem, the south approach to the intersection will be reconstructed by raising the road grade through the dip.

The project design also incorporates a wildlife crossing to reduce the number of animals killed by automobiles while crossing the road. Loss of native vegetation occurs adjacent to the roadway when motor vehicle accidents occur. Reduction in the accident rate will have a positive impact on native vegetation. The project will provide protection of the public experience and improve traffic safety with minimal disturbance to natural and cultural resources.

Funding

The project is to be a partnership with the Pima County Department of Transportation, which is concerned about the accident rate at the project site and has agreed to provide design services, contracting, construction engineering, and 50% of construction funds.

Timeline

Construction for this project is expected to last approximately three months, starting in October of 2004; however, construction could be delayed by unforeseen events. The construction periods

allow approximately one to two months for road detours, placement of the box culvert, and completion of work on Sandario Road, and one month for repair work on Kinney Road in the event increased traffic causes road damage. The timeline has been minimized by closing Sandario Road rather than creating a detour around the construction site.

Description of project area

The project footprint, or actual construction area, extends along Sandario Road, beginning at the intersection with Kinney Road and ending approximately 500 feet south of the intersection (Figure 1). Construction limits are set at 30 feet from the road centerline and extend to approximately 50 feet from the centerline in the drainage. Where the drainage crosses the road, construction will occur along approximately 150 feet of road. This section will include the box culvert with wingwalls, fill, and a guardrail. There will be 15 feet of new disturbance beyond the existing road shoulder. For 130 feet both north and south of this area, fill will be added and disturbance will extend 8.5 feet beyond the shoulder. There will be no new disturbance for the 45-foot sections at the north and south ends of the construction area. A total of 0.2 acres will be disturbed. The project area includes Kinney Road through the Park, Mile Wide Road from Kinney to Sandario, and Sandario from Mile Wide to the construction area (Figure 2).

The affected wash is small, runs east to west, and crosses Sandario Road about 180 feet south of the intersection. The wash is a tributary of Brawley Wash, and is dry except during storms.

Construction equipment will be staged only in designated turnouts or parking areas. Recommended staging areas are the northeast corner of Sandario and Mile Wide Roads (pump house area with gate and lock), the maintenance yard for the Park (northeast of the visitor center, accessed by service road), and the road shoulder near the construction site (only on county-maintained shoulder, no disturbance outside of that area).

The construction site will be closed to two-way traffic during construction for approximately two to four weeks. This will eliminate the need for construction of an on-site detour, which would cause additional ground disturbance at the site. During construction, all non-commercial traffic will be routed through the Park via Kinney Road. Commercial traffic (vehicles over two axles) will be detoured according to the plan created by Pima County, but will not be allowed on Kinney Road through the Park. Exceptions would be made for emergency vehicles, school buses, Park deliveries, and trucks making deliveries to homes and businesses in adjacent neighborhoods. Recreation vehicles traveling to the Park would also be allowed.

Upon completion of construction on Sandario Road, Kinney Road may require minor repair or resurfacing due to damage caused by increased traffic.

Construction techniques

The south approach to the intersection will be reconstructed by raising the road grade approximately seven feet in elevation through the dip. Drainage flows will be conveyed through

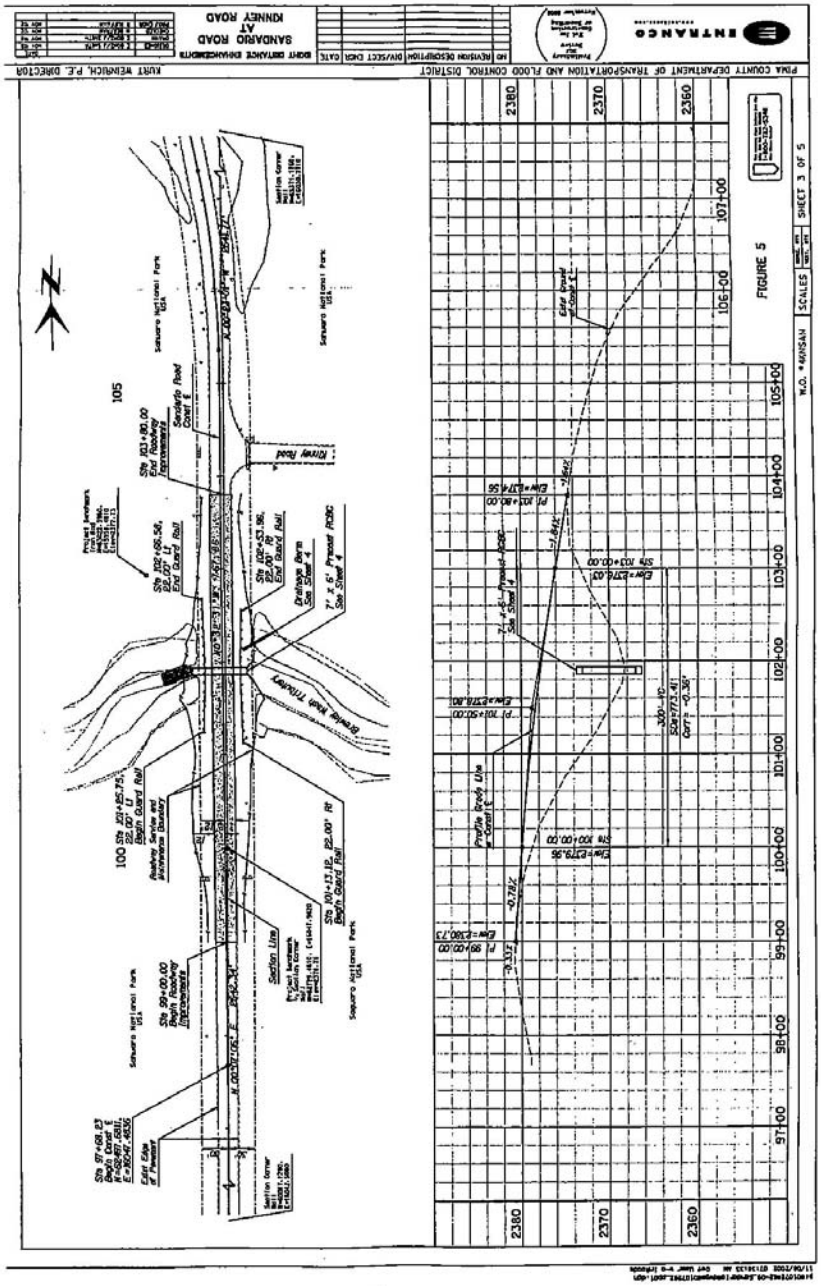

Figure 1. Proposed construction plans

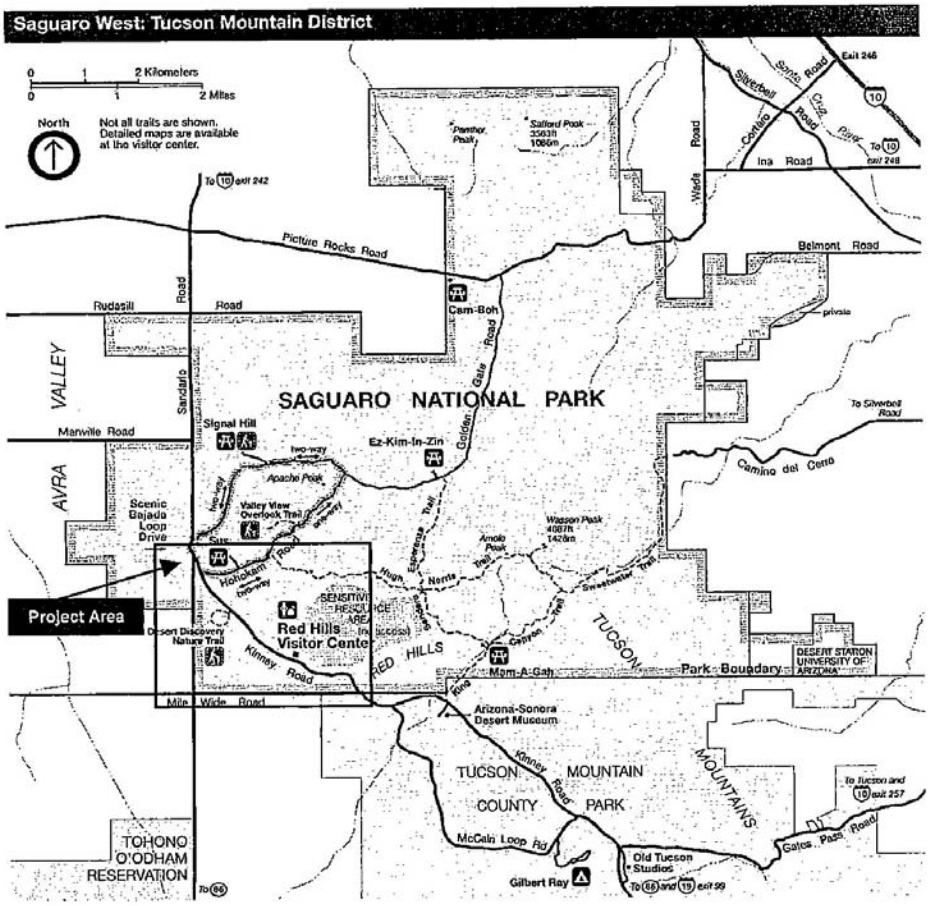

Figure 2. Map of project area

a reinforced concrete box culvert (6 feet high by 12 feet wide) and fill will be used on either side of the culvert to raise the road grade. The box culvert allows the quickest installation, thereby minimizing time necessary for traffic detours. The culvert is designed to handle peak flows from a 100-year, 24-hour storm event, although some water would back up at the culvert entrance raising the water surface elevation during a 100-year storm event by approximately 3.5 feet. The design prevents overtopping of the new roadway elevation or channelization of flows to the north or south, parallel to the roadway. The culvert inlet is designed with wingwalls and the outlet will have both wingwalls and erosion protection in a designed scour hole to reduce velocities upon exiting the culvert and prevent additional downstream erosion. The box culvert will be lowered into the ground to prevent disturbance of the natural flow of the wash. The culvert is large enough to allow most local wildlife to use it to pass under the road rather than crossing the road. The bottom of the scour hole will be layered with riprap and voids filled with sand to maintain a natural substrate for wildlife. Following construction completion, the culvert and scour hole will be monitored to assure that riprap remains covered and to determine use by wildlife.

Vegetation salvage/removal/restoration in project area

Larger cacti, trees, and shrubs along the project site will be tagged and protected with construction fencing to ensure they are not disturbed. The Park is responsible for salvaging particular species that will be replanted after project completion to preserve the integrity of the project site. Approximately seven trees and shrubs will be removed or pruned as part of the construction effort. Upon completion of construction, topsoil will be replaced and the area revegetated. Details on the effects of the project on vegetation and mitigation are given in the section on the cactus ferruginous pygmy-owl.

Mitigation measures

General considerations

- Prior to any work being completed by the contractor, construction/snow fencing would be installed to clearly delineate the project/disturbance limits. The fence would be bright in color with mesh holes at least 4-inch x 4-inch to allow reptiles to pass through without being entangled.
- All protection measures would be clearly stated in the construction specifications and workers would be instructed to avoid conducting activities beyond the construction zone, as defined by the construction zone fencing.
- Prior to construction, a Hazardous Spill Plan would be submitted, stating what actions would be taken in case of a spill. This plan would also incorporate preventive measures to be implemented such as the placement of refueling facilities, storage and handling of hazardous materials, and notification procedures for a spill, etc. The county would be immediately notified in the event of a spill of hazardous materials.
- Concrete and asphalt would be produced outside Saguaro National Park. No overnight storage of these materials would be permitted within Park boundaries.
- Oil, hydraulic fluids, anti-freeze, or other chemicals would not be drained onto the ground within Park boundaries.
- All equipment on the project would be maintained in a clean and well-functioning state to avoid or minimize contamination from automotive fluids and to ensure noise controls are properly functioning; all equipment would be checked daily.
- All earth-moving equipment (including hauling vehicles) would be steam cleaned of mud and weed seed to the approval of the county prior to entering the Park. Subsequent entries of hauling vehicles would not require cleaning unless requested.

- Vehicles or equipment would not be permitted outside the work limits, except as approved by the county and park.
- Construction equipment would be staged only in designated areas.
- All fill and aggregate material would be treated or certified free of non-native plants before coming into the Park. Many of the highly invasive non-native plants that Saguaro National Park actively controls are not on the State of Arizona Noxious Weed List; therefore, the Park would require that the fill material be free of non-native plants currently being controlled by the Park.
- Paleontological remains and specimens, petroglyphs, artifacts, structural features, ceremonial, domestic, and archeological objects of any nature, historic or prehistoric, found within the construction area, are the property of the National Park Service. The contractor shall control the actions of its employees and subcontractors at the job site to ensure that any protected sites would not be disturbed or damaged. Should contractor's operations uncover or the contractor's employees find any archeological remains, all operations would be suspended and the Park's project manager and the county would be notified immediately of the finding. The notification would include a brief statement of the location and details of the finding. After the findings have been evaluated by the National Park Service or its designated representatives, under section 106 of the National Historic Preservation Act, 36 CFR Part 800, and any necessary data recovery performed, work would resume upon notification by the park manager and the county.
- Should human remains or cultural items subject to the Native American Graves Protection and Repatriation Act of 1990 be discovered, all operations would be suspended. The National Park Service would follow the appropriate provisions of the act and its implementing regulations, 43 CFR Part 10.
- All tools, equipment, barricades, signs, surplus materials, and rubbish would be removed from the project work limits upon project completion. Any asphalt surfaces damaged due to work on the project would be repaired to original condition. All demolition debris would be removed from the project site, including all visible concrete and metal pieces.
- To control fugitive dust, water sprinkling would occur, as needed, on active work areas where dirt or fine particles are exposed.

Sediment control

- Best management practices for drainage and sediment control would be implemented to prevent or reduce nonpoint source pollution and minimize soil loss and sedimentation in drainage areas. Use of best management practices in the project area for drainage area protection would include all or some of the following actions, depending on site-specific requirements:
    - Keeping disturbed areas as small as practical to minimize exposed soil and the potential for erosion.
    - Locating waste and excess excavated materials outside of drainages to avoid sedimentation.
    - Installing silt fences, temporary earthen berms, temporary water bars, sediment traps, stone check dams, or other equivalent measures (including installing erosion-control measures around the perimeter of stockpiled fill material) prior to construction.
    - Conducting regular site inspections during the construction period to ensure that erosion-control measures were properly installed and are functioning effectively.
    - Storing, using, and disposing of chemicals, fuels, and other toxic materials in an appropriate manner.
    - Revegetating disturbed areas as soon as possible after construction is completed.
- During periods of heavy rainfall, work would be halted. During these work stoppage periods, project personnel would continue to check the silt fences and check dams, maintain the silt fences in effective condition, and remove accumulated sediment, if necessary.

Soils

- No blasting would be allowed.
- Topsoil (upper 2-3 inches of the soil) would be removed from areas of construction and stored for later revegetation use.
- The topsoil salvaged before construction would be redistributed in as near the original location as possible.

- Erosion and sediment control would be required.

Vegetation

- Revegetation would be carried out according to the revegetation plan set forth by the Park's restoration ecologist.
- Larger cacti, trees, and shrubs along the project site would be tagged and protected with construction fencing to ensure they are not disturbed.
- The Park's restoration crew would conduct pre-construction salvage work. All salvaged material would be placed in appropriate sized containers and transferred to a holding area within Park boundaries.
- All plant material not salvaged from the project area, but removed during the clearing and grubbing, would be left just outside of the clearing limits so that it can be used during the restoration work. Some plant material may be hauled off-site completely, but that would be determined during the clearing and grubbing by the restoration ecologist or a designee. The restoration ecologist (or designee) would be onsite and allowed to direct the contractor during the clearing and grubbing phase.
- When feasible, pruning shrubs to ground level is preferred over blading vegetation with heavy equipment.
- Additional mitigation for the cactus ferruginous pygmy-owl is discussed under the species account.

Wildlife

- The contractor would be required to maintain strict garbage control so that scavengers (e.g., coyotes, ravens) are not attracted to the project area. No food scraps would be discarded or fed to wildlife.
- The contractor will cover or fence trenches to prevent wildlife from falling in and becoming trapped.
- Park employees will survey before and during construction for tortoise and other herpetofauna.

Special-status species

- If any special-status animal or plant species or critical habitats are discovered within or adjacent to the project area during construction, construction would be halted, consultation with the U.S. Fish and Wildlife Service would be initiated, and appropriate mitigation measures would be implemented.
- Construction activities will take place between October 1 and December 31 to avoid the cactus ferruginous pygmy-owl breeding season.
- Additional mitigation for the cactus ferruginous pygmy-owl is discussed under the species account.

Public experience

- Signs would be posted notifying visitors and commuters of expected delays and detours.

DESCRIPTION OF THE AFFECTED ENVIRONMENT

The project area is located in the Tucson Mountain District of Saguaro National Park in Pima County, Arizona, approximately 15 miles west of the city of Tucson. Elevation is approximately 2360 feet. The vegetative community within the project area is typical of that described as paloverde-cacti-mixed shrub series, Arizona Upland subdivision of Sonoran Desertscrub (Brown 1994). Dominant species within the project site are the saguaro cactus (*Carnegiea gigantea*), desert ironwood (*Olneya tesota*), and little-leaf paloverde (*Cercidium microphyllum*). Other important species within the project include whitethorn acacia (*Acacia constricta*), ocotillo (*Fouquieria splendens*), and desert hackberry (*Celtis pallida*). Cacti are prevalent and diverse and include barrel cactus (*Ferocactus wislizeni*), prickly pear (*Opuntia phaeacantha*), buckhorn cholla (*Opuntia acanthocarpa*), jumping cholla (*Opuntia fulgida*), and hedgehog cactus (*Echinocereus fasciculatus*). Terrain slopes gently downhill from east to west.

The project area is within proposed Critical Habitat for the cactus ferruginous pygmy-owl, although no CFPO have been detected in the project area (NPS files, SWCA data). The detection in the King Canyon area (Davis and Russell 1990) may or may not have been in the Tucson Mountain District.

Entranco conducted a native plant inventory in winter 2003 along Sandario Rd, beginning at the intersection with Kinney Road, continuing south for 700 feet, and extending 50 feet on each side of the centerline. An additional area was surveyed to cover potential work within the wash that crosses Sandario Road about 180 feet south of Kinney Road. No special-status species were found. Vicki Gempko, BioTech at Saguaro National Park, conducted two follow-up surveys specifically for special-status plants in fall 2003 with negative results.

EXPECTED EFFECTS/RESULTS OF THE PROPOSED ACTION

The improvements to the intersection are expected to result in a reduction in traffic accidents, due to increased sight distance for vehicles. Potential damage to vegetation along the roadside from accidents also will be reduced. Visitors to the Park traveling south on Sandario Road will be able to turn left onto Kinney Road to access the Visitor's Center, trails, and pullouts. This will eliminate the current necessity for a longer, potentially confusing route to these sites.

During construction, non-commercial traffic will be detoured onto Kinney Rd between Sandario and Mile Wide Roads for two to four weeks. Roadkill on these roads may increase because of the increased traffic. Some species of wildlife may avoid crossing roads when traffic is heavier than usual. Roadkill may decrease on Sandario Road because of the road closure, and wildlife may cross Sandario more than usual because of decreased traffic.

There will be dust and noise at the construction site and staging areas. These factors may affect unknown/undetected CFPO in or passing through the area.

There will be a temporary loss of vegetation that will be salvaged before construction; it will be replanted after construction. Seven trees and bushes will be permanently removed, including one large ironwood. Loss of the ironwood could conceivably affect a pygmy-owl crossing Sandario Road at the wash. The 0.2 acres that will be disturbed during construction will be revegetated and monitored. Trees will be replaced and monitored.

Wildlife traveling along the wash may use the box culvert to cross under Sandario Road rather than cross the road. This may result in fewer animals killed by vehicles.

LOCAL STATUS OF FEDERALLY LISTED SPECIES AND EVALUATIONS OF POTENTIAL EFFECTS OF THE PROPOSED ACTION

According to the USFWS list of listed, proposed, and candidate species for Pima County, there are 26 federally listed, candidate, or conservation agreement species of special status in Pima County. This list includes two species (Mexican gray wolf and ocelot) that have likely been extirpated in Pima County, or whose presence is considered unlikely, unconfirmed, or hypothetical. There are no historic or current records of jaguar in the TMD. Included on this list

are also 21 species known to occur in Pima County but that do not range into, or are not typically found in habitats that occur on, or adjacent to, the Tucson Mountain District (TMD) of Saguaro National Park (Huachuca water umbel, Kearney's blue star, Acuna cactus, Nichol Turk's head cactus, Pima pineapple cactus, Goodding's onion, Sonoran pronghorn, San Xavier talussnail, desert pupfish, loach minnow, Gila topminnow, Gila chub, spikedace, Chiricahua leopard frog, Sonoyta mud turtle, bald eagle, Mexican spotted owl, brown pelican, masked bobwhite, yellow-billed cuckoo, and southwestern willow flycatcher). Therefore, the proposed action was determined to have no effect on the listed species above, and species accounts are not provided in this document. Of the remaining species, two are listed as threatened or endangered (cactus ferruginous pygmy-owl, lesser long-nosed bat). The American peregrine falcon, occasionally seen in TMD, was delisted in 1999 but is still being monitored (USFWS 1999). The lesser long-nosed bat has never been documented in the TMD, although foraging habitat exists. For the cactus ferruginous pygmy-owl in the TMD, there is one unconfirmed report of a roadkill in 1988 (Park files). There is a report of a pygmy-owl in King's Canyon, but this may not have been in the Park (Davis and Russell 1990). There are no other confirmed detections of pygmy owls in the TMD. This section includes full species accounts and effects determinations for these three species.

Species Accounts

Lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*)

The lesser long-nosed bat is a nectar-feeding bat that migrates between its wintering grounds in the drier parts of Mexico and its breeding/summering grounds in northern Mexico (including Baja California), and southern Arizona and New Mexico in the United States (USFWS 1995). Lesser long-nosed bat migrations coincide with the availability of the nectar, pollen, and fruit of columnar cactus (e.g., cardon, organ-pipe cactus, saguaros) and the nectar and pollen of blooming agaves. In Arizona, this species forms large maternity colonies that give birth in June. Maternity roosts are typically in caves or abandoned mines and are found in "lower elevations near concentrations of flowering columnar cacti" (USFWS 1995). Beginning mid-July, bats appear in caves and mines in southeastern Arizona, foraging on agave blooms, and leaving the area in September and October. Most late-summer colonies are females and volant young, but small bachelor colonies exist also. The bat was listed by the USFWS as federally endangered, primarily due to loss of roosting habitat and vulnerability to disturbance of maternity colonies and other roosting sites (Shull 1988).

Bat surveys in Saguaro National Park confirmed a small (less than five since 1991) colony of lesser long-nosed bats roosting in a cave in the Rincon Mountain District (RMD) of the Park (Sidner 1991, Sidner & Davis 1994). The species has never been documented in the TMD. Surveys were conducted to locate this species in mines in the TMD, with negative results, in 1991 and 2003 (Sidner 1991, Wolf and Dalton 2003).

Determination:
There are no agaves in the project area. No saguaros will be disturbed during the project. The proposed action, therefore, will not affect any lesser long-nosed bat roosts or foraging habitat. We determine that this action will have *no effect* on lesser long-nosed bats or their habitat.

American peregrine falcon (*Falco peregrinus anatum*)

This species was delisted from endangered status by the USFWS in August 1999; however, their numbers are still to be monitored (through 2004) to ensure their recovery. This large, striking falcon is primarily a hunter of small to medium-sized birds often associated with water (e.g., waterfowl, shorebirds, swallows). Along with a proximity to water, the most important habitat characteristic needed by this species is the presence of tall cliffs (typically over 150 feet but sometimes as low as 60 feet). Within this habitat, peregrines nest on ledges, potholes or in small caves that are relatively inaccessible to mammalian predators and that also provide protection from weather extremes.

In Arizona, peregrine falcon breeding activity was documented at 179 locations in 1992 (Ward 1993). Within Saguaro National Park, peregrines are known to nest at four locations, all in the RMD (Berner and Mannan 1992). The Avra Valley Christmas Bird Count, which includes the TMD, recorded only six sightings from 1980-2002.

Determination:
No nesting habitat for peregrine falcons is in or near the project area and birds are rarely seen in the district. The proposed action, therefore, will not affect any peregrine falcon nest or foraging habitat. We determine that this action will have *no effect* on peregrine falcons or their habitat.

Cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*)

This analysis is based upon no pygmy-owls being located in 2004 in the project area. Because 2004 surveys are not completed, if an owl is detected on a future survey, during the project, or AGFD tracks a transmittered owl into the area, USFWS will be contacted immediately. Consultation will be conducted on how to proceed.

General biology/ecology

The cactus ferruginous pygmy-owl (CFPO) is a small (about 6.75" long), long-tailed, earless owl federally listed as endangered due to a dramatic decline in its abundance and distribution in the U.S. in the last 50 years (Abbate et al. 1996). Loss of habitat is suspected as the major cause of its decreased numbers (USFWS 1993). The CFPO is the northernmost subspecies of the wide-ranging, but tropically based ferruginous pygmy-owl (Phillips et al. 1964). Although historic accounts associated this subspecies with riparian woodlands and mesquite bosques in Arizona (Phillips et al. 1964, USFWS 1993), recent sightings of CFPOs in the state have generally been in the paloverde-cacti-mixed scrub series of Sonoran desertscrub in the Arizona Upland subdivision (Abbate et al. 1996). Both districts of Saguaro National Park contain potential habitat for CFPO - virtually all of the TMD, and the RMD below 4,000 feet (some 40,000 acres total). However, only the Tucson Mountain District of Saguaro National Park currently contains proposed critical habitat for this species (the entire 24,000 acre district).

In 2004, there were three male pygmy-owls reported in northwest Tucson (over 10 miles from the project area) and five were confirmed in Altar Valley, including one known pair (AGFD

unpubl. data). In 2003, there were three near the Garcia Strip on the Tohono O'odham Reservation; however this area was not surveyed in 2004 (D. Abbate, AGFD, pers. comm.).

History and ecology at Saguaro National Park (TMD)

There is an unverified report of a roadkill cactus ferruginous pygmy-owl in the TMD from January 2, 1988, on Golden Gate Road 0.5 miles north of the Sendero Esperanza trailhead (NPS files). The species has also been reported from King Canyon (Davis and Russell 1990). Since 1994, Park staff, AGFD biologists, private contractors, and volunteers have surveyed for CFPO within and nearby the Park. Surveys through 2000 (about 250 in the RMD and 250 in the TMD) have been about equally divided between inventory efforts and clearance surveys. The Park has conducted surveys in the TMD every year since 2001; when the 2004 survey season is complete, 182 surveys will have been conducted. Several of these survey routes are in the vicinity of the project area (Figure 3). All of these surveys followed protocols specified by AGFD and the USF&WS at the time.

Pima County contracted SWCA to conduct project clearance surveys for pygmy-owls in 2003 and 2004. No owls were detected and no birds responded to taped calls on surveys conducted 10 April, 30 April, 7 May, 27 May, 2003 and on 6 January and 25 February in 2004 (third survey not completed as of this writing). The report for 2003 is included under separate cover.

Critical habitat
The project area falls within Unit 2 of proposed Critical Habitat for the cactus ferruginous pygmy-owl.

Primary constituent elements of habitat found important to pygmy-owls and relevant to this project are (USFWS 2003):

- elevations below 4,000 feet within biotic communities including Arizona Upland subdivision of Sonoran desertscrub
- nesting cavities in saguaros or in trees with a trunk diameter of at least 6 inches at 4.5 feet above the ground
- multilayered vegetation
- vegetation providing mid-story and canopy level cover (primarily trees ever 6 feet tall)
- habitat elements configured and human activity levels minimized so that unimpeded use by owls can occur

Possible Effects of Project and Proposed Mitigation

There will be dust and noise at the construction site and staging areas. These factors may affect unknown/undetected CFPO in or passing through the area. However, construction will occur October-November, which is outside of the breeding season and part of the dispersal season. The duration of the project has been minimized by using a box culvert rather than a round concrete culvert, and by closing Sandario Road and rerouting traffic, rather than constructing a detour around the project area, which would also increase damage to vegetation.

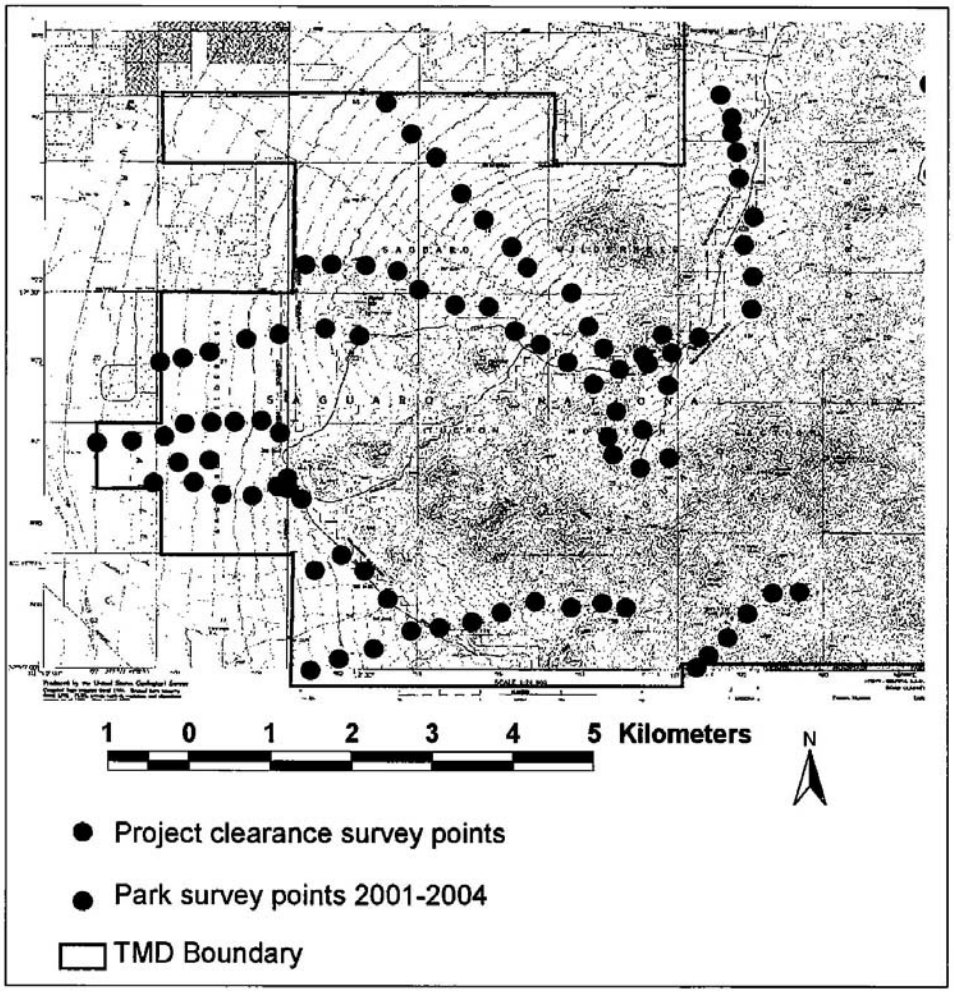

Figure 3. Survey points for the cactus ferruginous pygmy-owl in the vicinity of the project area, 2001-2004

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Upon completion of construction on Sandario Road, Kinney Road may require repair or resurfacing due to damage caused by increased traffic. Noise from this activity may affect unknown/undetected CFPO in or passing through the area. However, work will occur in late fall 2004, after dispersal season and before the breeding season begins in 2005. No habitat components important to owls will be disturbed.

Effects on important habitat components for owls will be avoided or mitigated. Larger cacti, trees, and shrubs outside the boundaries of the construction zone will be tagged and protected with construction fencing so they will not be disturbed. No saguaros will be disturbed. Only seven trees and bushes will be permanently removed. Only one of the seven removed is large and may be important for owls. This is an ironwood, already senescent, and full of mistletoe and dead limbs. Trees adjacent to busy roads, such as this one, do not appear to be used on a consistent basis by resident birds; however, dispersing owls seem to use larger, higher canopy species when they cross roads (S. Richardson, pers. comm.). Therefore, although unlikely, removing this tree may affect an owl crossing Sandario Road at this particular location.

A total of only 0.2 acres will be disturbed during the construction. After construction, topsoil salvaged before construction will be replaced. The Park's restoration crew will replant those plants salvaged before construction. They will also plant 150 nursery-grown plants, 30 of which will be trees (10 each of ironwood, mesquite, and paloverde). Trees will be saplings of native seed stock grown in elongated pots to encourage growth of a tap root. Protective cages will be placed on nursery-grown plants, and the fill bank and replanted areas will be seeded. To enhance effectiveness of replanting and natural recovery, the crew will create microsites for plant establishment with plant materials that were cleared from the construction site (shrubs, grasses, and trees that were not salvaged). If rainfall levels fall below normal, plants will be watered every three to four weeks as needed for up to two years. Survival criteria is that 75% of trees planted will survive the first three years. This survival rate will be achieved by monitoring and follow-up watering. Follow-up monitoring will also be conducted after five years. If at any time, the survival rate is less than 75%, additional trees will be grown and planted on site. Although habitat will be affected in the short-term by the removal of one large tree, long-term results should be beneficial when the 23 (assuming 75% survival) planted trees reach maturity. The addition of trees to the project area should enhance connectivity of habitat by allowing more opportunities for owls to cross Sandario Road in the future.

Cumulative effects

Increasing urbanization in the Tucson metropolitan area is decreasing habitat for pygmy-owls. Natural vegetation is being destroyed and replaced by buildings and roads. Habitat is being fragmented and connectivity between existing patches of habitat is decreasing. As areas that pygmy-owls currently occupy in northwest Tucson become unsuitable through land-use changes, owls may disperse to the remaining large areas of natural desert, such as the Tucson Mountain District of Saguaro National Park. It is therefore puzzling why no owls have been detected in the TMD, despite an extensive survey effort every year. One possible reason may be site tenacity by adult owls, but no reproduction. Another may be the inability of dispersing owls to successfully cross I-10.

The Park is planning to chip-seal Kinney Road in the summer of 2004. Although vegetation important to owls will not be affected, noise from the project may disturb owls, if there are any in the area. However, noise levels are not expected to be much higher than normal traffic levels, and trucks will not stay in one location, but will be moving along the road. The project is expected to take two days; it was recommended that work take place in August. The Park has conducted surveys along a portion of Kinney Road and nearby areas continuously since 2001; no owls have been detected. Therefore, we do not expect this project to affect owls or their habitat.

Buffelgrass, a fast-spreading exotic plant, was removed along Kinney Road and areas of Sandario Road within the Park (from the intersection of Kinney Road south to Mile Wide Road) in 2000. These roadsides are monitored and new buffelgrass is removed every year by the Park's restoration crew. Removal of exotics allows native plants to re-establish, which may enhance habitat for pygmy-owls.

Because no owls have been detected in the project area, to our knowledge, the project will not affect CFPO recovery or population viability.

Determination:

We believe that the proposed action *may affect, but is not likely to adversely affect*, the cactus ferruginous pygmy-owl. We believe that the proposed action *may affect, but is not likely to adversely affect*, proposed Critical Habitat of the cactus ferruginous pygmy-owl. This determination was based on the following rationale:

- No owls have been detected in the project area, or in the vicinity of the project area, despite many surveys.
- Only one large tree will be removed.
- We plan to implement the following mitigation procedures in order to prevent or minimize potential impacts:
    - Construction will occur outside the breeding season and part of the dispersal season
    - Construction time and project area footprint will be minimized by using a box culvert and closing the road to traffic rather than creating a detour alongside the construction site
    - The disturbed area is as small as possible (0.2 acres) and will be restored using the best methods currently available, beginning as soon as construction is completed
    - Trees removed will be replaced at a 3:1 ratio. This will result in long-term enhancement of habitat

CONSULTATION AND COORDINATION

The following persons/agencies contributed to and/or were consulted in the writing of this document.

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As the nation's principal conservation agency, the Department of the Interior has the responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historic places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. Administration.