

Saguaro National Park

National Park Service
U.S. Department of the Interior

Saguaro National Park
Arizona



Environmental Assessment

Rehabilitate Cactus Forest Drive
November 2004



ENVIRONMENTAL ASSESSMENT

Rehabilitate Cactus Forest Drive

Prepared For:
National Park Service



Prepared By:
engineering-environmental Management, Inc.



Saguaro National Park
Arizona

**U.S. Department of the Interior
National Park Service**

**Environmental Assessment
Rehabilitate Cactus Forest Drive
Saguaro National Park
Pima County, Arizona**

Summary

At Saguaro National Park, the National Park Service proposes to rehabilitate the 8.4-mile Cactus Forest Drive along Route 500 and Route 100. This action is needed to improve deteriorating road edges and lateral cracking in the roadbed, primarily as a result of drainage control problems.

This environmental assessment examines in detail two alternatives: no action and the National Park Service preferred alternative. The preferred alternative includes the repaving of the existing roadway along Route 500 and Route 100; reconfiguring turnouts and the Javelina picnic area; improving road shoulders; establishing bicycle lanes on Route 500; improving roadside drainage; replacing two concrete box culverts; and improving drainage around stone walls constructed by the Civilian Conservation Corps.

The preferred alternative would have no or negligible impacts on soils; geology; vegetation; wildlife; wetlands; water quality; air quality; designated critical habitat, ecologically critical areas, wild and scenic rivers, and other unique natural areas; ethnographic resources; historic resources; cultural landscapes; museum objects; prime and unique farmland; socioeconomics; land use; transportation; environmental justice; scenic values, natural soundscapes, and night skies; wilderness; or Indian trust resources.

Impacts to threatened and endangered species and species of concern would be short term, negligible, and adverse, and long term, minor to moderate, and beneficial. Long-term impacts on archeological resources would be moderate and adverse. Short-term impacts on visitor use and experience would be moderate and adverse. Long-term effects on visitor use and experience from road improvements would be minor to moderate and beneficial. Short-term impacts to park operations would be negligible to minor and adverse. Long-term, minor to moderate, beneficial effects to park operations would occur when the project is complete. Short-term health and safety impacts would be negligible and adverse for construction workers. Long-term, minor to moderate, beneficial effects to health and safety would occur when the project is complete.

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 name and 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: Rehabilitate Cactus Forest Drive Project; 3693 South Old Spanish Trail; Tucson, Arizona 85730-5601.
E-mail: SAGU_Planning@nps.gov

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ACRONYMS AND ABBREVIATIONS

CCC	Civilian Conservation Corps
CFR	Code of Federal Regulations
NEPA	National Environmental Policy Act of 1969, as amended
NPS	National Park Service
NRHP	National Register of Historic Places
USC	United States Code

INTRODUCTION

PURPOSE AND NEED

The National Park Service (NPS) is considering rehabilitating 8.4 miles of the existing Cactus Forest Drive on the west side of the Rincon Mountain District of Saguaro National Park, Pima County, Arizona, including the one-way loop (Route 500) and the two-way road (route 100). Both roadways would be rehabilitated on the existing bench. Parking areas and turnouts would also be rehabilitated or eliminated; drainage crossings would be improved, and bicycle lanes would be added on the one-way loop.

The purpose of the project is to provide a safe and comfortable driving surface for park visitors, provide adequate parking in designated parking areas, eliminate informal turnouts that have caused the destruction of vegetation and facilitated the development of a network of social trails, extend the life of rehabilitated road segments and associated features, provide improved safety for bicyclists using the one-way loop, and improve poor roadway drainage that has resulted in deteriorated pavement edges and roadbed cracking.

This action is needed because:

1. The travel lanes and parking areas are deteriorated and in poor condition for the traffic the road receives.
2. The existing road has many drainage problems.
3. Low-water crossings often flood the road with sediment requiring maintenance to remove the sediment and keep the road open.
4. The use of undesignated turnouts has resulted in resource damage to previously undisturbed vegetation and soils.
5. Bicycles and motorized vehicles share narrow travel lanes.

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

PURPOSE AND SIGNIFICANCE OF THE PARK

An essential part of the planning process is to understand 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.

The purpose of Saguaro National Park is listed in the *Saguaro National Park General Management Plan*, Newsletter One (NPS 2003a) 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

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.

Saguaro National Park is significant because:

- 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 2003a).

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

Cactus Forest Drive is an 8.4-mile paved auto tour loop that is the only paved road in Rincon Mountain District (figure 1). It begins at the main entrance and visitor center and is a two-way road to the Javelina picnic area (approximately 1.6 miles on Route 100), but is a one-way road over the remainder of its length (approximately 6.8 miles on Route 500). Both segments of Cactus Forest Drive, but especially the one-way loop, are popular with bicyclists and pedestrians throughout the year. The road is a narrow (12.5- to 19-foot wide), slow speed (15-miles per hour) scenic drive in a Sonoran Desert landscape. Several turnouts, including those for wayside exhibits and Cactus Forest Trail, are accessible from the road.

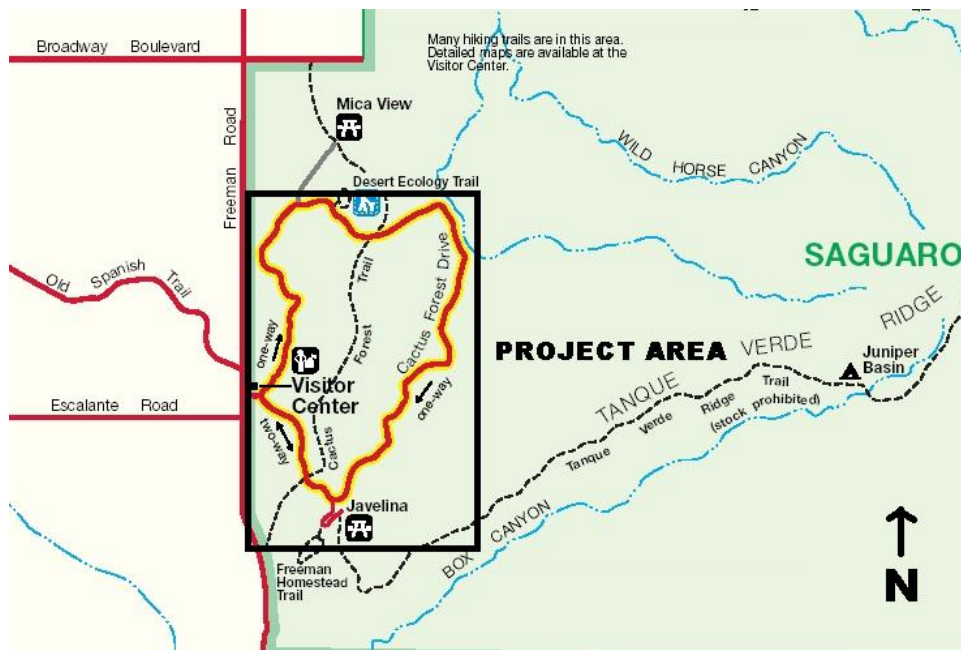


FIGURE 1. CACTUS FOREST DRIVE PROJECT AREA

Previous Planning

Cactus Forest Trail Environmental Assessment

In 2002, the National Park Service evaluated the environmental and social impacts of reopening a section of Cactus Forest Trail to mountain bicycle use. As a result, the section of Cactus Forest Trail that was previously open to mountain bikes has been reopened for such use; it continues to remain open to hiking and equestrian use as well (NPS 2002).

Saguaro National Park Draft Fire Management Plan

The Draft Fire Management Plan presents alternatives for providing fire management policies at Saguaro National Park. The purpose of the plan is to identify and implement methods to restore and maintain park ecosystems and processes that allow fire to play its natural role, both as wildland fire and prescribed fire; reduce the risk of fire to cultural resources; reduce the risk of catastrophic fire; execute a fire management program that provides a safe environment for firefighters and the public; and to execute a fire management program consistent with the National Park Service wildland fire management policy (NPS 2004a).

Saguaro National Monument General Management Plan

The park is in the process of updating its *General Management Plan*, which was last updated in 1988 when the unit was Saguaro National Monument. The park is approximately 2 years into the process. The park's *General Management Plan* provides a vision and policy guidance for the preservation of park resources, visitor use and experience, the types and general intensities of development, visitor carrying capacities, and opportunities to address management issues internal and external to the park. It also identifies connections among the various park programs and provides a policy framework for more site-specific planning.

According to the 1988 *General Management Plan*, the Rincon Mountain District is managed as the main attraction for first-time visitors, with the focus on the saguaro forest and lower Sonoran Desert (NPS 1988).

Saguaro National Monument Trails Management Plan – Cactus Forest Section

The park's trail management plan for the Cactus Forest section of the Rincon Mountain District was completed in 1991. The Cactus Forest section of trails encompasses an area extending from the park boundary along Old Spanish Trail to the Cactus Forest trailhead on Broadway, the Wildhorse and Douglas Spring trailheads on Speedway, and ranging to the east and south to an elevation of approximately 4,500 feet. The purpose of the plan is to protect resources, meet increasing visitor demands for recreational purposes, and to formalize a trail system in terms of location, types of use, and proper signage (NPS 1991).

Pima County Planning

Pima County passed a special Buffer Overlay Zone ordinance to provide some protection to the park (and other public preserves) from encroachment by the city. The ordinance neither promotes nor discourages changes in underlying zoning, but rather provides continuing performance standards for the unique lands within the Buffer Overlay Zone.

The ordinance outlines standards and requirements for the construction of any building over 1,000-square feet in size within a one-mile zone of the national park boundary, including colors, landscaping, fencing, and lighting (Pima County Code chapter 18.67, <http://www.co.pima.az.us/cob/code/c.a7htm>).

Eastern Pima County Trail System Master Plan

The *Eastern Pima County Trail System Master Plan* serves to identify acquisition priorities for the development of a trail network for a variety of trail users across eastern Pima County. The plan indicates the importance of securing access to trails on public lands given the rapid development occurring on bordering private lands. The plan identifies five existing access points into Saguaro National Park and five suggested trail entry points that are currently not approved by Saguaro National Park (NPS 2002).

Scoping

Scoping is the effort to involve agencies and the general public in determining the scope of issues to be addressed in the environmental assessment. Among other tasks, scoping determines important issues and eliminates issues not important; allocates assignments among the interdisciplinary 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 (including the Advisory Council on Historic Preservation, the State Historic Preservation Office, and American Indian tribes) to obtain early input.

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 preferred alternative to other planning efforts at Saguaro National Park.

A press release initiating scoping and describing the preferred alternative was issued on March 24, 2004 (appendix A). Comments were solicited during a public scoping period that ended April 23, 2004. Approximately 12 responses to this initial scoping were received. In one case, an individual simply requested that she be sent information on the plans for Cactus Forest Drive. In four cases, the response to the project was negative and respondents believed that:

- The road was in good shape and the project is not worth the disruption to visitors or the natural environment.
- The project would have a negative effect on the scenery in the vicinity of Cactus Forest Drive.
- The current road conditions force visitors to drive slowly while the project would create a “speedway” in the park.
- A concrete surface would be bad for runners and walkers who use Cactus Forest Drive because it would be very hard on their joints and knees.

In two cases, the response was in support of the project. Additionally, five respondents indicated that they are in support of the project, however, they made some recommendations, including:

- The road should be paved and a bicycle or pedestrian lane should be installed to reduce the dangers associated with increased traffic conditions.
- The road should not be widened to help avoid impacts on vegetation.
- the road should be designed for low speeds to help avoid collisions between wildlife and vehicles.
- A softer (asphalt) surface should be used in the shoulders for runners and walkers, while the travel lanes could be surfaced with concrete.
- Weekend access should be provided to bicyclists, walkers, and joggers.
- Cactus Forest Drive should be open for the annual Saguaro National Park Labor Day Run.

The public and American Indian groups traditionally associated with the lands of Saguaro National Park will have another opportunity to review and comment on this environmental assessment.

ISSUES AND IMPACT TOPICS

Issues

Issues and concerns affecting this proposal were identified from past National Park Service planning efforts, input from environmental groups, and state and federal agencies. The primary issues are the conformance of this proposal with the Saguaro *General Management Plan*; natural resource issues including potential impacts to vegetation, wildlife, threatened and endangered species and species of concern, soils, and floodplains; cultural (historic and archeological) resources; park operations; visitor use and experience; and health and safety.

Derivation of Impact Topics

Specific impact topics were developed for discussion focus and to allow comparison of the environmental consequences of each alternative. These impact topics were identified based on federal laws, regulations, and executive orders; *NPS 2001 Management Policies*; and National

Park Service knowledge of limited or easily impacted resources. A brief rationale for the selection of each impact topic is given below, as well as the rationale for dismissing specific topics from further consideration.

Impact Topics Selected for Detailed Analysis

Soils

Road rehabilitation would involve ground-disturbing activities on previously undisturbed desert soil; therefore, soils are addressed as an impact topic in this environmental assessment.

Vegetation

National Park Service policy is to protect the components and processes of naturally occurring biotic communities, including the natural abundance, diversity, and ecological integrity of plants (*NPS 2001 Management Policies*). Road rehabilitation would involve ground-disturbing activities that would affect vegetation; therefore, this impact topic is addressed in detail in this environmental assessment.

Wildlife

National Park Service policy is to protect the components and processes of naturally occurring biotic communities, including the natural abundance, diversity, and ecological integrity of animals (*NPS 2001 Management Policies*). Road rehabilitation would involve ground-disturbing activities with the potential to affect wildlife or their habitats; therefore, this impact topic is addressed in detail in this environmental assessment.

Threatened and Endangered Species and Species of Concern

The Endangered Species Act of 1973, as amended, requires an examination of 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. Noise and ground disturbances from construction activities have the potential to affect federally listed species, specifically the lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*) and cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*), or their habitats; therefore, this impact topic is addressed in this environmental assessment.

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 (NRHP) be considered, and that appropriate steps be taken to avoid, minimize, or mitigate these effects. The National Park

Service *Cultural Resource Management Guideline* (Director's Order – 28) recognizes five types of cultural resources: archeological resources, ethnographic resources, historic structures, cultural landscapes, and museum objects.

Archeological sites near the road are part of the Rincon Foothills Archeological District, which is listed on the NRHP. Because there would be ground-disturbing activities associated with this project, archeological resources are addressed in this environmental assessment. Cactus Forest Drive and the stone retaining walls built by the Civilian Conservation Corps (CCC) are on the park's list of classified structures. Because the road rehabilitation project could affect these features, historic structures are analyzed in detail. In addition, the road and many of its associated features are considered contributing elements to the Cactus Forest Drive cultural landscape, which has been determined to be eligible for inclusion on the NRHP; therefore, cultural landscapes are described in detail in this environmental assessment. Ethnographic resources and museum objects would not be affected and are dismissed in the following section.

Visitor Use and Experience

Cactus Forest Drive is the only paved road in the Rincon Mountain District and provides various recreational opportunities for park visitors. Because this loop would be closed throughout the construction period (anticipated to be about 4.5 months), impacts to visitor use by bicyclists, motorists, and pedestrians are anticipated. Therefore, this impact topic is analyzed in this environmental assessment.

Park Operations

Rehabilitation of Cactus Forest Drive would affect park operations by requiring dedicated staff for construction oversight. This project has the potential to cause lost revenue from reduced entrance fees, as well as delays for park staff who need to use the loop for access to other park facilities (e.g., trails). Therefore, these park operations are addressed in this environmental assessment.

Health and Safety

Either alternative has the potential to affect public safety and worker safety; therefore, health and safety is addressed as an impact topic in this environmental assessment.

Impact Topics Dismissed From Detailed Analysis

Geology

Generally, construction activities related to the preferred alternative such as rehabilitation of the existing roadway and shoulders along Route 500 and Route 100, reconfiguration of turnouts and the Javelina picnic area, establishment of bicycle lanes on Route 500, and drainage improvements, would disturb currently paved or graveled surface areas. Some

ground disturbance would occur in previously undisturbed areas, including the potential need for blasting where the road is being widened on the approach to the Javelina picnic area. These disturbances would be localized and would have negligible effects on the visual character of potentially affected geologic features and/or their stability. Therefore, geology was dismissed as an impact topic in this environmental assessment.

Wetlands

Executive Order 11990 (*Protection of Wetlands*) require an examination of impacts to wetlands and the National Park Service, Director's Order 77-1 and Procedural Manual #77-1 (*Wetland Protection*) provide guidelines for protection of wetlands. The intermittent streambeds that intersect Cactus Forest Drive are identified under the National Wetlands Inventory as wetlands. The purpose of this proposed action is to repair and rehabilitate the existing road in its current location. The low-water crossings associated with the road would be repaired and rehabilitated in their existing locations with no material change in the road corridor. Any culvert replacement would be in kind or allow for slightly greater culvert size and as such not restrict or impede water flow. The proposed action essentially repairs or replaces in kind the existing low-water crossings and replaces two culverts with larger-capacity culverts. Because the anticipated impact to wetlands would be negligible, the impact topic was dismissed from further analysis in this environmental assessment.

Because the anticipated impact to wetlands from the proposed action is determined to be minor or less in association with "maintenance, repair, or renovation (but not full reconstruction or expansion) of currently serviceable facilities or structures," the proposal is excepted from a statement of findings for wetlands.

Floodplains

Executive Order 11988 (*Floodplain Management*) requires an examination of impacts to floodplains and potential risk involved in placing facilities within floodplains. The National Park Service *2001 Management Policies*, Director's Order – 2: *Planning Guidelines*, Director's Order – 12: *Conservation Planning, Environmental Impact Analysis, and Decision-making*, and Procedural Manual #77-2 (*Floodplain Management*) provide guidelines for actions in floodplains. The replacement of two culverts with slightly larger culverts, rehabilitation of low-water crossings, and road rehabilitation work would occur within the floodplains of the intermittent streambeds / desert washes that cross Cactus Forest Drive. Although these actions would, in some cases, improve the drainage capacity of selected culverts, the remainder of the actions would maintain current floodplain contours and pathways. As a result, these activities would not result in a material change to the floodplain or flood flows (e.g., flash floods) in these washes and streambeds. Therefore, because the impact to floodplains would be negligible, floodplains was dismissed as an impact topic in this environmental assessment.

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 2001 Management Policies* provides 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. With mitigation (see "Mitigation Measures" section of the environmental assessment), the preferred alternative would have no effect on water quality. Therefore, water quality 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.*), requires land managers to protect air quality. Section 118 of the Clean Air Act requires national parks to meet all federal, state, and local air pollution standards. *NPS 2001 Management Policies* addresses the need to analyze potential impacts to air quality during park planning.

The Clean Air Act also established stringent requirements for class I areas, which include national parks over 6,000 acres and national wilderness areas over 5,000 acres. Saguaro National Park is designated a class I airshed.

Should the preferred alternative be selected, local air quality would be temporarily affected by dust and vehicle emissions during construction activities. Hauling material and operating equipment during the construction period would result in increased vehicle exhaust and emissions. Based on typical air flow patterns, hydrocarbons, nitrogen oxide, and sulfur dioxide emissions would be rapidly dissipated.

If fugitive dust becomes a problem due to dry weather, areas of concern would be subjected to periodic water sprinkling.

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, localized, and short term; therefore, air quality was dismissed as an impact topic in this environmental assessment.

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

No areas within the project corridor are designated as critical habitat or ecologically critical, nor are there any existing or potential wild and scenic rivers. Saguaro National Park is an important natural area, but the preferred alternative would not threaten the associated qualities and resources that make the park unique. This topic was, therefore, dismissed from detailed analysis in this environmental assessment.

Ethnographic Resources

Ethnographic resources are defined by the National Park Service as a “site, subsistence, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it (Director’s Order – 28).” American Indian tribes traditionally associated with Saguaro National Park, including the Ak Chin Indian Community Council, Fort McDowell Yavapai Nation, Gila River Indian Community Council, Hopi Tribe, Pascua Yaqui Tribe, Salt River Pima-Maricopa Indian Community, Tohono O’odham Nation, and Zuni Tribe, were apprised of the preferred alternative by letter on March 24, 2004. The National Park Service would continue to consult with these American Indian groups and copies of the environmental assessment would be forwarded to each affiliated tribe or group for review or comment. If subsequent issues or concerns are identified, appropriate consultations would be undertaken. Because it is unlikely that ethnographic resources would be affected, and because appropriate steps would be taken to protect any human remains, funerary objects, sacred objects, or objects of cultural patrimony inadvertently discovered, ethnographic resources was dismissed from detailed analysis in this environmental assessment.

Historic Structures

Cactus Forest Drive and the stone retaining walls are listed on the park’s list of classified structures, an evaluated inventory of all historic and prehistoric structures that have historical, architectural, and/or engineering significance. The road, retaining walls, and some of the associated drainage features (culverts, low-water crossings) were built by CCC crews working in the region from 1933 to 1941. Cactus Forest Drive and its associated features are all that remain of the CCC legacy in the Rincon Mountain Unit of Saguaro National Park. In 1994, the National Park Service, in consultation with the Arizona State Historic Preservation Office, determined that the road is eligible for the NRHP as a potential district. A section of the retaining walls along Cactus Forest Drive was also determined eligible for the NRHP as a contributing element to the potential district (NPS 2004b). The National Park Service has recently completed a cultural landscape assessment of Cactus Forest Drive. The cultural landscape includes the road, retaining walls, drainage structures, and a number of other character-defining features. Potential impacts to the road and associated structures are addressed in detail in the “Cultural Landscapes” section. Therefore, historic structures was dismissed as an impact topic in this environmental assessment.

Museum Objects

The National Park Service defines museum objects as “a material thing possessing functional, aesthetic, cultural, symbolic, and/or scientific value, usually moveable by nature or design associated with it (DO – 28).” Museum objects include prehistoric and historic artifacts, objects, works of art, natural specimens, and archival and manuscript material that constitute a museum collection.

There are no museum objects or collections in the areas affected by the proposed activities along Cactus Forest Drive. Therefore, Saguaro National Park museum objects

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would not be affected. Museum objects were dismissed as an impact topic in this environmental assessment.

Prime and Unique Farmland

In 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. There are no prime or unique farmlands associated with the project area, so this resource was dismissed from detailed analysis in this environmental assessment.

Socioeconomics

The partial or total closure of Cactus Forest Drive during the low visitation period between May and September under the preferred alternative would neither change local or regional socioeconomic conditions nor appreciably impact local businesses or other agencies.

Implementation of the preferred alternative could provide a negligible beneficial impact to the economy of Tucson (e.g., increased employment opportunities for the construction work force and revenues for local businesses and government related to construction activity). Benefits to the local economy would be temporary, lasting only during construction, and negligible overall. Therefore, socioeconomics was dismissed from further analysis in this environmental assessment.

Land Use

The preferred alternative would not affect land use in the park, the city of Tucson, or the region. Saguaro National Park, along with the city of Tucson and Pima County, are cooperating to maintain the Buffer Overlay Zone on the park boundary. The preferred alternative is not anticipated to affect land use in the current Buffer Overlay Zone. Therefore, this impact topic was dismissed from analysis in this environmental assessment.

Transportation

The preferred alternative would result in the closure of Cactus Forest Drive while road rehabilitation was being completed from May 15 through September 30. However, the closure of Cactus Forest Drive would not impact current local or regional transportation routes or thoroughfares. Therefore, transportation was dismissed from analysis 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 not have disproportionate health or environmental effects on minorities or low-income populations or communities as defined in the Environmental Protection Agency's *Draft Environmental Justice Guidance* (July 1996). Therefore, environmental justice was dismissed from detailed analysis in this environmental assessment.

Scenic Values, Natural Soundscapes, and Night Skies

Cactus Forest Drive is designed along the natural topography and vegetation of the area. In an evaluation of scenic quality, both the visual character and visual quality of a viewshed are considered. A viewshed comprises the limits of the visual environment associated with the preferred alternative. During construction, effects would result from the presence of temporary construction equipment and dust, but they would be short term and occur within the existing road corridor. Because the scenic values of Cactus Forest Drive are already impacted (many developments are visible from the road), and the road would be completely closed during construction, scenic values were dismissed from detailed analysis in this environmental assessment.

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. Noise associated with road improvements would be short term and localized, and construction activities would be scheduled to minimize effects on visitor experience. Road improvements would result in a measurable increase in noise, especially should blasting be required where the road is being widened on the approach to the Javelina picnic area; however, the road would be closed to visitors during this time. The impacts of noise on wildlife and threatened, endangered, and special-concern species are considered under those impact topics; therefore, natural soundscapes were dismissed from detailed analysis in this environmental assessment.

The National Park Service strives to preserve natural ambient lightscapes, which are natural resources and values that exist in the absence of human-caused light. Both districts of Saguaro National Park are closed to motor vehicles at sunset. Because construction work would not be permitted after sunset, night skies and lightscapes would not be affected. Therefore, this impact topic was dismissed from detailed analysis in this environmental assessment.

Introduction

Wilderness

Saguaro National Park contains 71,400 acres of designated wilderness. The Wilderness Act prohibits the use of mechanized equipment within the wilderness boundary. Cactus Forest Drive is not within or adjacent to any wilderness lands within the park. Therefore, wilderness lands and values were dismissed from the analysis in this environmental assessment.

Indian Trust Resources

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 States to protect tribal lands, assets, resources, and treaty rights, and it represents a duty to carry out the mandates of federal law with respect to American Indian and Alaskan Native tribes.

There are no Indian trust resources in Saguaro National Park. The lands comprising Saguaro National Park are 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 was dismissed as an impact topic in this environmental assessment.

PREFERRED ALTERNATIVE AND OTHER ALTERNATIVES

INTRODUCTION

The alternatives section describes two management alternatives for Cactus Forest Drive at Saguaro National Park: the no-action alternative and the preferred alternative.

The no-action alternative describes 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 Cactus Forest Drive at Saguaro National Park without major actions or changes in course.

The preferred alternative presents the National Park Service preferred alternative and defines the rationale for the action in terms of resource protection and management, visitor 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 the continuation of existing conditions for Cactus Forest Drive. Should the no-action alternative be selected, the National Park Service would respond to future needs and conditions associated with Cactus Forest Drive in Saguaro National Park without major actions or changes in the present course. This would include performing roadwork and maintenance such as limited safety and drainage improvements, fixing potholes, and grading shoulders.

ALTERNATIVE B: PREFERRED ALTERNATIVE

The proposed action presents the National Park Service preferred alternative and defines the rationale for the action in terms of resource protection and management, visitor and operational use, and costs. The preferred alternative meets the Saguaro National Park planning objective of improving motorist, bicyclist, and pedestrian safety and managing resources on and along Cactus Forest Drive.

Roadway Improvements, Cactus Forest Drive

Under the preferred alternative, the entire segment of Cactus Forest Drive under consideration would be rehabilitated (see figure 1). Rehabilitation would provide the conditions and service life associated with a new road.

Rehabilitation

This part of the preferred alternative refers to rehabilitation of Cactus Forest Drive, beginning and ending at the Rincon Mountain District fee collection booth, a distance of 8.4 miles along Route 500 and Route 100 (figure 2). It is intended to improve poor pavement conditions that have resulted from deteriorated and inadequate drainage infrastructure. Rehabilitation would improve the roadway within the existing alignment and would include recycling a portion of the existing roadway surface and base; laying, leveling, and compacting the recycled material; and applying a 2-inch asphaltic concrete overlay. Subexcavation of unsuitable subgrade material and backfill with free-draining subbase would be performed in one location, as needed. It is anticipated that the construction zone would encompass 3 to 4 feet along both sides of the entire 8.4-mile-long roadway.



FIGURE 2. BEGINNING AND ENDING POINT OF CACTUS FOREST DRIVE REHABILITATION

The one-way roadway (Route 500) would be rehabilitated on the existing road bench to an average width of 12.5 feet, as currently exists. It would continue to be used as a one-way auto route. Route 100, a two-way road, would be rehabilitated on the existing road bench to an average width of 19 feet. It would continue to be used as a two-way auto route. Road widening to 20 feet is anticipated to occur leading into the Javelina picnic area, requiring clearing and grubbing at the following locations on Route 100:

- beginning about 1,060 feet before the Javelina picnic area, approximately 750 feet in length along west side of roadway
- beginning 400 feet before Javelina picnic area, approximately 230 feet in length along east side of roadway
- beginning 300 feet before Javelina picnic area, approximately 350 feet in length along west side of roadway

Shoulder Reconstruction

Road shoulders on both Routes 500 and 100 would be improved to meet standard safety requirements. This would include the placement of aggregate shoulder materials, as necessary. Shoulder reconstruction is anticipated to require clearing and grubbing at only two of the approximately 42 locations where reconstruction would occur:

- begins about 600 feet before Javelina picnic area, approximately 30 feet in length along east side of roadway
- begins about 600 feet before Javelina picnic area, approximately 30 feet in length along west side of roadway

Bicycle Lanes

On Route 500, a bicycle lane would be paved to a 5-foot width requiring clearing and grubbing 0.2 mile from the beginning of Route 500. The bicycle lane would extend approximately 300 feet in length along the east side of the roadway, and would be marked with striping and other indicators.

Beginning 1.1 miles past Cactus Forest north trailhead on Route 500, an approximately 2,000-foot-long paved drainage ditch on the west side of the roadway would be removed, and in its place, a bicycle lane would be created and marked with striping and other indicators.

Turnouts

Under the preferred alternative, 38 turnouts (figure 3) are anticipated to be reworked. On Route 500, 33 turnouts would be reworked, but only 8 of these would require additional clearing and grubbing. These turnouts are located at:

- approximately 450 feet from beginning of Route 500 on east (Future Generations Overlook)
- approximately 0.8 mile from beginning of Route 500 on west (Sonoran Desert Overlook)
- approximately 0.8 mile from beginning of Route 500 on west (Cactus Forest Overlook)
- approximately 2.7 miles from beginning of Route 500 on south (Cactus Forest north trailhead)
- approximately 3.5 miles from beginning of Route 500 on north (Loma Verde trailhead)

- approximately 5.0 miles from beginning of Route 500 on south (Rincon Mountains Overlook)
- approximately 5.4 miles from beginning of Route 500 on west side (Detachment Fault trailhead)
- approximately 6.1 miles from beginning of Route 500 on west (Javelina Rocks Overlook)

On Route 100, some turnouts would be reworked; three would require additional clearing and grubbing, including construction of a new Cactus Forest south trailhead turnout on the right side of the road. These turnouts are located at:

- approximately 470 feet from beginning of Route 100 on east (Desert Living Overlook)
- approximately 0.9 mile from beginning of Route 100 on west (Cactus Forest south trailhead)
- approximately 0.2 mile from the Javelina picnic area, on Route 100 on west (Freeman Homestead trailhead)



FIGURE 3. TURNOUT ALONG CACTUS FOREST DRIVE

Approximately 80 informal turnout locations on both roads that provide unofficial and potentially damaging access to cultural and natural resources along Cactus Forest Drive, would be eliminated or downsized. These areas would be restored and revegetated with native species.

New wayside exhibits would be installed in turnouts, parking areas, trailheads, and/or

overlooks along Cactus Forest Drive.

Drainage Improvements and Low-Water Crossings

Roadside drainage would be improved through construction of asphalt waterways and drainage channels. Some of the drainage channels would include curbing to eliminate the potential for water to short-cut the channel and flow along the roadway. One concrete box culvert (figure 4) along Route 100 would be replaced with a metal culvert. The outlets on three existing concrete box culverts would be extended, and drop inlets would be installed on two of these, along Route 100.

On Route 500, 12 asphalt low-water crossings (figure 5) are anticipated to be reworked, as necessary. Four of these would be removed and replaced with new low-water crossings that would be constructed of concrete; no asphalt or chip and seal would be used. Of these, one low-water crossing would be raised by approximately 0.8 feet to make the crossing flush with the streambed that has risen due to sediment deposits over the years. Another crossing, which tends to collect sediment, would be lowered to prevent sediment buildup. The asphalt on two of the existing low-water crossings would be milled and a new overlay applied (riprap baskets would be installed at the outlets). The other six existing low-water crossings would be improved by constructing riprap baskets at their outlets.



FIGURE 4. REPRESENTATIVE CONCRETE BOX CULVERT



FIGURE 5. ASPHALT LOW-WATER CROSSING



**FIGURE 6. CIVILIAN CONSERVATION CORPS
CONSTRUCTED WALL**

Areas of Interest

A series of stone walls approximately 0.8 mile in length constructed by the CCC (figure 6) can be found 1.1 miles past Cactus Forest north trailhead on Route 500. Under the preferred alternative, the drainage in this area would be improved to better preserve the wall structures. The existing drainage consists of concrete and asphalt paved ditches (depending on the location) and curbing that runs right up to and against the walls. These drainage structures would be removed (including the asphalt that lies against the walls) and replaced with a buried concrete curb (to prevent undercutting) and an asphalt channel located adjacent to the roadway and away from the walls.

The Javelina picnic area (figure 7) would be rehabilitated to better delineate and expand parking, improve universal access, and improve drainage through the use of asphalt paved ditches and waterways.



FIGURE 7. THE JAVELINA PICNIC AREA

Project Timing

The project is anticipated to begin May 15, 2005 and end by September 30, 2005. During this time of year, park visitation is at its lowest point due to high summer temperatures. Both Route 100 and Route 500 would be closed to the public for the duration of the construction project for each section.

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 long-term impact on the environment. The preferred alternative subscribes to and supports the practice of sustainable planning, design, and use of Cactus Forest Drive.

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 would 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 would 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 deteriorating road surface that creates safety hazards for employees and visitors, especially bicyclists (criteria 2 and 3 not met)
- reduce the need for road maintenance that consumes depletable resources (criteria 1 and 6 not met)
- ensure the protection of historic resources, including the road and associated stone walls constructed by the CCC (criteria 1, 2, and 4 not met)
- address concerns associated with deteriorating drainage systems, including culverts (criteria 1, 2, 3, and 5 not met)

The environmentally preferred alternative in this environmental assessment is the National Park Service preferred alternative. This alternative was selected based on the following criteria:

- protects public and employee health, safety, and welfare by addressing safety concerns associated with a deteriorated road surface, and also provides new safety features for bicyclists from the construction of 5-foot-wide bicycle lanes in segments of Route 500 (NEPA criteria 2, 3, and 5)
- improves operations efficiency and sustainability by reducing the need for ongoing road maintenance and the consumption of depletable resources associated with such maintenance (NEPA criteria 1 and 6)
- prevents loss of natural and cultural resources (NEPA criteria 1, 2, 3, 4, and 5)
- addresses concerns associated with deteriorating drainage systems, including culverts (NEPA criteria 1, 2, 3, and 5)

In short, the environmentally preferred alternative would provide protection of visitor and employee health, safety, and welfare and improve day-to-day operations at Saguaro National Park with minimal disturbance to natural and cultural resources.

STAGING AREA

The staging areas for construction would be limited to three existing turnouts that would be designated for this purpose by Saguaro National Park staff.

MITIGATION MEASURES

Mitigation measures are presented as part of the preferred alternative. These actions have been developed to lessen the adverse effects of the preferred alternative.

General Measures

- The National Park Service project manager would ensure that the project remains confined within the parameters established in the compliance documents and that mitigation measures are properly implemented.
- Construction zones outside of the existing disturbed area would be identified and staked prior to any construction activity. This would define the construction zone and confine activity to the minimum area required for construction. Sensitive areas and vegetation would be fenced.
- 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 stakes and fencing. This includes necessary temporary structures such as erosion control fencing.
- Construction equipment staging would occur at designated turnouts.
- 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.
- Contractors would be required to properly maintain construction equipment (i.e., mufflers) to minimize noise from use of the equipment.
- Contractor-selected, noncommercial areas outside of the project limits (including but not limited to material sources, disposal sites, waste areas, haul roads, and staging areas) would not encroach upon any regulated wetlands of the United States as defined by the U.S. Army Corps of Engineers, and as delineated by a wetlands specialist.

- To control fugitive dust, water sprinkling would occur, as needed, on active work areas where dirt or fine particles are exposed.
- Concrete and asphalt plants would be located outside Saguaro National Park. No overnight storage of these materials would be permitted in the park.
- Construction debris would be immediately hauled from the park to an appropriate disposal location.
- Work would comply with Pima County Code Section 17.16.050.B.1, which states that opacity from fugitive emissions shall not exceed 20% in Pima County east of the Tohono O'odham Reservation.
- A hazardous spill plan would be in place, stating what actions would be taken in the case of a spill and preventive measures to be implemented such as the placement of refueling facilities, storage, and handling of hazardous materials, etc.
- Silt fencing fabric would be inspected frequently and after every severe storm. Accumulated sediments would be removed when the fabric is estimated to be approximately 75% full. If captured silt exceeds 9 inches along silt fences, it would be removed by hand shovel or excavator and the fencing re-established if disturbed. Any damage or deterioration of the silt fence would be repaired or replaced immediately. A second silt fence may be installed uphill if there are signs of the fence clogging and acting as a barrier to flow, causing concentration of flows parallel to the fence.
- Where appropriate, environmentally friendly grease, hydraulic oil, and bar and chain oil would be used. These lubricants are vegetable or mineral oil based, less toxic, and biodegradable.
- All equipment on the project would be maintained in a clean and well-functioning state to avoid or minimize contamination from automotive fluids; all equipment would be checked daily.
- Best management practices for drainage and sediment control, as identified and utilized by the Federal Highway Administration and the National Park Service, 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
- Work would be halted during periods of heavy rainfall. 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

- Erosion and sediment control would be required (see “General Measures”).
- Topsoil (the upper 2 to 3 inches of the soil) would be salvaged in any areas where it would be restored after construction is complete (e.g., where the road is widened). The topsoil would be redistributed in as near the original location as possible and supplemented with scarification, mulching, seeding, and/or planting with species native to the immediate area.

Vegetation

- A revegetation plan has been developed for disturbances outside of the existing road prism. The following is a summary of mitigation measures outlined as part of the revegetation plan:
 - Prior to construction, Saguaro National Park staff would collect seeds from native plants in the road corridor for propagation in a nursery and use in post-construction revegetation activities.
 - Three months prior to construction, Saguaro National Park staff would salvage all barrel cacti (*Ferocactus* spp.), fishhook (*Mammillaria* spp) and hedgehog cacti (*Echinocereus* spp.), and saguaro cacti (*Carnegiea gigantea*) less than 4 feet in height, as well as a portion of the prickly pear cacti and cholla (*Opuntia* spp.), and grasses in the construction zone (as mentioned previously, the construction zone would extend 3 to 4 feet on either side of the road). Two large saguaros (greater than 4 feet in height) in the construction zone would be relocated.
 - During construction, all plant material that was not previously salvaged and removed during clearing and grubbing would be left just outside the construction zone so that it can be used during revegetation. A restoration ecologist (or designee) from Saguaro National Park would be onsite to direct the clearing and grubbing

phase. When feasible, pruning shrubs to the ground level would be the preferred method versus blading vegetation with heavy equipment.

- Topsoil (the upper 2 to 3 inches of soil) would be salvaged in any areas where it would be restored after construction is complete (e.g., where the road is widened). The topsoil would be redistributed in as near the original location as possible. All turnouts that would be obliterated or scaled back would be ripped to a depth of 18 inches to aerate the soil (depending on archeological clearance).
 - All fill and aggregate material would be treated or certified free of non-native plants before being brought into the park.
 - Construction equipment would be staged only in designated parking areas or turnouts.
 - Immediately following construction, Saguaro National Park staff would plant nursery grown and salvaged plant material in disturbed areas. Protective cages would be placed around nursery-grown plants. A minimum of 200 trees would be propagated and planted for cactus ferruginous pygmy-owl mitigation. Microsites would be created using plant materials cleared from the road edge to enhance the effectiveness of applied treatments as well as natural recovery.
 - Over the long term, Saguaro National Park staff would monitor revegetation success through the use of photo points and survival rates of nursery-grown plant material. Non-native plants would be monitored and removed. As needed, park staff would implement a supplemental watering schedule when rainfall levels fall below normal.
- Ground surface treatment would include grading to natural contours, replacing topsoil, seeding, and planting.
 - In an effort to avoid introduction of non-native / noxious plant species, no imported topsoil or hay bales would be used during revegetation. On a case-by-case basis, the following materials may be used for any erosion-control dams that may be necessary: certified weed-free rice straw, cereal grain straw that has been fumigated to kill weed seed, and wood excelsior bales.
 - Undesirable plant species would be controlled in high priority areas. Lower-priority areas would be monitored and, as necessary, undesirable plant species would also be controlled. To prevent the introduction and to minimize the spread of non-native vegetation and noxious weeds, the following measures would be implemented during construction:
 - Minimizing soil disturbance.
 - Pressure washing and/or steam cleaning all construction equipment to ensure that all equipment, machinery, rocks, gravel, or other materials are cleaned and weed free before entering Saguaro National Park.

- Covering all haul trucks bringing asphalt or other fill materials from outside the park to prevent seed transport.
- Limiting vehicle parking to existing roadways, parking lots, or access routes.
- Limiting disturbance to roadsides and culvert areas, including limiting equipment to the roadbed area; no machinery or equipment should access areas outside the construction zone.
- Obtaining all fill, rock, or additional topsoil from the project area, if possible. If not possible, obtaining weed-free sources from National Park Service-approved sources outside the park would be required.
- Initiating revegetation of disturbed sites in the winter following construction activities.
- Treatment of non-native vegetation would be completed in accordance with NPS-13, *Integrated Pest Management Guidelines*.

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.
- Construction fencing would be a minimum of 2.5 inches by 3.75 inches to allow reptiles to pass through without being entangled.
- Any holes and trenches would be covered at night to prevent wildlife entrapment and drainage would be provided to prevent ponding of water. Trenches and other holes would be checked for wildlife (e.g., tortoises, snakes) prior to backfilling, and contractors may remove lizards. A resource specialist from Saguaro National Park would be notified when it is necessary to remove wildlife such as tortoises (*Gopherus* sp.), gila monsters (*Heloderma suspectum*), or snakes.
- During blading operations, equipment operators would be instructed to prevent injury to wildlife.

Threatened and Endangered Species and Species of Concern

- Construction activities are anticipated to take place between May 15 and September 30 to avoid the greater part of the cactus ferruginous pygmy-owl breeding season (February 1 through July 31). However, should the cactus ferruginous pygmy-owl be found during the spring 2005 survey, a new analysis of effects would be written, and a new effects determination would be made. If appropriate, Saguaro National Park staff would consult with the U.S. Fish and Wildlife Service. Construction, if approved, would not begin until August 1 under these circumstances.
- In addition to revegetation efforts described above, the following measures would be taken to preserve habitat for the cactus ferruginous pygmy-owl and lesser long-nosed bat:
 - Two large saguaros and several small saguaros would be salvaged from the project area and planted outside of it.

- Only four trees (all mesquite) over 6 inches would be removed. Otherwise, trees over 6 inches in diameter would not be disturbed.
 - At least 200 trees (mesquite and paloverde) would be propagated and planted for revegetation purposes. Criteria for successful establishment of these trees is 50% survival in the first 2 years. If at any time the survival rate is less than 50%, additional trees would be grown and planted onsite.
- Although it is unlikely that the Pima pineapple cactus occurs in the project area, a survey for the plant would be conducted, and if any individuals are found, Saguaro National Park staff would notify and consult with the U.S. Fish and Wildlife Service on how to proceed.
- Contractor-selected, noncommercial areas outside of the project limits (including but not limited to material sources, disposal sites, waste areas, haul roads, and staging areas) would not encroach upon any species protected under the Endangered Species Act of 1973, as amended. Written proof shall be satisfactory to the National Park Service, and shall include:
 - a current list of all threatened or endangered species in the area from the U.S. Fish and Wildlife Service
 - a “no effect” determination according to section 7 of the Endangered Species Act from a biological specialist

Cultural Resources

- To mitigate some of the impact to archeological resources, the National Park Service has entered into a memorandum of agreement with the Arizona State Historic Preservation Office and the Advisory Council on Historic Preservation, and continues to consult with American Indian tribes regarding significant information about the resources. Phase II archeological data recovery would be conducted at two sites. This would occur beneath the road and a parking area after the existing surfaces are removed, with data recovery grids established and excavation completed before the new construction. This data recovery would complete the mitigation treatment for these two sites, explore the research potential of the sites, recover information about the resources before they are destroyed, and satisfy the requirements of section 106 of the National Historic Preservation Act. This data recovery would be conducted in accordance with a data recovery plan that has been approved by the Arizona State Historic Preservation Office.

Also, under the memorandum of agreement, a qualified professional archeologist would monitor each site during the initial stages of ground-disturbing construction to ensure that buried cultural materials are not inadvertently destroyed. If buried archeological or historical resources are exposed during construction, all work in the immediate vicinity would be halted to allow the monitor to identify whether or not they are significant. If significant resources are identified, the monitor will contact the National Park Service Western Archeological and Conservation Center supervisory archeologist to determine the appropriate course of action. If additional archeological

work is required to assess the exposed resources, the work would be conducted expeditiously to meet the requirements of section 106 of the National Historic Preservation Act and the Arizona State Historic Preservation Office, and to limit delays of the road construction schedule.

- Should human remains or cultural items subject to the Native American Graves Protection and Repatriation Act of 1990 be discovered, the National Park Service would follow the appropriate provisions of the act and its implementing regulations, 43 CFR Part 10. An inadvertent discover plan has been prepared and has been reviewed by the Arizona State Historic Preservation Office.

Should unanticipated archeological resources be discovered during construction, work in the area of the discovery would be halted, the site would be secured, and the National Park Service would follow the appropriate provisions of the implementing regulations for section 106 of the National Historic Preservation Act, 36 CFR Part 800.

- Paleontological remains and archeological specimens found within the construction area would only be removed by the National Park Service or their designated representatives.
- For any historic headwall that must be moved or repaired as part of the extension of culverts, preservation efforts will be undertaken to retain historic materials and details such as numbering stones, deconstructing the wall, stockpiling the stone, replacing the foundation and resetting the original stones with a similar mortar and joint type, and same width of wall, height, form, etc. If stones were missing from the wall, matching stone could be added to fill in any gaps and complete the historic appearance.
- Contractor-selected, noncommercial areas outside of the project limits (including but not limited to material sources, disposal sites, waste areas, haul roads, and staging areas) would not encroach upon sites listed or eligible for listing in the NRHP. Written proof satisfactory to the National Park Service and the Arizona State Historic Preservation Office shall document, for compliance with section 106 of the National Historic Preservation Act, that no historic properties would be affected because:
 - there are no historic resources present
 - there is no effect to historic properties present

Visitor Experience

- Efforts would be made to begin construction in May and end in September to avoid the spring and fall peak tourist seasons.
- A traffic and bicyclist management plan would be required from the contractor. This plan would also include information on how the public would be notified of road construction and signs to be placed to warn motorists.

General Construction Schedule and Costs

Construction to rehabilitate Cactus Forest Drive would begin May of 2005, and finish by the end of September 2005. However, should the cactus ferruginous pygmy-owl be found during the 2005 spring survey, construction would not begin until July 2005, and would be completed by December 2005.

The estimated value of the construction effort is \$1.9 million.

ALTERNATIVES CONSIDERED BUT DISMISSED FROM DETAILED ANALYSIS

One alternative included raising the road at certain low-water crossings and installing new culverts. Although this alternative would have improved drainage, it would also have caused unacceptable environmental disturbance and would likely be cost-prohibitive. Therefore, this alternative was not carried forward for detailed analysis.

COMPARATIVE SUMMARY OF NO-ACTION AND PREFERRED ALTERNATIVES

TABLE 1. COMPARATIVE SUMMARY OF NO-ACTION AND PREFERRED ALTERNATIVE

No-Action Alternative	Preferred Alternative
There would be no improvements to Cactus Forest Drive in Saguaro National Park. Saguaro National Park staff would respond to future needs and conditions associated with Cactus Forest Drive without major actions or changes in the present course. This would include road work and maintenance such as limited safety and drainage improvements, fixing potholes, and grading shoulders. <u>Meets project objectives?</u> No. Continuing the existing roadway maintenance would neither improve road surface conditions for park employees and visitors nor improve the stability of the road. Poor drainage in the area would continue to undermine the road.	The deteriorated road surface would be repaved along the entire length of Cactus Forest Drive. Route 500 would remain a one-way road with an average width of 12.5 feet, while Route 100 would remain a two-way road with an average width of 19 feet. Road widening to 20 feet would occur leading into the Javelina picnic area. Road shoulders on both Route 500 and Route 100 would be improved to meet safety requirements. This would include the placement of aggregate shoulder materials, as necessary. A bicycle lane would be paved to a 5-foot width in one segment of Route 500. In another segment of Route 500, an existing drainage ditch would be removed and a bicycle lane would be constructed in its place. Thirty-eight turnouts would be reworked along Routes 500 and 100. Approximately 80 informal turnout locations on both roads would be totally eliminated or downsized. Roadside drainage would be improved through the construction of asphalt waterways and drainage channels. One concrete box culvert along Route 100 would be replaced with a metal culvert. The outlets on three existing concrete box culverts would be extended, and drop inlets would be installed on two of these along Route 100. Twelve asphalt, low-water crossings along Route 500 would be reworked. Drainage around the CCC-constructed stone walls along Route 500 would be improved to direct drainage away from the walls. The Javelina picnic area would be rehabilitated to improve and expand parking, improve universal access, and improve drainage controls. <u>Meets project objectives?</u> Yes. The road improvements would correct safety hazards for motorists, bicyclists, and pedestrians, while drainage system improvements throughout Cactus Forest Drive would alleviate poor drainage that has caused the majority of road damage.

COMPARATIVE SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS

TABLE 2. COMPARATIVE SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS

Potential Environmental Impacts		
Impact Topic	No-Action Alternative	Preferred Alternative
Soils	Impacts to soils from vehicle and pedestrian trampling at formal and informal turnouts, including that associated with social trails, would continue to have long-term, negligible, adverse effects on soils.	Under the preferred alternative, local soil compaction and surface disturbance (which increases susceptibility to erosion) across 7.64 acres would have short-term, minor, adverse impacts on soils. The restoration of approximately 7.23 acres would have a local, long-term, negligible, beneficial effect on soils. Therefore, overall impacts to soils are expected to be short and long term, negligible, and adverse under the preferred alternative.
Vegetation	Under the no-action alternative, there would be no new ground-disturbing activities with the potential to affect vegetation. Ongoing road maintenance such as ditch and shoulder work, could adversely affect vegetation; however, such effects would be short term, localized, and negligible. The introduction of non-native species by visitors would have long-term, local, minor, adverse impacts on vegetation.	There would be short-term, minor, adverse impacts on vegetation from construction activities. Revegetation would have local long-term, negligible, beneficial effects on vegetation.
Wildlife	There would be no new impacts or changes to impacts to wildlife under the no-action alternative. Impacts to wildlife from collisions with automobiles and bicycles, as well as disturbances associated with human activities in the turnouts and picnic areas (e.g., feeding, harassment, noise), would continue having long-term, localized, negligible, adverse effects.	Construction activities are expected to have local, short-term (duration of the project and revegetation / habitat restoration), negligible, adverse impacts on wildlife from mortality or displacement. An estimated 7.64 acres of roadside habitat would be affected by project construction activities; however, approximately 7.23 acres of roadside area would be revegetated after construction. The loss of approximately 0.4 acre of wildlife habitat would have local, negligible, adverse impacts in the long term, although this would be partially offset by the increase in the numbers of trees in the project area.

TABLE 2. COMPARATIVE SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS

Potential Environmental Impacts		
Impact Topic	No-Action Alternative	Preferred Alternative
Threatened and Endangered Species	There would be no new impacts or changes to impacts to threatened, endangered, or sensitive species under the no-action alternative.	The preferred alternative is not anticipated to have any impact on Mexican spotted owls, yellow-billed cuckoos, American peregrine falcons, or their habitats. Although habitat for the Pima pineapple cactus occurs in the project area, no plants have ever been observed. Therefore, the preferred alternative is not anticipated to have any impact on the Pima pineapple cactus. The preferred alternative is not expected to have any impact on the lesser long-nosed bat because construction would only occur during the day and only one large saguaro would be removed. Construction noise and removal of four large mesquite trees is expected to have short-term, minor, adverse impacts on the cactus ferruginous pygmy-owl. However, a revegetation plan that includes criteria for the successful establishment of at least 100 mesquite and palo verde trees would have long-term, minor, beneficial effects on the habitat for the cactus ferruginous pygmy-owl.
Cultural Resources	Archeological sites would continue to be inadvertently disturbed from activities associated with the informal turnouts, having local, long-term, minor, adverse impacts. There would be no known impacts to cultural landscapes.	There would be long-term, moderate, adverse effects on archeological resources under alternative B as a result of construction activities. Overall, given the limited and localized nature of the proposed changes to Cactus Forest Drive, it is anticipated that alternative B would have long-term, negligible, adverse impacts on cultural landscapes.
Visitor Use and Experience	There would be no road improvements and associated improvements to visitor experience with the no-action alternative. Pedestrians, bicyclists, and motorists would have access to Cactus Forest Drive, but the deteriorating road surface and shoulders would continue to have long-term, minor, adverse effects on visitor experience, despite ongoing maintenance.	Cactus Forest Drive would be closed during construction activities. Because this road is the only driving route in the park and is widely used by bicyclists and pedestrians, total closure would have short-term, minor to moderate, adverse impacts. In the long term, minor to moderate beneficial effects would result from repaving the road; reconstructing shoulders; widening the road in one area to establish an uphill bicycle lane, and removing an existing drainage ditch and constructing a bicycle lane in its place; improving and expanding several overlook and trailhead turnouts; installing several wayside exhibits; and rehabilitating the Javelina picnic area to better delineate and expand parking, as well as improve universal access.

TABLE 2. COMPARATIVE SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS

Potential Environmental Impacts		
Impact Topic	No-Action Alternative	Preferred Alternative
Park Operations	Park staff would continue to address issues with Cactus Forest Drive using present practices under the no-action alternative. This would include road work and maintenance such as limited safety and drainage improvements, fixing potholes, and improving shoulders.	Short-term, minor to moderate, adverse impacts are anticipated for park operations as a result of diverting staff to construction oversight and the reduction in park entrance fees from closing Cactus Forest Drive during construction. However, long-term, minor to moderate, beneficial effects would result when the project is completed from the reduction in maintenance requirements and associated costs in the road corridor, as well as new interpretive opportunities.
Health and Safety	There would be no new impacts to health and safety under the no-action alternative. The deteriorated road surface and shoulders would continue to have long-term, negligible, adverse impacts on health and safety, especially for bicyclists who use Cactus Forest Drive. Poorly functioning low-water crossings and roadside drainage could create flooded conditions on the road that would contribute to these impacts.	The increased risk to construction staff from working in flash flood zones would have short-term (for the duration of construction), negligible, adverse effects on worker safety. It is anticipated that improvements to the road and shoulders associated with the preferred alternative would have localized, long-term, minor to moderate, beneficial effects on health and safety at Saguaro National Park.

AFFECTED ENVIRONMENT

Detailed information on resources in Saguaro National Park may be found in the *General Management Plan* (NPS 1988). A summary of the resources associated with this project follows.

LOCATION AND GENERAL DESCRIPTION OF THE PARK

Saguaro National Park consists of two units separated by the city of Tucson, Arizona, which has a population of approximately 885,000 (figure 8). The Tucson Mountain District and the Rincon Mountain District are located approximately 30 miles apart within Pima County, Arizona. Of the 91,446 total acres at the park, approximately 71,400 acres have been designated as wilderness (FOSNP 2003). The Rincon Mountain District unit is bordered by Coronado National Forest on the eastern and parts of the northern and southern boundary. Interstate 10, which runs through Tucson, is the primary transportation corridor in the vicinity of Saguaro National Park. Access to the Rincon Mountain District and Cactus Forest Drive can be gained from secondary roads, including Speedway and Broadway Boulevards in Tucson. Cactus Forest Drive, which is the subject of this environmental assessment, is located in the Rincon Mountain District where city development closes in on the park on the unit's west side.

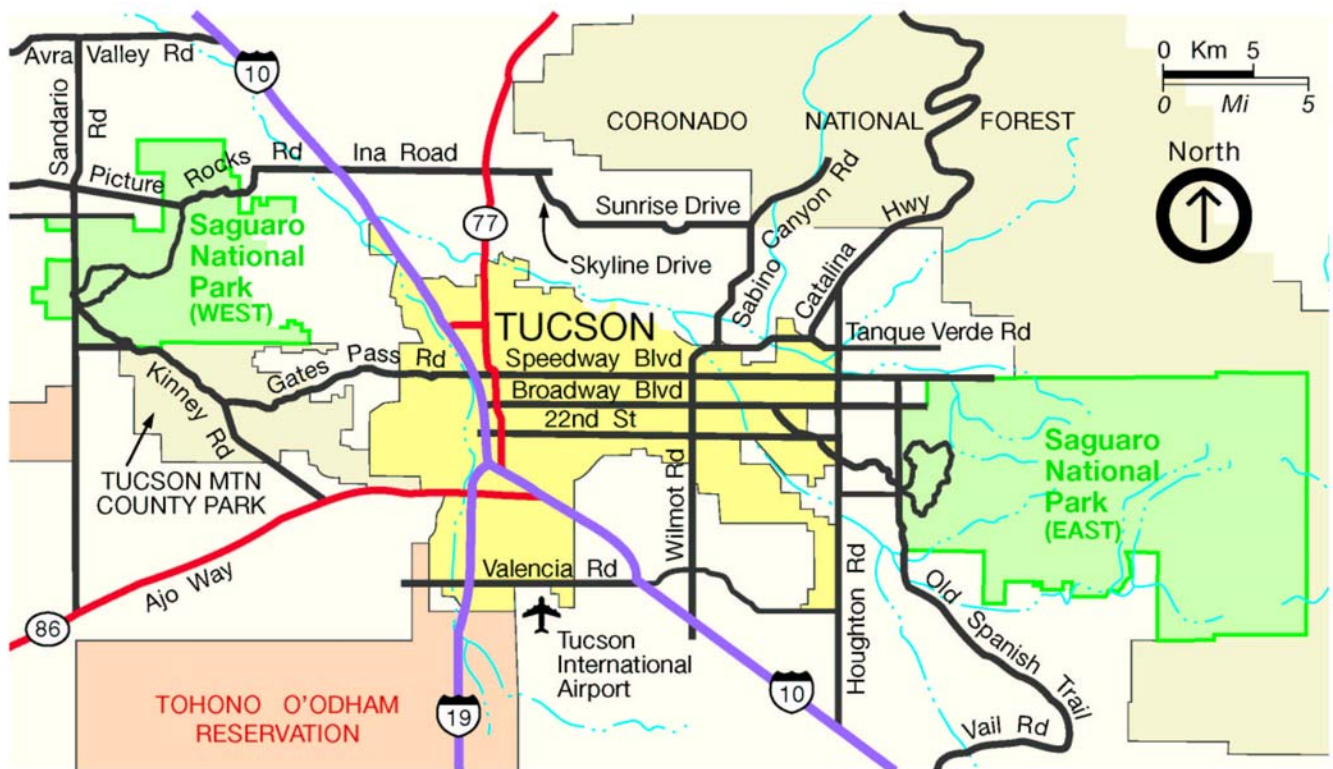


FIGURE 8. VICINITY MAP OF SAGUARO NATIONAL PARK

Saguaro National Park is located in the eastern portion of the Sonoran Desert, which is found in southern Arizona, northern Mexico, and southern California. The Sonoran Desert is located in the Basin and Range physiographic region of the United States, which is characterized by mountain ranges separated by broad valleys or basins. Within the park, elevation ranges from 2,180 feet in low deserts to 8,666 feet atop Mica Peak in the Rincon Mountains of the Rincon Mountain District. The Tucson Mountains are found in the Tucson Mountain District, with the highest point, Wasson Peak, reaching 4,687 feet (FOSNP 2003). The range and elevation of Saguaro National Park supports a wide variety of vegetation—from desert scrub to mountain coniferous forest. The saguaro cactus is probably the most recognizable plant of the Sonoran Desert, and both units of the park contain exceptional stands of this species.

Most visitors to Saguaro National Park choose a leisurely drive on one of the scenic loop drives. However, with over 150 miles of hiking trails, ranging from flat and easy strolls in the Sonoran Desert to steep and rugged hikes into the Rincon Mountains, visitors of every ability have a place to get out and explore (NPS 2003).

SOILS

Soils of the Rincon Mountain District range from coarse rock and talus in the mountainous areas to increasingly fine alluvial soils in the lower elevations. Most soils are shallow, well-drained, and have very low water-holding capacity. Collectively, these and other characteristics make soil found in the park and in the project area susceptible to erosion. Soils in the project area are in the Anklam-Pantano-Cellar map unit (NPS 2002). The primary soil types identified within this map unit are listed below.

Cellar-Lehmans complex: Soils in this complex are found on the northern and southern portions of Cactus Forest Drive. These soils range from very gravelly and sandy to a clay loam found at slopes of 5% to 25%. Soils are shallow and very well drained with low water capacity. Hazards of erosion from water runoff and wind are relatively slight.

Chimenea: Chimenea is a very fine, sandy loam found on slopes of 5% to 15%. The subsoil is a reddish-brown, gravelly, sandy, clay loam. Weathered granite is found at a depth of 15 inches. In some areas, the surface layer is thicker and darker than is typical. Permeability of this soil is moderate and available water capacity is very low. Hazards of erosion from water runoff and wind are relatively slight.

Palos Verdes-Jaynes complex: Soils in this regime range from gravelly to an extremely cobbly, fine, sandy loam. They are found in alluvium of gently sloping terraces, are very deep, and are well drained. Permeability is moderately slow to very slow in the Palos Verdes soils, and is moderately rapid to very slow in the Jaynes soils. Available water capacity is very low, and hazards of erosion from water runoff is slight in both soils; hazards of erosion from wind are slight in the Palos Verdes soils and high in the Jaynes soils.

Pantano-Granolite complex: These soils are found in the middle portion of the loop, in rolling and hilly pediments at the base of steeper slopes. It is an extremely gravelly loam in which

larger rock outcrops typically occur. Both the Pantano and Granolite soils are shallow and well drained; permeability is slow and available water capacity is very low. Erosion hazards from water runoff are slight to moderate in both soils, and erosion hazards from wind are very slight (USDA-NRCS 2004).

VEGETATION

The region surrounding Saguaro National Park and the city of Tucson is characterized as Sonoran desertscrub biome, where the geography, elevation, and climate (specifically the bimodal rainfall pattern) allow for a greater structural diversity of life forms and vegetation communities than surrounding southwest deserts. Sonoran desertscrub displays arboreal elements, truly large species of cacti, and a great variety of succulents in comparison to these other deserts that are mainly dominated by low shrubs (NPS 2002, Shreve 1964, Turner and Brown 1994).

The project area lies within the Tucson Basin and is characterized by the Arizona Upland plant community of the Sonoran desertscrub biome (NPS 2002, Turner and Brown 1994). The Arizona Upland supports a multi-storied canopy of vegetation, two of the most recognizable life forms being the large columnar saguaro cactus and the leguminous tree, the foothill paloverde (*Cercidium microphyllum*) (figures 9 and 10). Mesquite (*Prosopis velutina*), as well as more than 50 species of cacti, are also found in the Arizona Upland plant community (FOSNP 2003).



FIGURE 9. COLUMNAR SAGUARO CACTUS

Vegetation at the project site falls into two general associations. The paloverde/saguaro plant association (figure 11) is structurally and floristically diverse and species rich. This association occurs at elevations of 2,000 to 4,500 feet above mean sea level on bajadas and well-drained rocky slopes with a multi-storied mosaic of saguaros and mixed cacti, trees, shrubs and sub-shrubs, and grasses (NPS 2002).

Along the drainages, the desert riparian scrub association predominates. Although the term “riparian” implies vegetation associated with perennial water, relatively mesic plant associations along the drainages are integral parts of the desert (NPS 2002, Rondeau et al. 1996). This association supports linear communities of vegetation with greater density and cover, often dominated by species of trees and larger shrubs (figure 12).



FIGURE 10. FOOTHILL PALOVERDE

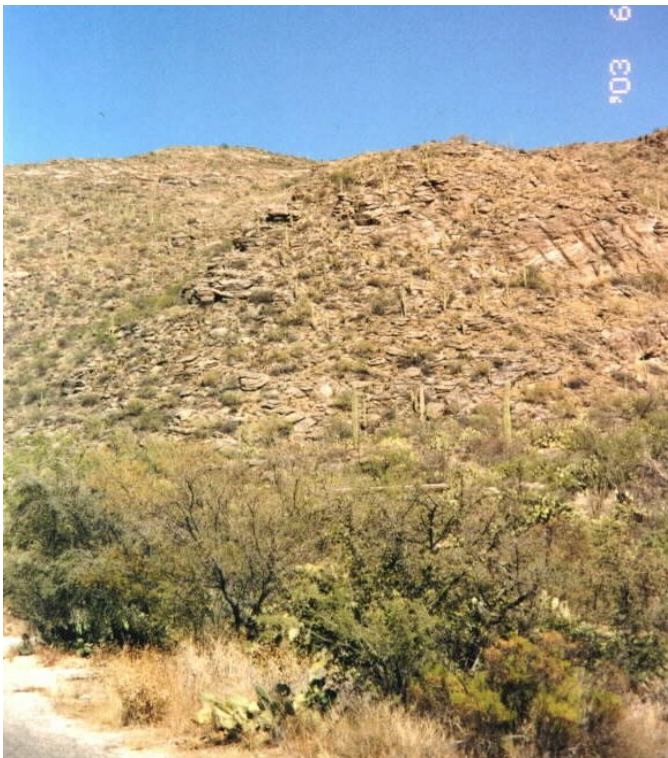


**FIGURE 11. PALOVERDE / SAGUARO PLANT ASSOCIATION
ALONG CACTUS FOREST DRIVE**

The non-native invasive species found in the Tucson area include two perennial bunch grasses that are of specific concern within Saguaro National Park: buffelgrass (*Pennisetum ciliare*) and fountain grass (*Pennisetum setaceum*) (NPS 2002). Both grasses have been observed along Cactus Forest Drive. Annually, park staff remove any new plants that are observed. These plants crowd out native plants and alter ecosystem functions such as nutrient cycling, hydrology, and most importantly, fire regime. The Arizona Upland is not a fire-adapted community, with high post-fire mortality to some of the communities' most important floral species: the saguaro, foothill paloverde, and desert ironwood. The presence of buffelgrass and fountain grass fuels larger and more frequent wildfires.



FIGURE 12. RIPARIAN VEGETATION OF A DESERT WASH CROSSING CACTUS FOREST DRIVE

WILDLIFE

Wildlife resources at Saguaro National Park are diverse, reflecting the park's ecologically unique location. The Rincon Mountain District is part of the "sky-island" chain of scattered mountain tops in southeastern Arizona that connect the Rocky Mountains of the north to the Sierra Madre Mountains to the south. Faunal elements from each of these biomes are represented in the Rincon Mountains. In addition, the elevation ranges from 2,700 feet to 8,666 feet and encompasses six life zones, from the Sonoran desertscrub to mixed coniferous forest. The San Pedro River runs east of the district. The primary drainages of the Rincon Mountains, including the headwaters of Tanque Verde Creek and Pantano Wash, add riparian components that support greater faunal diversity, as well as provide wildlife movement corridors between mountain ranges through the surrounding desert lands. As a result, Saguaro National Park supports a diverse assemblage of thousands of invertebrates and over 325 vertebrates, including about 70 mammals, 200 birds, 50 reptiles, and 8 amphibians (NPS 2002).

Wildlife supported along Cactus Forest Drive include species typical of the Arizona Upland plant community of the Sonoran Desert, including over 230 vertebrate species (NPS 2002). Resident fauna includes conspicuous species such as the mule deer (*Odocoileus hemionus*), coyote (*Canis latrans*), javelina (*Pecari tajacu*), western diamondback rattlesnake (*Crotalus atrox*), roadrunner (*Geococcyx californianus*), Gambel's quail (*Callipepla gambelii*), and a variety of lizards and snakes. Species such as the Sonoran desert tortoise (*Gopherus agassizii*), golden eagle (*Aquila chrysaetos*), mountain lion (*Puma concolor*), and lowland leopard frog (*Rana yavapaiensis*) also occur, but are seen less frequently (NPS 2002). The denser and larger

vegetation along drainages and washes (xeroriparian habitat) that bisect Cactus Forest Drive provides especially high-quality habitat with good cover and refuge for wildlife, and provides movement corridors through the desert for some species.

Since the turn of the century, desert bighorn sheep (*Ovis canadensis mexicana*), gray (Mexican) wolf (*Canis lupus*), jaguar (*Panthera onca*), grizzly bear (*Ursus horribilis*), and most recently (in the late 1980s), the Gila topminnow (*Poeciliopsis occidentalis*), have been extirpated from lands encompassed by the Rincon Mountain District (FOSNP 2003).

THREATENED AND ENDANGERED SPECIES AND SPECIES OF CONCERN

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 is responsible for providing other federal agencies with a list of endangered or threatened species or species of concern that may be affected by a proposed federal action. The species identified by the U.S. Fish and Wildlife Service as potentially occurring in Pima County, Arizona, are presented in appendix B (USFWS 2003). Appendix C provides a detailed biological assessment that describes and considers impacts to threatened, endangered, and special-concern species with the potential to occur in the Cactus Forest Drive corridor.

As described in the biological assessment for Cactus Forest Drive, the U.S. Fish and Wildlife Service listed 26 species with the potential to occur in Pima County. These include:

- four species likely to have been extirpated from Saguaro National Park
- fifteen species known to occur in Pima County, but do not range into, or are not typically found in habitats that occur on or adjacent to, the Rincon Mountain District of Saguaro National Park
- two species that have never been recorded in the Rincon Mountain District of Saguaro National Park and whose habitats do not exist in the project area

The only known federally listed threatened, endangered, and candidate species that could occur in the Cactus Forest Drive corridor, and those that were considered in detail in the biological assessment, are the Pima pineapple cactus (*Coryphantha scheerivar. robustispina*), lesser long-nosed bat, Mexican spotted owl (*Strix occidentalis lucida*), yellow-billed cuckoo (*Coccyzus americanus*), and the cactus ferruginous pygmy-owl. The American peregrine falcon (*Falco peregrinus anatum*), delisted in 1999 but still being monitored, may also occur in the project area. The lesser long-nosed bat, Mexican spotted owl, yellow-billed cuckoo, and the cactus ferruginous pygmy-owl are listed as special-concern species in the state of Arizona. The Pima pineapple cactus is listed by the state as highly safeguarded, meaning no collection is allowed (AZG&F 2003).

The following is a summary of the surveys for these species in the Cactus Forest Drive corridor as described in the biological assessment. Please refer to the biological assessment included in appendix C for more detailed information regarding habitat requirements and survey results.

Pima Pineapple Cactus



FIGURE 13. PIMA PINEAPPLE CACTUS

The Pima pineapple cactus (figure 13) was listed as endangered under the Endangered Species Act of 1973, as amended, on September 23, 1993 (58 *Federal Register* 49875). The project area is at the northern edge of the range of this cactus and potential for habitat is low. Surveys have never been conducted in the project area specifically looking for this cactus. However, the Pima pineapple cactus has never been observed during vegetation data collection in the Rincon Mountain District or during extensive vegetation work along Cactus Forest Drive.

Lesser Long-Nosed Bat

The lesser long-nosed bat (figure 14) was listed as endangered under the Endangered Species Act of 1973, as amended, on September 30, 1988 (59 *Federal Register* 38456). The lesser long-nosed bat is known to occur in Saguaro National Park as a result of bat surveys that confirmed the presence of a small colony (less than five individuals) roosting in a cave over one mile from the project area.



FIGURE 14. LESSER LONG-NOSED BAT



FIGURE 15. MEXICAN SPOTTED OWL

Mexican Spotted Owl

The Mexican spotted owl (figure 15) was listed as threatened under the Endangered Species Act of 1973, as amended, on March 16, 1993 (58 *Federal Register* 14248). Surveys in Saguaro National Park have documented five Mexican spotted owl territories since 1992. These territories are consistently occupied every year, though sometimes only by one bird or a non-breeding pair, and protected activity centers have been established for each territory. The protected activity center closest to the project area is about 7 miles away, and there is no habitat for this owl in the Cactus Forest Drive corridor because of its elevation and vegetation association.

Cactus Ferruginous Pygmy-Owl

The cactus ferruginous pygmy-owl (figure 16) was listed as endangered under the Endangered Species Act of 1973, as amended, on March 10, 1997 (62 *Federal Register* 10730). Habitat for the cactus ferruginous pygmy-owl occurs throughout the Cactus Forest Drive project area. Since 1994, Saguaro National Park staff, Arizona Game and Fish Department biologists, private contractors, and volunteers have surveyed for this owl. The park has conducted 171 surveys in the Rincon Mountain District during annual surveys from 2001 to 2004.

In March of 1984, a cactus ferruginous pygmy-owl was detected on the east side of Cactus Forest Drive. There was a second confirmed detection in October 1995, a little more than one mile southeast of the road. In April of 2001, there was a possible, unconfirmed aural detection near the center of the area enclosed by Cactus Forest Drive. Several follow-up visits to this location failed to detect an owl.



FIGURE 16. CACTUS FERRUGINOUS PYGMY-OWL

In 2003 and 2004, the National Park Service hired a private contractor to conduct clearance surveys for cactus ferruginous pygmy-owls in the Cactus Forest Drive project area. Thirty-eight call stations were established at 400-meter intervals along the road and were surveyed three times each. No birds were detected and no birds responded to taped calls in the 2003 or 2004 surveys. Clearance surveys will also be conducted in 2005, prior to construction. Three years of survey work for the cactus ferruginous pygmy-owl will have been completed when construction begins, exceeding the requirements established by U.S. Fish and Wildlife Service protocol (two surveys).

Yellow-Billed Cuckoo

The yellow-billed cuckoo (figure 17) is a candidate for listing under the Endangered Species Act of 1973, as amended. In southeastern Arizona, the yellow-billed cuckoo is a summer resident in tall, dense, riparian growth, and is considered a rare transient in the Rincon Mountain District of Saguaro National Park. There was a recent sighting of this bird at Rincon Creek, about 3 miles from the project area; however, there is no habitat for the yellow-billed cuckoo in the Cactus Forest Drive project area.



FIGURE 17. YELLOW-BILLED CUCKOO

American Peregrine Falcon

The American peregrine falcon (figure 18) was delisted from the federal list of threatened and endangered species on August 25, 1999 (64 *Federal Register* 46541). Although delisted, this bird is still monitored. Within Saguaro National Park, American peregrine falcons are known to nest at four locations, all above 6,000 feet in elevation in the Rincon Mountains of the Rincon Mountain District. The nest location nearest the Cactus Forest Drive project area is over 8 miles away. American peregrine falcons are occasionally seen in the project area during winter; however, there is no nesting habitat in the vicinity.



FIGURE 18. AMERICAN PEREGRINE FALCON

CULTURAL RESOURCES

Archeological Resources

There have been several intensive archeological surveys conducted at Saguaro National Park. According to National Park Service archeologists, the level of archeological site inventory for Saguaro National Park is sufficient to meet current management needs. An intensive (100%) archeological inventory survey of the Cactus Forest area of the Rincon Mountain unit of the park was conducted in 1983 (Simpson and Wells 1983). Surveyors recorded 160 prehistoric and historic sites and 401 isolated finds.

Nine of the previously recorded archeological sites are located along Cactus Forest Drive. All of these sites lie within, and are contributing resources to, the Rincon Mountain Foothills Archeological District, which was listed on the NRHP on October 16, 1979. In accordance with section 106 of the National Historic Preservation Act of 1966, as amended, and the requirements of the Arizona State Historic Preservation Office, data testing as Phase I of data recovery for the proposed project to rehabilitate Cactus Forest Drive was conducted in May and June 2004. The majority of the sites were recorded as surface or near-surface prehistoric sherd, and lithic scatters, though there are some historic components as well. A rock shelter and an associated midden (an archeological site that generally contains the remains of food waste, ash and charcoal, and pieces of other household artifacts) was recorded at one site. Two sites include more extensive subsurface deposits of sherds, flakes, fire-cracked rock fragments, groundstone fragments, lithic flaking debris, and/or some apparently intrusive small rodent bone remains.

Most of the sites have been previously disturbed to varying levels as a result of the original road construction, the development of formal parking areas and informal turnouts, as well as human vandalism.

Cultural Landscapes

According to the National Park Service *Cultural Resource Management Guideline* (Director's Order 28), a cultural landscape is:

...a reflection of human adaptation and use of natural resources and is often expressed in the way land is organized and divided, patterns of settlement, land use, systems of circulation, and the types of structures that are built. The character of a cultural landscape is defined both by physical materials, such as roads, buildings, walls, and vegetation, and by use reflecting cultural values and traditions.

In May of 2004, a cultural landscape assessment was conducted to provide historical documentation, a description of the existing conditions, and an evaluation of the significance and integrity of Cactus Forest Drive as a resource potentially eligible for the NRHP (NPS 2004b).

Cactus Forest Drive, originally named Skyline Loop Road, was built by the CCC from 1936 to 1939 and remained a gravel route until 1951, when it was paved. Associated features constructed by the CCC include:

- three mortar and non-mortar cut-block retaining walls
- low-water crossings at washes
- culvert headwalls
- shoulder stabilization

The layout of the road, which was intended to provide a leisurely drive through the surrounding saguaro cactus forest, is an example of National Park Service design and planning. Also, the architectural styles and building materials reflect the National Park Service rustic design philosophy of the 1930s. In keeping with the principles of designing in harmony with nature, native materials such as local stone were incorporated into the road and associated structures, which were sited to minimize intrusion on the landscape and maximize the ability of visitors to experience the pristine natural setting from their vehicles. Although it has been paved, the road alignment has not changed since the original construction, nor have the acreage or boundaries of the original tract. Despite the fact that many formal and informal turnouts have been established since the road was built, Cactus Forest Drive continues to provide opportunities for park visitors to view and experience the Sonoran Desert in an unobstructed setting. The layout of the road and associated water control features also blend in with the historic and existing environment.

To be listed in the NRHP, a resource must have integrity, which is defined as “the authenticity of a property’s historic identity, evidenced by the survival of physical characteristics that existed during the property’s historic or prehistoric period.” Although Cactus Forest Drive was paved in 1951, this did not reduce the integrity of the layout or design of the road. The width, vertical and horizontal alignment, and associated features (retaining walls, culverts) reflect the original construction. No significant changes have been made to the retaining walls and culverts; however, some loss of integrity has occurred at some culvert headwalls and

portions of the retaining walls as a result of erosion, vegetation overgrowth, and resurfacing and patching of the roadbed. The species composition of the lands surrounding Cactus Forest Drive, which include the saguaro cactus and associated vegetation of the Sonoran Desert plant community, has been retained and protected since the road was constructed. The roadbed and road alignment, retaining walls, and culvert headwalls all reflect the original craftsmanship and design elements followed by CCC workers. Therefore, the National Park Service has concluded that the road alignment and the associated landscape retain sufficient integrity for listing on the NRHP (NPS 2004b).

In determining the eligibility of the Cactus Forest Drive landscape for inclusion on the NRHP, the National Park Service has concluded that the road and associated features are significant as examples of historic trends and events, and distinctive characteristics of the type, period, or method of construction are exhibited. The cultural landscape assessment notes that “The Cactus Forest Drive cultural landscape reflects the government sponsored work relief programs of the New Deal Era and national park design philosophies of the 1930s.” It also notes that the road has a direct association with “Arizona’s theme of tourism, park development, and Depression (New Deal-era) road projects” (NPS 2004b).

The existing alignment, retaining walls, water-control structures, and culverts of Cactus Forest Drive are considered representative and characteristic of CCC construction in terms of form, proportion, structure, plan, style, and materials. All of the built features are related to one another by cultural tradition (CCC), function (historic road and accessibility to viewshed), dates of construction (1936 – 1939), style (New Deal-era park development), and availability of materials and technology (use of native stone and masonry construction). The existing road is also reflective of the understanding of road engineering during New Deal-era construction.

There are a number of turnouts along Cactus Forest Drive and it is believed that some were constructed with the original road. However, historical research conducted for the Cactus Forest Drive Cultural Landscape Assessment and Determination of Eligibility (NPS 2004b) was unable to verify if turnouts were part of the original road design, as none are shown on the design or as-built drawings. Many are considered to be informal or “social” turnouts that have been created over the years by people pulling off the road indiscriminately. One turnout, (Riparian Overlook and the associated retaining walls and culvert headwalls) is considered to be a contributing feature of the cultural landscape.

VISITOR USE AND EXPERIENCE

The National Park Service recorded a total of 577,585 recreational visits to Saguaro National Park in 2002. Approximately 170,339 or 29% of those visits were recorded at the Rincon Mountain District. Of the 170,339 visits to the Rincon Mountain District, approximately 23% occurred from May through September (Florez 2003). According to the park’s 2001 strategic planning results, 99% of park visitors reported being satisfied with their park visit, while 71% claimed that they understood and appreciated park significance (NPS 2002).

Visitors have opportunities to understand, appreciate, and enjoy the resources of Saguaro National Park in a variety of ways. Popular recreational opportunities in both mountain

districts include auto touring, bird watching, hiking, nature walks, and wildlife viewing. The park also offers a number of educational programs to enhance visitor understanding and appreciation of the resource. The Rincon Mountain District offers ranger-guided nature walks, self-guided field trips, audiovisual programs, and a number of educational and outreach programs. There are also educational brochures and books available at the visitor center.

Cactus Forest Drive is the only auto loop tour in the Rincon Mountain District. It is 8.4 miles long, 6.8 miles of which are specified one-way traffic; 1.6 miles are specified two-way traffic. Additionally, two picnic areas (Javelina and Mica View) are located off Cactus Forest Drive. Along with the picnicking opportunities, there are approximately 150 miles of trails that wind through the Rincon Mountain District and provide access to the backcountry. Cactus Forest Trail bisects the Cactus Forest Drive auto tour loop.

PARK OPERATIONS

National Park Service protection and maintenance staff assigned to the Rincon Mountain District provides trail repair, maintenance, and visitor safety for approximately 150 miles of trail. When fully staffed, a total of one to two National Park Service rangers may patrol Cactus Forest Drive and Cactus Forest Trail at any one time. Park maintenance staff has one full-time trail foreman and a seasonal trail crew that varies in size, depending on funding and needs (NPS 2002).

HEALTH AND SAFETY

The Rincon Mountain District of the park records a number of hiking, equestrian, and bicycling-related accidents each year. District-wide incident reports indicate that park rangers responding to visitors suffering from heat stroke, heart attack, broken bones, and insect bites are not uncommon. Bicycling-related accidents include broken arms and collar bones from falls occurring on Cactus Forest Drive, and punctures and lacerations resulting from falls into desert shrub and cactus (NPS 2002).

Another aspect of safety in the project area is flash flooding in desert washes. Most annual precipitation falls during intense thunderstorms from July through early September and has the potential to create flash floods in the drainages crossed by Cactus Forest Drive.

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This section describes the environmental consequences associated with the alternatives. It is organized by impact topics that distill 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 (including the Arizona State Historic Preservation Office), professional judgments and park staff insights, input from associated American Indian tribes; and public input.

General Definitions

The following definitions were used to evaluate the context, intensity, 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.

Duration

Duration of an impact is analyzed independently for each resource area because impact duration is dependent on the resource being analyzed. Depending on the resource, impacts may last as long as construction takes place, or a single year or growing season, or longer. For purposes of analysis, impact duration is measured as short and long term.

Direct versus Indirect Impacts

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 in the same 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 Descriptions

Potential impacts are described in terms of type (are the effects beneficial or adverse?), context (are the impacts site-specific, local, or even regional?), duration (are the effects short term, long term, or permanent?), intensity (are the effects negligible, minor, moderate, or major?), and impairment (would the effects constitute impairment of park resources and/or values?). Because definitions of duration (short term, long term, or permanent) and intensity (negligible, minor, moderate, or major) vary by impact, they are provided separately for each impact topic analyzed in this environmental assessment.

Soils

All available information on soils potentially impacted in various areas of the park was compiled. Where possible, map locations of sensitive soils were compared with locations of proposed actions. 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:

- **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 no long-term effects to soils would occur.
- **Minor:** The effects to soils would be detectable. Effects to soil area would be small. Mitigation may be needed to offset adverse effects and would be relatively simple to implement and likely be successful.
- **Moderate:** The effects to soils would be readily apparent, likely long term, and result in a change to the soil character over a relatively wide area. Mitigation measures would be necessary to offset adverse effects and likely be successful.
- **Major:** The effects to soils would be readily apparent, long term, and would substantially change the character of the soils over a large area in and out of the park. Mitigation measures to offset adverse effects would be needed, extensive, and their success could not be guaranteed.

For soils, the following definitions are used for the duration of an impact:

- *Short term*— recovers in less than 3 years
- *Long term*— takes more than 3 years to recover

Vegetation

All available information on vegetation and vegetative communities potentially impacted on Cactus Forest Drive was compiled. Where possible, map locations of sensitive vegetation species, populations, and communities were identified and avoided. 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 are defined as follows:

- **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 short term, on a small scale, and no species of special concern would be affected.
- **Minor:** The alternative would affect some individual native plants and would also affect a relatively minor portion of that species' population. Mitigation to offset adverse effects, including special measures to avoid affecting species of special concern, 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 in the long term and over a relatively large area. Mitigation to offset adverse effects could be extensive, but would likely be successful. Some species of special concern could also be affected.
- **Major:** The alternative would have a considerable long-term effect on native plant populations, including species of special concern, 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.

For vegetation, the following definitions are used for the duration of an impact:

- *Short term* – recovers in less than 3 years
- *Long term* – takes more than 3 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 animal life 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 2001 Management Policies*, 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 intensity of an impact are defined as follows:

- **Negligible:** There would be no observable or measurable impacts to native species, their habitats, or the natural processes sustaining them. Impacts would be of short duration and well within natural fluctuations.
- **Minor:** Impacts would be detectable, but they would not be expected to be outside the natural range of variability and would not be expected to have any long-term effects on native species, their habitats, or the natural processes sustaining them. Mitigation measures, if needed to offset adverse effects, would be simple and successful.
- **Moderate:** Breeding animals of concern are present; animals are present 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, and they could be outside the natural range of variability for short periods of time. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.
- **Major:** Impacts on native species, their habitats, or the natural processes sustaining them would be detectable, and they would be expected to be outside the natural range of variability for long periods of time or be permanent. Key ecosystem processes might be disrupted in the long term or permanently. 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.

For wildlife, the following definitions are used for the duration of an impact:

- *Short term* – recovers in less than 1 year
- *Long term* – takes more than 1 year to recover

Threatened and Endangered Species and Species of Concern

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 adversely affect a federally listed species, consultation with the U.S. Fish and Wildlife Service is required to ensure that the action would not jeopardize the species' continued existence or result in the destruction or adverse modification of critical habitat. *NPS 2001 Management Policies* state that potential effects of agency actions would 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 on which they depend. A list of special-status species and designated critical habitats that may be within the project area or affected by any of the alternatives was obtained from the U.S. Fish and Wildlife Service (appendix B). Information on possible threatened, endangered, candidate species, and species of special concern was gathered from the U.S. Fish and Wildlife Service and the Arizona Game and Fish Department. Information from prior research at Saguaro National Park was also incorporated. Map locations of habitat associated with threatened, endangered, candidate species, and species of special concern were compared with locations

of preferred alternatives. Known impacts caused by development and human use were also considered. The thresholds of change for the intensity of an impact are defined as follows:

- **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 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 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 to individuals, 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 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.

For threatened and endangered species and species of concern, the following definitions are used for the duration of an impact:

- *Short term* – recovers in less than 1 year
- *Long term* – takes more than 1 year to recover

Cultural Resources

Archeological Resources

Certain important research questions about human history can only be answered by the actual physical material of cultural resources. Archeological resources have the potential to answer, in whole or in part, such research questions. An archeological site(s) can be eligible to be listed in the NRHP if the site(s) yielded, or may be likely to yield, information important in prehistory or history. An archeological site(s) can be nominated to the NRHP in one of three historic contexts or levels of significance: local, state, or national (see *National Register Bulletin 15, How to Apply the National Register Criteria for Evaluation*). For purposes of analyzing impacts to archeological resources, thresholds of change for the intensity of an impact are based on the potential of the site(s) to yield information important in prehistory or

history, as well as the probable historic context of the affected site(s). The thresholds of change for the intensity of an impact are defined as follows:

Negligible: Impact is at the lowest levels of detection with neither adverse or beneficial consequences. The determination of effect for section 106 would be *no adverse effect*.

Minor: *Adverse impact*– disturbance of a site(s) results in little, if any, loss of integrity. The determination of effect for section 106 would be *no adverse effect*.

Beneficial impact– maintenance and preservation of a site(s). The determination of effect for section 106 would be *no adverse effect*.

Moderate: *Adverse impact*– disturbance of a site(s) results in loss of integrity. The determination of effect for section 106 would be *adverse effect*. A memorandum of agreement is executed among the National Park Service and applicable state or tribal historic preservation officer and, if necessary, the Advisory Council on Historic Preservation, in accordance with 36 CFR 800.6(b). Measures identified in the memorandum of agreement to minimize or mitigate adverse impacts reduce the intensity of impact under NEPA from major to moderate.

Beneficial impact– stabilization of a site(s). The determination of effect for section 106 would be *no adverse effect*.

Major: *Adverse impact*– disturbance of a site(s) results in loss of integrity. The determination of effect for section 106 would be *adverse effect*. Measures to minimize or mitigate adverse impacts cannot be agreed upon and the National Park Service and applicable state or tribal historic preservation officer and/or Advisory Council are unable to negotiate and execute a memorandum of agreement in accordance with 36 CFR 800.6(b).

Beneficial impact– active intervention to preserve a site(s). The determination of effect for section 106 would be *no adverse effect*.

Cultural Landscapes

Cultural landscapes are the result of the long interaction between people and the land; the influence of human beliefs and actions over time upon the natural landscape. Shaped through time by historical land-use and management practices, as well as politics and property laws, levels of technology, and economic conditions, cultural landscapes provide a living record of an area's past, a visual chronicle of its history. The dynamic nature of modern human life, however, contributes to the continual reshaping of cultural landscapes; making them a good source of information about specific times and places, but at the same time rendering their long-term preservation a challenge.

In order for a cultural landscape to be listed in the NRHP, it must possess significance (the meaning or value ascribed to the landscape) *and* have integrity of those features necessary to convey its significance. The character-defining features of a cultural landscape include spatial organization and land patterns; topography; vegetation; circulation patterns; water features; and structures/buildings, site furnishings, and objects (see *the Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*, 1996). The thresholds of change for the intensity of an impact are defined as follows:

Negligible: Impact is at the lowest levels of detection with neither adverse nor beneficial consequences. The determination of effect for section 106 would be *no adverse effect*.

Minor: *Adverse impact*– alteration of a pattern(s) or feature(s) of the landscape would not diminish the overall integrity of the landscape. The determination of effect for section 106 would be *no adverse effect*.

Beneficial impact– preservation of landscape patterns and features in accordance with the *Secretary of the Interior's Standards for Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*. The determination of effect for section 106 would be *no adverse effect*.

Moderate: *Adverse impact* – alteration of a pattern(s) or feature(s) of the landscape would diminish the overall integrity of the landscape. The determination of effect for section 106 would be *adverse effect*. A memorandum of agreement is executed among the National Park Service and applicable state or tribal historic preservation officers and, if necessary, the Advisory Council on Historic Preservation, in accordance with 36 CF 800.6(b). Measures identified in the memorandum of agreement to minimize or mitigate adverse impacts reduce the intensity of the impact under NEPA from major to moderate.

Beneficial impact– rehabilitation of a landscape or its patterns and features in accordance with the *Secretary of the Interior's Standards for Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*. The determination of effect for section 106 would be *no adverse effect*.

Major: *Adverse impact*– alteration of a pattern(s) or feature(s) of the landscape would diminish the overall integrity of the landscape. The determination of effect for section 106 would be *adverse effect*. Measures to minimize or mitigate adverse impacts cannot be agreed upon and the National Park Service and applicable state or tribal historic preservation officer and/or Advisory Council are unable to negotiate and execute a memorandum of agreement in accordance with 36 CFR 800.6(b).

Beneficial impact– restoration of a landscape or its patterns and features in accordance with the *Secretary of the Interior's Standards for Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*. The determination of effect for section 106 would be *no adverse effect*.

Visitor Use and Experience

National Park Service 2001 Management Policies 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 people 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.

Public scoping input and observation of visitation patterns, combined with an assessment of what is available to visitors under current management, were used to estimate the effects of the actions in the various alternatives of this document. The impact on the ability of the visitor to experience a full range of Saguaro National Park resources was analyzed by examining resources and objectives presented in the park's significance statement. The potential for change in visitor use and experience proposed by the alternatives was evaluated by identifying projected increases or decreases in use of Cactus Forest Drive and other visitor uses, and determining how these projected changes would affect the desired visitor experience, to what degree, and for how long. The thresholds of change for the intensity of an impact to visitor experience are defined as follows:

- **Negligible:** Visitors would not be affected or changes in visitor use and/or experience would be below or at the level of detection. Any effects would be short term. The visitor would not likely be aware of the effects associated with each alternative.
- **Minor:** Changes in visitor use and/or experience would be detectable, although the changes would be slight and likely short term. The visitor would be aware of the effects associated with the alternative, but the effects would be slight.
- **Moderate:** Changes in visitor use and/or experience would be readily apparent and likely long term. The visitor would be aware of the effects associated with the alternative and would be likely to express an opinion about the changes.
- **Major:** Changes in visitor use and/or experience would be readily apparent, severely adverse, or exceptionally beneficial, and have important long-term consequences. The visitor would be aware of the effects associated with the alternative and would likely express a strong opinion about the changes.

For visitor use and experience, the following definitions are used for the duration of an impact:

- *Short term* – effects lasting for the duration of the action
- *Long term* – effects lasting longer than the duration of the action

Park Operations

Park operations, for the purpose of this analysis, refers 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 an effective visitor experience. This includes an analysis of the condition and usefulness of the facilities and developed features used to support the operations of the park. Facilities included in this project include the road and associated turnouts, as well as the Javelina and Mica View picnic areas.

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.

- **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 and likely short term, 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, likely long term, and would result in a substantial change in park operations in a manner noticeable to staff and to the public. Mitigation measures would be necessary to offset adverse effects and would likely be successful.
- **Major:** The effects would be readily apparent, long term, and would result in a substantial change in park operations in a manner noticeable to 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.

For park operations, the following definitions are used for the duration of an impact:

- *Short term* – effects lasting for the duration of the treatment action
- *Long term* – effects lasting longer than the duration of the treatment action

Health and Safety

National Park Service 2001 Management Policies call for providing a safe and healthful environment for visitors and employees. Impacts on public safety were assessed by gathering information on public use of Cactus Forest Drive from park staff and public scoping, and were based on professional judgment and past experience with similar road construction projects. The thresholds of change for the intensity of an impact to health and safety are defined as follows:

- **Negligible:** Public health and safety would not be affected, or the effects would be at low levels of detection and would not have an appreciable effect on the public health or safety.

- **Minor:** The effect would be detectable and would likely be short term, but would not have an appreciable effect on public health and safety. If mitigation were needed, it would be relatively simple and would likely be successful.
- **Moderate:** The effects would be readily apparent and long term, and would result in substantial, noticeable effects to public health and safety on a local scale. Mitigation measures would probably be necessary and would likely be successful.
- **Major:** The effects would be readily apparent and long term, and would result in substantial, noticeable effects to public health and safety on a regional scale. Extensive mitigation measures would be needed, and their success would not be guaranteed.

For health and safety, the following definitions are used for the duration of an impact:

- *Short term* – effects lasting for the duration of the treatment action
- *Long term* – effects lasting longer than the duration of the treatment action

CUMULATIVE EFFECTS

Effects can be direct, indirect, or cumulative. Direct effects are caused by an action and occur at the same time and place as the action. Indirect effects are caused by the action and occur later or farther away, but are still reasonably foreseeable. 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 significant, actions taking place over a period of time.

The Council on Environmental Quality regulations, which implement NEPA, require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions” (40 CFR 1508.7). Cumulative impacts are considered for all alternatives, including the no-action alternative.

Cumulative impacts were determined by combining the impacts of the alternatives with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other ongoing or reasonably foreseeable future projects at Saguaro National Park, and if applicable, the surrounding region.

Projects That Make Up The Cumulative Impact Scenario

To determine potential cumulative impacts, projects in the area surrounding Saguaro National Park were identified, including those in the city of Tucson and on nearby lands administered by the U.S. Forest Service. 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, or visitor use. Because some of these cumulative actions are in the early planning stages, the evaluation of cumulative effects was based on a general description of the project.

Past Actions

The following past actions could contribute to 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 Saguaro National Park and has largely restricted natural open space 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. Increasing urbanization in the Tucson metropolitan area has also replaced natural vegetation with buildings and roads, decreasing habitat available to wildlife, fragmenting habitat, and decreasing connectivity between existing habitat islands.

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 as well as trails.

- Control of buffelgrass, fountain grass, and other non-native plants along Cactus Forest Drive. Annually, park staff mechanically remove non-native plants in the Cactus Forest Drive road corridor.

Current and Future Actions

Current actions and those projected for the future could also contribute to cumulative effects. These include:

- Land-use changes as a result of population growth in the Tucson metropolitan area (see “Past Actions” for a detailed description).
- Control of non-native species in the Cactus Forest Drive road corridor (see “Past Actions” for a detailed description).

IMPAIRMENT OF SAGUARO NATIONAL PARK RESOURCES OR VALUES

In addition to determining the environmental consequences of the preferred and other alternatives, *NPS 2001 Management Policies* 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 and monument 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 impairment. However, an impact would more likely constitute 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 General Management Plan* or other relevant National Park Service planning documents

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

IMPACTS TO CULTURAL RESOURCES AND SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT

In this environmental assessment, impacts to cultural resources are described in terms of type, context, duration, and intensity, which is consistent with the regulations of the Council on Environmental Quality that implement NEPA. These impact analyses are intended, however, to comply with the requirements of both NEPA and section 106 of the National Historic Preservation Act. In accordance with the Advisory Council on Historic Preservation's regulations implementing section 106 of the National Historic Preservation Act (36 CFR Part

800, *Protection of Historic Properties*), impacts to cultural resources were also identified and evaluated by (1) determining the area of potential effects; (2) identifying cultural resources present in the area of potential effects that are either listed in or eligible to be listed in the NRHP; (3) applying the criteria of adverse effect to affected NRHP eligible or listed cultural resources; and (4) considering ways to avoid, minimize, or mitigate adverse effects.

Under the Advisory Council's regulations, a determination of either *adverse effect* or *no adverse effect* must also be made for affected NRHP listed or eligible cultural resources. An *adverse effect* occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualifies it for inclusion in the NRHP, e.g., diminishing the integrity (or the extent to which a resource retains its historic appearance) of its location, design, setting, materials, workmanship, feeling, or association. Adverse effects also include reasonably foreseeable effects caused by the alternatives that would occur later in time, be farther removed in distance or be cumulative (36 CFR 800.5, *Assessment of Adverse Effects*). A determination of *no adverse effect* means there is an effect, but the effect would not diminish the characteristics of the cultural resource that qualify it for inclusion in the NRHP.

Council on Environmental Quality regulations and the National Park Service's *Conservation Planning, Environmental Impact Analysis and Decision-making* (Director's Order – 12) also call for a discussion of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact, e.g., reducing the intensity of an impact from major to moderate or minor. Any resultant reduction in intensity of impact due to mitigation, however, is an estimate of the effectiveness of mitigation under NEPA only. It does not suggest that the level of effect as defined by section 106 is similarly reduced. Cultural resources are non-renewable resources and adverse effects generally consume, diminish, or destroy the original historic materials or form, resulting in a loss in the integrity of the resource that can never be recovered. Therefore, although actions determined to have an adverse effect under section 106 may be mitigated, the effect remains adverse.

ENVIRONMENTAL CONSEQUENCES — ALTERNATIVE A: NO ACTION

Soils

No action would be taken in this alternative and, therefore, there would be no new impact to soils. Impacts to soils from vehicle and pedestrian trampling at formal and informal turnouts, including that associated with social trails, would continue to have long-term, negligible, adverse effects on soils.

Cumulative Impacts. Soils in the area are impacted by past, present, and reasonably foreseeable urban and suburban development in the Tucson Basin such as roads, buildings, landscaping, and utility lines on federal, tribal, state, and private lands. Soils are excavated and replaced, buried beneath concrete, and eroded. The cumulative effects of these past, present, and reasonably foreseeable future actions would have short- and long-term, minor to moderate, adverse impacts on soils in the Tucson Basin. This alternative would contribute long-term, negligible, adverse, cumulative effects, and overall, cumulative impacts would be short and long term, minor to moderate, and adverse.

Conclusion. Impacts to soils from vehicle and pedestrian trampling at formal and informal turnouts, including that associated with social trails, would continue to have long-term, negligible, adverse effects on soils. The cumulative effects of past, present, and reasonably foreseeable future actions would have short- and long-term, minor to moderate, adverse impacts on soils. This alternative would contribute long-term, negligible, adverse, cumulative effects, and overall cumulative impacts would be short and long term, minor to moderate, and adverse.

Impairment. Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill the 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 soils.

Vegetation

Under the no-action alternative, there would be no new ground-disturbing activities with the potential to affect vegetation. Ongoing road maintenance such as ditch and shoulder work (e.g., vegetation and rock clearing) could adversely affect vegetation; however, such effects would be short term, localized, and negligible. Non-native species such as buffelgrass and fountain grass seeds could continue to be inadvertently transported in and spread along Cactus Forest Drive by people on foot, horseback, and bicycles. This would have long-term, local, minor, adverse impacts on vegetation.

Cumulative Impacts. Desert vegetation has been and would continue to be lost to rapid urbanization in the Tucson Basin. Increased urbanization also results in the emergence of non-native vegetation on public lands. Non-native species control in the Cactus Forest Drive corridor promotes native vegetation growth and reduces the risk of fire in a plant community (the Arizona Upland) not adapted to fire. The cumulative effects of these past, present, and reasonably foreseeable future actions would have short- and long-term, minor to moderate, adverse impacts on vegetation in the Tucson Basin. Because the no-action alternative would have only localized, short-term, minor, adverse impacts to vegetation from routine maintenance activities and visitor use, when viewed with past, present, and reasonably foreseeable future actions, there would be negligible contributions from the no-action alternative. Overall, cumulative impacts to vegetation would be short and long term, minor to moderate, and adverse.

Conclusion. Under the no-action alternative, there would be no new ground-disturbing activities with the potential to affect vegetation. Ongoing road maintenance such as ditch and shoulder work could adversely affect vegetation; however, such effects would be short term, localized, and negligible. The introduction of non-native species by visitors would have long-term, local, minor, adverse impacts on vegetation. The cumulative effects of past, present, and reasonably foreseeable future actions would have short- and long-term, minor to moderate, adverse impacts on vegetation. The no-action alternative would provide negligible contributions to cumulative impacts.

Impairment. Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill the 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 vegetation.

Wildlife

There would be no new impacts or changes to impacts to wildlife under the no-action alternative. Impacts to wildlife from collisions with automobiles and bicycles, as well as disturbances associated with human activities on the road, in the turnouts, and in picnic areas (e.g., feeding, harassment, noise) would continue, having long-term, localized, negligible, adverse effects.

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. Non-native species control in the Cactus Forest Drive corridor promotes native vegetation growth and reduces the risk of fire in a plant community (the Arizona Upland) not adapted to fire, which benefits native wildlife. The cumulative effects of these past, present, and reasonably foreseeable future actions would have short- and long-term, minor to moderate, adverse impacts on wildlife in the Tucson Basin. Because this alternative would not affect wildlife beyond the localized, negligible, adverse impacts associated with visitor use and automobile traffic, there would be only negligible contributions from the no-action alternative. Overall cumulative effects would be short and long term, minor to moderate, and adverse.

Conclusion. There would be no new impacts or changes to impacts to wildlife under the no-action alternative. Impacts to wildlife from collisions with automobiles and bicycles, as well as disturbances associated with human activities on the road, in the turnouts, and in picnic areas (e.g., feeding, harassment, noise) would continue, having long-term, localized, negligible, adverse effects. The cumulative effects of past, present, and reasonably foreseeable future actions would have short- and long-term, minor to moderate, adverse impacts on wildlife. Because this alternative would not affect wildlife beyond the localized, negligible, adverse impacts associated with visitor use and automobile traffic, there would be only negligible contributions from the no-action alternative. Overall, the cumulative effects would be short and long term, minor to moderate, and adverse.

Impairment. Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill the 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 wildlife.

Threatened and Endangered Species and Species of Concern

Under the no-action alternative, there would be no new activities that have the potential to change the current status of listed species (e.g., Pima pineapple cactus, lesser long-nosed bat, Mexican spotted owl, yellow-billed cuckoo, cactus ferruginous pygmy-owl, and American peregrine falcon) with the potential to occur in the Cactus Forest Drive project area. There would be no new ground-disturbing activities with the potential to impact individuals or habitats for these species. Disturbances associated with traffic noise (e.g., displacement or disruption) and human activity would continue to be inconsequential.

Cumulative Impacts. Threatened and endangered species in the Tucson Basin are affected by urban and suburban development as a result of habitat destruction, habitat fragmentation, and direct loss of individuals. Non-native species control in the Cactus Forest Drive corridor promotes native vegetation growth, and reduces the risk of fire in a plant community (the Arizona Upland) not adapted to fire, which could benefit threatened and endangered species. The cumulative effects of these past, present, and reasonably foreseeable future actions would have short- and long-term, moderate, adverse impacts on threatened, endangered, or special-status species. Because the no-action alternative would have inconsequential effects on threatened, endangered, or special-status species, there would be no contribution and overall, cumulative effects would be short and long term, moderate, and adverse.

Conclusion. There would be no new impacts or changes to impacts to threatened, endangered, or sensitive species under the no-action alternative. The cumulative effects of past, present, and reasonably foreseeable future actions would have short- and long-term, moderate, adverse impacts on threatened, endangered, or special-status species. Because the no-action alternative would have inconsequential effects on threatened, endangered, or special-status species, there would be no contribution to cumulative effects and 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 the 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 threatened, endangered, or sensitive species.

Cultural Resources

Archeological Resources

As no action would be taken in this alternative, construction would not occur and, therefore, there would be no change in direct or indirect impacts on archeological resources. The informal turnouts would remain and archeological sites would continue to be inadvertently disturbed by activities (hiking, picnicking, sight-seeing) associated with the turnouts along the road, as well as vandalism, having local, long-term, minor, adverse impacts.

Cumulative Impacts. The population of the Tucson Basin is increasing, leading to the construction of more homes on the periphery of the park, and potentially affecting archeological resources outside the park. As the population increases, one may assume that there would be more public land use, which could result in a greater occurrence of sites being damaged. Visitors may also inadvertently disturb unidentified archeological sites near the road and in other areas of the park. The cumulative impact of these past, present, and reasonably foreseeable future actions would be long term, minor to moderate, and adverse. Because the no-action alternative would have localized, minor effects on archeological resources, there would be minor contributions to cumulative effects. Overall, cumulative impacts would be long term, minor to moderate, and adverse.

Conclusion. Archeological sites would continue to be disturbed, both inadvertently and as a result of vandalism, having local, long-term, minor, adverse impacts. The cumulative impact of past, present, and reasonably foreseeable future actions would be long term, minor to moderate, and adverse. Because the no-action alternative would have localized, negligible to minor effects on archeological resources, there would be negligible contributions to cumulative effects. Overall, cumulative impacts would be long term, minor to 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 archeological resources.

Cultural Landscapes

As no action would be taken in this alternative, construction would not occur and, therefore, there would be no impacts to the NRHP-eligible cultural landscape.

Cumulative Impacts. The population of the Tucson Basin is increasing, leading to the construction of more homes on the periphery of the park, potentially affecting historic resources outside the park. As the population increases, one may assume that there would be more public land use, which could result in a greater occurrence of resources being damaged. The cumulative impact of these past, present, and foreseeable future actions, would be long term, negligible to minor, and adverse. The no-action alternative would have no contribution to the cumulative effects, and overall, cumulative impacts would be long term, negligible to minor, and adverse.

Conclusion. There are no known impacts to cultural landscapes under the no-action alternative. The cumulative impact of past, present, and foreseeable future actions would be long term, negligible to minor, and adverse. The no-action alternative would not contribute to cumulative effects and overall cumulative impacts would remain long term, negligible to minor, and adverse.

Visitor Use and Experience

There would be no road improvements or associated improvements to visitor experience with the no-action alternative. Pedestrians, bicyclists, and motorists would have access to Cactus Forest Drive, but the deteriorating road surface and shoulders would continue to have long-term, minor, adverse effects on visitor experience, despite ongoing maintenance.

Cumulative Impacts. As the population in the Tucson metropolitan area increases, demand for accessible recreation areas would be anticipated to increase, resulting in the greater potential for crowding and visitor use conflicts in such areas. The cumulative effects of these past, present, and reasonably foreseeable future actions would have long-term, minor, adverse impacts on visitor use and experience. Because the no-action alternative would have minor effects on visitor use and experience, there would be minor contributions to cumulative effects and overall cumulative impacts would be long-term, minor, and adverse.

Conclusion. There would be no road improvements and associated improvements to visitor experience with the no-action alternative. Pedestrians, bicyclists, and motorists would have access to Cactus Forest Drive, but the deteriorating road surface and shoulders would continue to have long-term, minor, adverse effects on visitor experience, despite ongoing maintenance. The cumulative effects of these past, present, and reasonably foreseeable future actions would have long-term, minor, adverse impacts on visitor use and experience. Because the no-action alternative would have inconsequential effects on visitor use and experience, there would be no contribution to cumulative effects and overall cumulative impacts would be long term, minor, and adverse.

Park Operations

Park staff would continue to address issues with Cactus Forest Drive using present practices under the no-action alternative. This would include road work and maintenance such as limited safety and drainage improvements, fixing potholes, and improving shoulders. The ongoing impact on park operations from road work and maintenance on Cactus Forest Drive would be long term, negligible, and adverse. There would be no other park operations affected by the no-action alternative.

Cumulative Impacts. Park staff maintain a few small roads and approximately 150 miles of trails at Saguaro National Park. Although maintenance associated with Cactus Forest Drive requires the use of park staff and resources, the no-action alternative would have negligible contributions to cumulative effects on park resources. Therefore, past, present, and reasonably foreseeable future actions, in conjunction with the no-action alternative, would have short- and long-term, negligible, adverse, cumulative impacts.

Conclusion. Park staff would continue to address issues with Cactus Forest Drive using present practices under the no-action alternative. The ongoing impact on park operations from road work and maintenance on Cactus Forest Drive would be long term, negligible, and adverse. Past, present, and reasonably foreseeable future actions, in conjunction with the no-action alternative, would have short- and long-term, negligible, adverse, cumulative impacts.

However, the no-action alternative would have inconsequential contributions to cumulative effects on park resources as a result of ongoing maintenance.

Health and Safety

There would be no new impacts to health and safety under the no-action alternative. The deteriorated road surface and shoulders would continue to have short- and long-term, negligible to minor, adverse impacts on health and safety, by increasing the potential for accidents, especially for bicyclists who use Cactus Forest Drive. Poorly functioning low-water crossings and roadside drainage could create flooded conditions on the road that would contribute to these impacts.

Cumulative Impacts. As visitation increases in response to population growth, the potential for accidents and injuries to visitors would be expected to increase. The cumulative effects of these past, present, and reasonably foreseeable future actions would have short- and long-term, negligible to minor, adverse impacts on health and safety. Because the no-action alternative would have negligible contributions to cumulative effects on health and safety, overall cumulative impacts would be long term, negligible to minor, and adverse.

Conclusion. There would be no new impacts to health and safety under the no-action alternative. The deteriorated road surface and shoulders would continue to have long-term, negligible, adverse impacts on health and safety, especially for bicyclists who use Cactus Forest Drive. Poorly functioning low-water crossings and roadside drainage could create flooded conditions on the road that would contribute to these impacts. The cumulative effects of past, present, and reasonably foreseeable future actions would have long-term, negligible to minor, adverse impacts on health and safety. Because the no-action alternative would have negligible contributions to cumulative effects on health and safety, overall cumulative impacts would be long term, negligible to minor, and adverse.

ENVIRONMENTAL CONSEQUENCES — ALTERNATIVE B: PREFERRED ALTERNATIVE

Soils

Blasting activities may be required where the road is being widened on the approach to the Javelina picnic area. Some trampling and soil compaction by equipment and workers within the construction zone is also expected. Most of the construction activities would be conducted on previously disturbed soils that occur within the existing road prism and have been compacted by years of maintenance and motor vehicle passage. However, under the preferred alternative, approximately 7.64 acres of roadside desert soil would be impacted by the preferred alternative. Local soil compaction would temporarily decrease permeability, alter soil moisture content, and diminish the water storage capacity of these generally xeric soils. Surface disturbance to desert soils would also increase susceptibility to erosion during precipitation events. These effects would have short-term, minor, adverse impacts on soils.

When construction is complete, previously disturbed soil areas would be restored and revegetated in accordance with a revegetation plan developed for the project (see “Mitigation Measures” section). Approximately 7.23 acres of roadside area would be restored after construction, including areas associated with the total or partial elimination of turnouts, as well as revegetation of embankment and picnic area slopes. Although approximately 0.4 acre of soils would be permanently disturbed, scaling back or obliterating turnouts would reduce impacts to soils from vehicle and pedestrian trampling (including that associated with social trails at turnouts). This would have a local, long-term, negligible, beneficial effect on soils.

Cumulative Impacts. The cumulative effects of past, present, and reasonably foreseeable future actions under the preferred alternative would be the same as those for soils under the no-action alternative. (See the no-action alternative discussion for details.) The impacts of these cumulative effects, in conjunction with the preferred alternative, would be short and long term, minor to moderate, and adverse. The preferred alternative would have only negligible adverse contributions in the short term, and negligible beneficial contributions in the long term.

Conclusion. Under the preferred alternative, local soil compaction and surface disturbance (which increases susceptibility to erosion) across 7.64 acres would have short-term, minor, adverse impacts on soils. The restoration of approximately 7.23 acres would have a local, long-term, negligible, beneficial effect on soils. The impacts of past, present, and reasonably foreseeable future actions, in conjunction with the preferred alternative, would be long term, minor to moderate, and adverse. The preferred alternative would have only negligible adverse contributions in the short term, and negligible beneficial contributions in the long term.

Impairment. Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill the 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 soils.

Vegetation

Most of the construction activities such as rehabilitation of the existing roadway and shoulders along Route 500 and Route 100, reconfiguration of turnouts and parking areas, establishment of a bicycle lane on Route 500, and drainage improvements, would disturb currently paved or graveled surface areas that do not support vegetation. An estimated 7.64 acres of roadside vegetation, which primarily consists of native plant species, would be affected by these project construction activities. As a result of this disturbance, one large (over 4 feet) saguaro would be removed, and two large, as well as several small, saguaros would be relocated. Four mesquite trees with diameters greater than 6 inches would be removed. Another 35 small trees (mesquite, paloverde, and acacia) would be removed. Larger cacti, trees, and shrubs outside the construction zone (approximately 3 to 4 feet on both sides of the road) would be tagged and protected with construction fencing so they would not be disturbed.

When construction is complete, disturbed soil areas would be restored and revegetated with native species, and measures would be taken to minimize invasion by non-native species, in accordance with a revegetation plan developed for the project (see “Mitigation Measures” section). Approximately 7.23 acres of roadside area would be revegetated after construction, including those areas associated with the total or partial elimination of turnouts as well as the revegetation of embankment and picnic area slopes. Scaling back or obliterating turnouts would also reduce impacts to plant communities that result from pedestrian trampling associated with social trails at these turnouts.

As part of revegetation, Saguaro National Park staff would replace topsoil, replant those plants salvaged before construction, and plant nursery-grown plants, including 200 mesquite and paloverde trees. Protective cages would be placed around all nursery-grown plants, and restored areas would be seeded with seeds collected from the project area. To enhance effectiveness of replanting and natural recovery, park staff would create microsites with plant materials that were cleared prior to construction. Revegetation would be considered successful if 50% of the trees planted (100) survive the first 2 years. If at any time the survival rate is less than 50%, additional trees would be grown and planted onsite. Should supplemental watering be necessary, park staff would water every 3 to 4 weeks, as needed, for up to 2 years.

Localized, short-term impacts to vegetation as a result of construction activities under the preferred alternative are expected to be minor and adverse. The loss of approximately 0.4 acre of vegetation would be offset by the fact that only four large trees would be lost and at least 100 planted trees would be expected to reach maturity under the revegetation plan for the project. Therefore, the preferred alternative would have local, negligible, beneficial impacts in the long term.

Cumulative Impacts. The cumulative effects of past, present, and reasonably foreseeable future actions under the preferred alternative would be the same as those for vegetation under the no-action alternative. (See the no-action alternative discussion for details.) The cumulative effects of past, present, and reasonably foreseeable future actions would have short- and long-term, minor to moderate, adverse impacts on vegetation in the Tucson Basin. Because the preferred alternative would have localized, short-term, minor, adverse impacts and long-term, negligible, beneficial effects on vegetation, when viewed with past, present, and reasonably foreseeable future actions, there would be negligible contributions from the preferred alternative. Overall, cumulative impacts to vegetation would be short and long term, minor to moderate, and adverse.

Conclusion. There would be short-term, minor, adverse impacts on vegetation from construction activities. Revegetation would have local long-term, negligible, beneficial effects on vegetation. The cumulative effects of past, present, and reasonably foreseeable future actions would have short- and long-term, minor, adverse impacts on vegetation. Because the preferred alternative would have localized, short-term, negligible, adverse impacts, and long-term, beneficial effects on vegetation from construction activities when viewed with past, present, and reasonably foreseeable future actions, there would be negligible contributions to cumulative impacts from the preferred alternative. Overall, cumulative impacts to vegetation would be short and long term, minor to moderate, and adverse.

Impairment. Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill the 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 vegetation.

Wildlife

Noise and human presence during construction activities would cause short-term impacts to wildlife species; however, these impacts would disappear and wildlife usage would return to normal as construction is completed. During construction, some wildlife, particularly small mammals and reptiles, would be temporarily displaced. Some individuals may be killed outright or would be dispersed outside the construction limits and become susceptible to predation or competitive stress. This displacement would result in a slight population depression adjacent to the corridor, but following project completion and successful restoration, wildlife would again reoccupy restored portions of the project area. It is likely that certain larger species such as the mule deer, javelina, and coyote would avoid the road corridor during construction. Other large species (i.e., common raven) may be more visible as prey species are flushed or uncovered during ground disturbance or are made available as carrion. These effects are expected to have local, short-term (duration of the project and revegetation / habitat restoration), negligible, adverse impacts on wildlife.

Most of the construction activities such as rehabilitation of the existing roadway and shoulders along Route 500 and Route 100, reconfiguration of turnouts and parking areas, establishment of a bicycle lane on Route 500, and drainage improvements, would disturb currently paved or graveled surface areas that do not support vegetation and are of no habitat value to wildlife. However, an estimated 7.64 acres of roadside habitat would be affected by these project construction activities including the removal of one large (over 4 feet) saguaro, the relocation of two large, as well as several small saguaros, the removal of four mesquite trees with diameters greater than 6 inches, and the removal of another 35 small trees (mesquite, paloverde, and acacia).

When construction is complete, disturbed soil areas would be restored and revegetated with native species and measures would be taken to minimize invasion by non-native species. Approximately 7.23 acres of roadside area would be revegetated after construction, including those areas associated with the total or partial elimination of turnouts, as well as the revegetation of embankment and picnic area slopes. The net loss of wildlife habitat would, therefore, be only 0.4 acre. The loss of approximately 0.4 acre of wildlife habitat would have local, negligible, adverse impacts in the long term, although this would be partially offset by the increase in the numbers of trees in the project area.

Cumulative Impacts. The cumulative effects of past, present, and reasonably foreseeable future actions under the preferred alternative would be the same as those for wildlife under the no-action alternative. (See the no-action alternative discussion for details.) The cumulative effects of past, present, and reasonably foreseeable future actions would have short- and long-term, minor to moderate, adverse impacts on wildlife. Because this alternative would not affect

wildlife beyond the localized, negligible, adverse impacts associated with construction, there would be only negligible contributions from the preferred alternative. Overall, the cumulative effects would be short and long term, minor to moderate, and adverse.

Conclusion. Construction activities are expected to have local, short-term (duration of the project and revegetation / habitat restoration), negligible, adverse impacts on wildlife from fatality or displacement. An estimated 7.64 acres of roadside habitat would be affected by project construction activities; however, approximately 7.23 acres of roadside area would be revegetated after construction. The loss of approximately 0.4 acre of wildlife habitat would have local, negligible, adverse impacts in the long term, although this would be partially offset by the increase in the numbers of trees in the project area. The cumulative effects of past, present, and reasonably foreseeable future actions would have short- and long-term, minor to moderate, adverse impacts on wildlife. Because this alternative would not affect wildlife beyond the localized, negligible, adverse impacts associated with construction, there would be only negligible contributions from the preferred alternative. Overall, cumulative effects would be short and long term, minor to moderate, and adverse.

Impairment. Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill the 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 wildlife.

Threatened and Endangered Species and Species of Concern

The preferred alternative is not anticipated to have any impact on Mexican spotted owls, yellow-billed cuckoos, American peregrine falcons, or their habitats. The Mexican spotted owl protected activity center closest to Cactus Forest Drive is about 7 miles away, and the project area does not have the elements of critical habitat for this species. Therefore, the preferred alternative is not expected to affect individual Mexican spotted owls or their roosting and foraging habitat. The yellow-billed cuckoo is considered a rare transient in the Rincon Mountain District of Saguaro National Park, and there is no habitat for this species (riparian woodland) in the project area. Therefore, the preferred alternative is not expected to affect the yellow-billed cuckoo. There is no nesting habitat for the American peregrine falcon in the vicinity of the project area, and these birds are only seen in the Cactus Forest Drive area as transients during the winter. The project would occur in the summer, so the preferred alternative is not expected to affect individual American peregrine falcons or their nesting and foraging habitat.

Although habitat does exist in the project area for the Pima pineapple cactus, Saguaro National Park is located at the northern edge of its range, and the potential for this species to occur near Cactus Forest Drive is low. In addition, previous vegetation surveys have never located this plant in the Rincon Mountain District. Approximately 0.4 acre of potential Pima pineapple cactus habitat would be lost as a result of the preferred alternative; however, the preferred alternative is not anticipated to affect any individual plants. In addition, Saguaro National Park staff will survey the project area for the Pima pineapple cactus in the fall of 2004, and should

any plants be found, park staff would notify and consult with the U.S. Fish and Wildlife Service on how to proceed. The minimal loss of habitat is not expected to affect the species; therefore, the proposed action is not anticipated to have any effect on the Pima pineapple cactus.

Lesser long-nosed bats are nocturnal and would not be active during daylight hours when construction would occur. Therefore, it is not anticipated that any individuals would be affected by human presence or noise associated with the project. As mentioned previously, most of the construction activities would disturb currently paved or graveled surface areas that do not support vegetation and are, therefore, of no habitat value to the lesser-long nosed bat. However, an estimated 7.64 acres of roadside habitat would be affected by these project construction activities, including the removal of one large (over 4 feet) saguaro and the relocation of two large, as well as several small, saguaros. Because there are no agave (the primary food source for the lesser long-nosed bat in the late summer) in the project area, and because only one saguaro of flowering age (also a food source) would be lost, the preferred alternative would not affect foraging habitat for the bats. Therefore, the preferred alternative is not expected to have any impact on the lesser long-nosed bat or its habitat.

Although no cactus ferruginous pygmy-owls were detected in the project area during surveys conducted in 2003 and 2004, it is possible that some undetected individuals could be harassed from the increased noise and ground vibrations produced by vehicles and heavy equipment during the road work. However, Cactus Forest Drive is the only paved road in the Rincon Mountain District, and as a result, vehicles and visitors concentrate in this area. It is, therefore, expected that cactus ferruginous pygmy-owls in the vicinity of the road are accustomed to some noise and human presence. It is expected that noise associated with construction activities under the preferred alternative would have short-term, negligible to minor, adverse impacts on cactus ferruginous pygmy-owls.

As described above, an estimated 7.64 acres of roadside habitat would be affected by construction activities under the preferred alternative, including the removal of one large (over 4 feet) saguaro; the relocation of two large, as well as several small saguaros; the removal of four mesquite trees with diameters greater than 6 inches; and the removal of another 35 small trees (mesquite, paloverde, and acacia). Although one saguaro would be lost, it does not have any cavities and is, therefore, not considered a nesting location for cactus ferruginous pygmy-owls. The loss of the four large mesquite trees would represent a loss of potential nesting habitat for this species, which would have short-term, minor, adverse impacts. However, approximately 7.23 acres would be revegetated once construction is complete, which would result in a net loss of only 0.4 acre of potential cactus ferruginous pygmy-owl habitat. The revegetation plan calls for planting 200 nursery-grown mesquite and paloverde trees to offset the four mesquite that are removed during construction. Revegetation would be considered successful if 50% of the trees planted (100) survive the first 2 years. If at any time the survival rate is less than 50%, additional trees would be grown and planted onsite. Therefore, it is expected that there would be long-term, minor, beneficial effects on the cactus ferruginous pygmy-owl.

Cumulative Impacts. The cumulative effects of past, present, and reasonably foreseeable future actions under the preferred alternative would be the same as those for threatened and endangered species and species of concern under the no-action alternative. (See the no-action alternative discussion for details.) The cumulative effects of past, present, and reasonably

foreseeable future actions would have short- and long-term, moderate, adverse impacts on threatened, endangered, or special-status species. Because this alternative would have short-term, negligible to minor, localized, adverse effects, and local, long-term, minor, beneficial effects on threatened, endangered, or special-status species, there would be negligible contributions to cumulative impacts and overall, cumulative effects would be short and long term, moderate, and adverse.

Conclusion. The preferred alternative is not anticipated to have any impact on Mexican spotted owls, yellow-billed cuckoos, American peregrine falcons or their habitats. Although habitat for the Pima pineapple cactus occurs in the project area, no plants have ever been observed. Therefore, the preferred alternative is not anticipated to have any impact on the Pima pineapple cactus. The preferred alternative is not expected to have any impact on the lesser long-nosed bat because construction would only occur during the day and only one large saguaro would be removed. Construction noise and removal of four large mesquite trees is expected to have short-term, minor, adverse impacts on the cactus ferruginous pygmy-owl and its habitat. However, a revegetation plan that includes criteria for the successful establishment of at least 100 mesquite and paloverde trees would have long-term, minor, beneficial effects on habitat for the cactus ferruginous pygmy-owl. The cumulative effects of past, present, and reasonably foreseeable future actions would have short- and long-term, moderate, adverse impacts on threatened, endangered, or special-status species. Because this alternative would have short-term, minor, localized, adverse effects, as well as local, long-term, minor, beneficial effects on threatened, endangered, or special-status species, there would be negligible to minor contributions to cumulative impacts. Overall, cumulative effects 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 the 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 threatened and endangered species or species of concern.

Cultural Resources

Archeological Resources

The activities proposed in alternative B have the potential to affect archeological resources, although such resources would be avoided to the maximum possible extent. There is expected to be very little new ground disturbance as most work would be limited to the existing road corridor. The area of potential effect for road construction includes the roadway and approximately 3 to 4 feet along both sides (the construction zone). The removal of informal turnouts and renovation of established turnouts and parking areas has the potential to affect archeological sites. Eight of the nine archeological sites known in the vicinity of Cactus Forest Drive would be affected by the road rehabilitation. They are previously disturbed and consist of low-density, surface artifact scatters. At the ninth site, an extensive surface artifact scatter

and well-developed midden deposits would be avoided. It is anticipated that disturbances to these archeological sites would have long-term, moderate, adverse impacts to these resources.

The removal of informal turnouts in or near archeological sites would also have long-term, negligible to minor, beneficial effects on such resources because avenues for potential disturbance would be eliminated or reduced. In accordance with the memorandum of agreement between Saguaro National Park and the Arizona State Historic Preservation Office, archeological site monitoring and data recovery efforts would also be implemented to mitigate the effects of this alternative. Should previously unidentified archeological resources be discovered during construction, work in that location would stop until a qualified archeologist could inventory and evaluate the resource and appropriate measures could be implemented, either to avoid further resource impacts or to mitigate their loss or disturbance. Should human remains or cultural items subject to the Native American Graves Protection and Repatriation Act be discovered, the National Park Service would follow the appropriate provisions of the act and its implementing regulations, 43 CFR Part 10.

Cumulative Impacts. The cumulative effects of past, present, and reasonably foreseeable future actions under the preferred alternative would be the same as those for archeological resources under the no-action alternative. (See the no-action alternative discussion for details.) The cumulative impact of past, present, and reasonably foreseeable future actions would be long term, minor to moderate, and adverse. The preferred alternative would have long-term, moderate, adverse contributions to cumulative effects on archeological resources. Overall, cumulative impacts would be long term, moderate, and adverse.

Conclusion. There would be long-term, moderate, adverse effects on archeological resources under alternative B as a result of construction activities. The cumulative impact of past, present, and reasonably foreseeable future actions would be long term, minor to moderate, and adverse. The preferred alternative would have long-term, moderate, adverse contributions to cumulative effects on archeological resources. Overall, cumulative impacts would be 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 archeological resources.

Cultural Landscapes

There is a balance between change and continuity in cultural landscapes that results from both natural processes and human interaction. The dynamic quality of change, however, can be balanced by the continuity of distinctive characteristics, or character-defining features, retained over time, which maintains continuity of form, order, use, features, or materials. The activities proposed under alternative B take into consideration the need to alter or add to the Cactus Forest Drive landscape to meet new uses (e.g., a new bicycle lane) while retaining the

landscape's historic character (e.g., maintaining the circulation pattern of the road and preserving the retaining walls).

Elements that contribute to the cultural landscape of Cactus Forest Drive (alignment, circulation pattern, natural setting, retaining walls, shoulder stabilization, and culvert headwalls) would be largely unaffected. There would be no changes to the circulation pattern of the road or the shoulder stabilization that date back to the CCC construction. The addition of a bicycle lane at approximately milepost 9.7 would slightly modify the horizontal alignment of the road in this stretch. This is expected to have local, long-term, minor, adverse impacts on the cultural landscape.

Although some vegetation, including one large (over 4 feet) saguaro, would be removed as a result of implementing alternative B, salvage and revegetation efforts, including relocating several smaller saguaro, would be implemented to minimize impacts to vegetation. As a result, effects of the road rehabilitation on the natural setting would be negligible.

The retaining walls themselves would be unaffected by the road rehabilitation; however, improvements to the drainage associated with these walls include removing the existing concrete and asphalt paved ditches and replacing them with buried concrete curb and new asphalt channels located adjacent to the roadway. New roadside drainageways would also be installed, including some that would use curbing. One concrete box culvert would be replaced with a metal culvert, and the outlets on three existing culverts would be extended, while drop inlets would be installed on two of these. Although this would actually improve the likelihood that the integrity of the walls and road themselves are maintained, it would change the materials and form of the CCC-designed drainage structures. It is important to note, however, that the function (or use) of these drainageways would remain intact. This is expected to have local, long-term, minor, adverse effects on the Cactus Forest Drive cultural landscape.

Under this alternative, four existing low-water crossings would be removed and replaced with new low-water crossings that would be constructed of concrete; no asphalt or chip and seal would be used. Of these, one low-water crossing would be raised by approximately 0.8 feet to make the crossing flush with the streambed. Another crossing, which tends to collect sediment, would be lowered slightly to prevent sediment buildup. The asphalt on two of the existing low-water crossings would be milled and a new overlay applied (gabion baskets would be installed at the outlets). The other six existing low-water crossings would be improved by constructing gabion baskets at their outlets. These proposed actions would involve changes to the form and materials of the original low-water crossings, but these changes would improve the effectiveness of the low-water crossings and help protect the road from further deterioration caused by inadequate drainage. As with the other drainageways in the road corridor, the function of these low-water crossings would remain intact. These changes to the low-water crossings are, therefore, expected to have local, long-term, negligible, adverse effects on the Cactus Forest Drive cultural landscape.

Approximately 38 turnouts would be rehabilitated under this alternative. Eleven of these would require additional clearing and grubbing to slightly expand the footprint. The rehabilitation of the Riparian Overlook (turnout) is expected to have beneficial impacts to the cultural landscape. The cement channels that are found adjacent to various segments of the wall are not contributing elements to the cultural landscape. Removal of these channels will

have a beneficial impact to both the significance of the wall segments and to the enhancement of the cultural landscape.

In addition, approximately 80 turnouts would be scaled back or obliterated. Of the 80 informal turnouts proposed for removal, many are considered to be informal or “social” turnouts that have been created over the years and some most likely date back to the original road. The rehabilitation of selected turnouts and the obliteration of numerous informal turnouts is expected to have beneficial impacts to the cultural landscape. This will reduce the area currently used for vehicles and allow those areas to be restored and revegetated. Limiting and controlling the number of turnouts and their location would also allow the park to limit or reduce inadvertent disturbance to natural and cultural resources caused by vehicles and park visitors. Overall, rehabilitation of turnouts is anticipated to have local, long-term, negligible to minor, beneficial impacts on the cultural landscape.

Overall, given the limited and localized nature of these changes to Cactus Forest Drive, it is anticipated that alternative B would have long-term, negligible, adverse impacts on cultural landscapes. This alternative would result in alteration of landscape features (roadway width, culverts, and low-water crossings), but would not diminish the overall integrity of the landscape.

Cumulative Impacts. The cumulative effects of past, present, and reasonably foreseeable future actions under the preferred alternative would be the same as those for cultural landscapes under the no-action alternative. (See the no-action alternative discussion for details.) The cumulative impact of past, present, and reasonably foreseeable future actions would be long term, negligible to minor, and adverse. The preferred alternative would have local, long-term, negligible, adverse contributions to the cumulative effects, and overall cumulative impacts would be long term, negligible to minor, and adverse.

Conclusion. The addition of a bicycle lane, changes to culverts and changes to low-water crossings would have long-term, minor, adverse effects on the Cactus Forest Drive cultural landscape. Obliterating or scaling back approximately 80 turnouts that have been established since the original construction is anticipated to have local, long-term, negligible to minor, beneficial impacts on the cultural landscape. Overall, given the limited and localized nature of these changes to Cactus Forest Drive, it is anticipated that alternative B would have long-term, negligible, adverse impacts on cultural landscapes. The cumulative impact of past, present, and reasonably foreseeable future actions would be long term, negligible to minor, and adverse. The preferred alternative would have local, long-term, negligible, adverse contributions to the cumulative effects, and overall cumulative impacts would be long term, negligible to minor, 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 cultural landscapes.

Visitor Use and Experience

Cactus Forest Drive would be closed during construction activities; however, construction would begin in mid-May and end in September to avoid the spring and fall peak tourist seasons. Because this road is the only driving route in the Rincon Mountain District and is widely used by bicyclists and pedestrians as well, total closure would have short-term (for the duration of construction), minor to moderate, adverse impacts on visitor experience if construction occurs outside the peak tourist season. Should delays cause a shift in the construction schedule so that it overlaps with the peak season, impacts would be short term, moderate, and adverse; however, more visitors would be affected.

When construction is complete, the entire length of the road would be repaved; shoulders would be reconstructed where necessary; the road would be widened in one area to establish an uphill bicycle lane, and an existing drainage ditch would be converted to a bicycle lane; several overlook and trailhead turnouts would be improved and expanded; several wayside exhibits would be installed; and the Javelina picnic area would be rehabilitated to better delineate and expand parking, as well as improve universal access. This would have a long-term, moderate, beneficial effect on visitor use and experience.

Approximately 80 informal turnouts would be obliterated, which could have adverse and beneficial effects on visitor use and experience in the long term. For those visitors who like to stop along the road and get out of their vehicle, the loss of turnouts would have an adverse impact. However, this impact could partially be offset by the improvements and expansion of the formal overlook and trailhead turnouts. For those visitors who would rather see less human disturbance on the landscape (e.g., dirt turnouts, social trails that occur near these turnouts, and parked vehicles throughout the road corridor), this would have beneficial effects. Overall, it is expected that the preferred alternative would, therefore, have long-term, minor to moderate, beneficial effects on visitor use and experience.

Cumulative Impacts. The cumulative effects of past, present, and reasonably foreseeable future actions under the preferred alternative would be the same as those for visitor use and experience under the no-action alternative. (See the no-action alternative discussion for details.) The cumulative effects of past, present, and reasonably foreseeable future actions would have long-term, minor, adverse impacts on visitor use and experience. The preferred alternative would provide short-term, moderate, adverse, as well as long-term, minor to moderate, beneficial contributions to cumulative effects on visitor use and experience. Overall, cumulative impacts would be minor to moderate and adverse in the short term, and negligible, adverse in the long term.

Conclusion. Cactus Forest Drive would be closed during construction activities. Because this road is the only driving route in the park and is widely used by bicyclists and pedestrians, total closure would have short-term, minor to moderate, adverse impacts. In the long term, minor to moderate, beneficial effects would result from repaving the road; reconstructing shoulders; widening the road in one area to establish an uphill bicycle lane, and removing an existing drainage ditch and constructing a bicycle lane in its place; improving and expanding several overlook and trailhead turnouts; installing several wayside exhibits; and rehabilitating the Javelina picnic area to better delineate and expand parking, as well as improve universal access.

The cumulative effects of past, present, and reasonably foreseeable future actions would have long-term, minor, adverse impacts on visitor use and experience. The preferred alternative would provide short-term, moderate, adverse as well as long-term, minor to moderate, beneficial contributions to cumulative effects on visitor use and experience. Overall, cumulative impacts would be minor to moderate and adverse in the short term, and negligible, adverse in the long term.

Park Operations

Rehabilitation of Cactus Forest Drive would require park staff to oversee construction activities. This requires reallocating staff so that individuals would be available for this assignment, which would likely take a limited number of staff away from other park operations for the duration of the construction project. This would have a short-term (for the duration of construction), minor, adverse impact on park operations.

Closure of the road would result in decreased visitation to the Rincon Mountain District and, in turn, decreased park entrance fee revenues. Road closure would have short-term (for the duration of construction), negligible, adverse effects on park revenues due to a decrease in funds for the park if construction occurs outside of the peak tourist season. Should construction delays cause the project to occur during the peak tourist season, impacts from decreased entrance fee revenues could be short term, minor to moderate, and adverse. Overall, short-term impacts to park operations would be short term, minor to moderate, and adverse.

When the project is complete, improvements to the Cactus Forest Drive loop, including repaving, drainage, and shoulder improvements, better drainage around the CCC stone walls, and obliterating turnouts, would reduce the maintenance requirements and associated costs of the existing road. Obliterating turnouts, as well as reworking numerous others, would result in fewer social trails that require the attention of park restoration / revegetation staff. The new wayside exhibits would provide Saguaro National Park interpretive staff new opportunities to educate the public about park resources. Overall, these changes would have a long-term, minor to moderate, beneficial effect on park operations.

Cumulative Impacts. The cumulative effects of past, present, and reasonably foreseeable future actions under the preferred alternative would be the same as those for park operations under the no-action alternative. (See the no-action alternative discussion for details.) Past, present, and reasonably foreseeable future actions would have short- and long-term, negligible, adverse, cumulative impacts. The preferred alternative would provide short-term, minor to moderate, adverse contributions, and long-term, minor to moderate, beneficial contributions to cumulative impacts. Overall, the cumulative effects would be minor to moderate and adverse in the short term, and negligible and adverse in the long term.

Conclusion. Short-term, minor to moderate, adverse impacts are anticipated for park operations as a result of diverting staff to construction oversight and the reduction in park entrance fees from closing Cactus Forest Drive during construction. However, long-term, minor to moderate, beneficial effects would result when the project is completed from the reduction in maintenance requirements and associated costs in the road corridor, as well as new interpretive opportunities. Past, present, and reasonably foreseeable future actions would

have short- and long-term, negligible, adverse cumulative impacts. The preferred alternative would provide short-term, minor to moderate, adverse contributions, and long-term, minor to moderate, beneficial contributions to cumulative impacts. Overall, the cumulative effects would be minor to moderate and adverse in the short term, and negligible and adverse in the long term.

Health and Safety

Because construction activities would occur at desert wash crossings between May and September, when a majority of the rain falls at Saguaro National Park, the potential for flash flooding presents a health and safety hazard for construction workers. However, construction activities would be halted during storms, minimizing flash flood hazards. The increased risk to construction staff from working in flash flood zones would have short-term (for the duration of construction), negligible, adverse effects on worker safety.

However, road and shoulder improvements on Cactus Forest Drive would provide a safer surface for motorists, bicyclists, and pedestrians. These improvements would reduce the potential for a bicyclist or pedestrian to hit a pothole or other cracked surface, thereby reducing the potential for falls that may result in injury. Improved shoulders would also provide a safer surface for vehicles pulling over to allow others to pass, and would make the shoulder edge more visible, reducing the potential for motorists and bicyclists to ride off the shoulder when pulling over. The creation / marking of the bicycle lanes would reduce the potential for bicyclists to be crowded out by motorists in two uphill climbs along the road, reducing the potential for accidents between motorized and non-motorized vehicles in these areas. It is anticipated that these improvements would have localized, long-term, minor to moderate, beneficial effects on health and safety at Saguaro National Park.

Cumulative Impacts. The cumulative effects of past, present, and reasonably foreseeable future actions under the preferred alternative would be the same as those for health and safety under the no-action alternative. (See the no-action alternative discussion for details.) The cumulative effects of past, present, and reasonably foreseeable future actions would have short- and long-term, negligible to minor, adverse impacts on health and safety. The preferred alternative would have short-term, negligible, and adverse contributions, as well as long-term, minor to moderate, beneficial contributions to cumulative effects on health and safety. Therefore, overall cumulative impacts would be minor and adverse in the short term, and minor and beneficial in the long term.

Conclusion. The increased risk to construction staff from working in flash flood zones would have short-term (for the duration of construction), negligible, adverse effects on worker safety. It is anticipated that improvements to the road and shoulders associated with the preferred alternative would have localized, long-term, minor to moderate, beneficial effects on health and safety at Saguaro National Park. The cumulative effects of past, present, and reasonably foreseeable future actions would have long-term, negligible to minor, adverse impacts on health and safety. The preferred alternative would have short-term, negligible, and adverse contributions, as well as long-term, minor to moderate, beneficial contributions to cumulative effects on health and safety. Therefore, overall cumulative impacts would be minor and adverse in the short term, and minor and beneficial in the long term.

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 biological assessment submitted to the U.S. Fish and Wildlife Service for this project on June 22, 2004, is included in appendix C. This biological assessment discusses potential impacts to these species in detail, while this environmental assessment also provides a summary of the impacts analysis for threatened and endangered species. The U.S. Fish and Wildlife Service issued their response, or biological opinion, on July 23, 2004 (see appendix C), stating their concurrence with the determination made by Saguaro National Park staff regarding impacts to the cactus ferruginous pygmy-owl. As a result, the U.S. Fish and Wildlife Service indicated that no further consultation was needed at this time.

The National Park Service contacted eight American Indian tribes by letter, dated March 24, 2004 (appendix D), to solicit input on the Cactus Forest Drive project. Responses to these letters were received from two of the tribes contacted. These responses, as well as subsequent Saguaro National Park communications, are not provided in appendix D because they reference the location of specific archeological sites.

The Hopi Tribe responded with concerns about increased visitation as a result of the project, and the impact this would have on known and unknown cultural resources in the vicinity of Cactus Forest Drive and the Rincon Mountains Foothills Archeological District. Tribal representatives requested copies of interim progress reports, data recovery plans, and any other plans the National Park Service intends to implement to protect and preserve recorded and unrecorded archeological sites. Saguaro National Park staff responded by letter indicating that the use of paving, curbs, and interpretive signs is intended to encourage visitors to stay on the pavement, curtailing or perhaps even eliminating the proliferation of social trails that affect such resources. The staff also communicated that they would work with the Western Archeological and Conservation Center, Tucson, Arizona, to initiate a site monitoring protocol and develop a formal trail to divert visitors away from archeological sites.

The Tohono O'odham Nation responded with concerns regarding avoidance of archeological sites to eliminate impacts. They indicated that indirect impacts (e.g., from social trails at improved turnouts) could be avoided by siting recreation areas and trails away from archeological sites; for existing trails, they recommended closure if it is determined that archeological sites are being affected. Tribal representatives suggested that subsurface testing and data recovery, which would disturb the archeological sites, would not be necessary if the sites can be avoided altogether. Saguaro National Park staff responded by letter indicating that the project has been designed to follow the original road prism and help visitors tread lightly on both natural and cultural resources. It was explained that the use of paving, curbs, and interpretive signs is intended to encourage visitors to stay on the pavement, curtailing or perhaps even eliminating the proliferation of social trails that affect such resources.

The National Park Service Western Archeological and Conservation Center consulted with the Arizona State Historic Preservation Office regarding potential impacts to archeological resources, in accordance with the requirements of section 106 of the National Historic

Preservation Act. This consultation resulted in the execution of a memorandum of agreement between Saguaro National Park and the Arizona State Historic Preservation Office for the recovery of significant information from archeological sites potentially affected by the proposed road rehabilitation. A copy of the memorandum of agreement is provided in appendix D. Saguaro National Park is also consulting with the Arizona State Historic Preservation Office regarding potential impacts to the Cactus Forest Drive cultural landscape. A copy of the consultation letter is provided in appendix D. A response from the Arizona State Historic Preservation Office is expected in October 2004, and any additional stipulations or mitigation measures will be incorporated into the NEPA decision document.

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

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

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APPENDIX A

NATIONAL PARK SERVICE PRESS RELEASE



National Park Service
U.S. Department of the Interior

Saguaro National Park

3693 South Old Spanish Trail
Tucson, AZ 85730

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

Saguaro National Park News Release

For Immediate Release

March 24, 2004

Contact: Jeff Nasiatka, (520) 733-5141

Saguaro National Park to Rehabilitate Cactus Forest Drive

Superintendent Sarah Craighead announced that Saguaro National Park is planning to rehabilitate eight miles of the Cactus Forest Loop Drive, in the park's Rincon Mountain (east) District. This project proposal consists of milling and overlay of a 2" asphalt concrete mat over the Cactus Forest Loop Drive. The Cactus Forest Loop Drive is an eight mile scenic road that tours the lower elevations of Saguaro National Park – East. The loop drive will be closed during the project. The route is located beyond the Visitor's Center off of Old Spanish Trail. The road is currently in poor condition, and limited repair activities are not deemed cost effective.

Construction is anticipated to begin in May 2005, with an estimated completion date no later than September 30, 2005. The public is invited to direct concerns or comments regarding this project to Superintendent Craighead at 520-733-5100, or by sending an email to SAGU_Planning@nps.gov, or by writing her at Saguaro National Park, 3693 South Old Spanish Trail, Tucson, AZ 85730-5601. Comments will be accepted through April 23, 2004.

04-08

EXPERIENCE YOUR AMERICA

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

APPENDIX B

U.S. FISH AND WILDLIFE THREATENED AND ENDANGERED SPECIES LIST

Endangered Species List

Back to Start

List of species by county for Arizona:

Counties Selected: Pima

Select one or more counties from the following list to view a county list:

Apache

Cochise

Coconino

Gila

Graham

▲

▼

View County List

Pima County

Common Name	Scientific Name	Listing Status	More Info
Acuna Cactus	<i>Echinomastus erectocentrus var. acunensis</i>	C	P
bald eagle	<i>Haliaeetus leucocephalus</i>	AD, T	P
brown pelican	<i>Pelecanus occidentalis</i>	DM, E	P
cactus ferruginous pygmy-owl	<i>Glaucidium brasilianum cactorum</i>	E	P
Chiricahua leopard frog	<i>Rana chiricahuensis</i>	T	P
desert pupfish	<i>Cyprinodon macularius</i>	E	P
Gila chub	<i>Gila intermedia</i>	PE	P
Gila topminnow (incl. Yaqui)	<i>Poeciliopsis occidentalis</i>	E	P
gray wolf	<i>Canis lupus</i>	DR, E, EXPN, T	P
Huachuca water-umbel	<i>Lilaeopsis schaffneriana var. recurva</i>	E	P
jaguar	<i>Panthera onca</i>	E	P
Kearney's blue-star	<i>Amsonia kearneyana</i>	E	P
lesser long-nosed bat	<i>Leptonycteris curasoae yerbabuenae</i>	E	P

Appendix B

loach minnow	<i>Tiaroga cobitis</i>	T	P
masked bobwhite (quail)	<i>Colinus virginianus ridgwayi</i>	E	P
Mexican spotted owl	<i>Strix occidentalis lucida</i>	T	P
mountain plover	<i>Charadrius montanus</i>	PT	P
Nichol's Turk's head cactus	<i>Echinocactus horizonthalonius var. nicholii</i>	E	P
ocelot	<i>Leopardus (=Felis) pardalis</i>	E	P
Pima pineapple cactus	<i>Coryphantha scheeri var. robustispina</i>	E	P
Sonoran pronghorn	<i>Antilocapra americana sonoriensis</i>	E	P
Sonoyta mud turtle	<i>Kinosternon sonoriense longifemorale</i>	C	P
southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	E	P
spikedace	<i>Meda fulgida</i>	T	P
yellow-billed Cuckoo	<i>Coccyzus americanus</i>	C	P

APPENDIX C
BIOLOGICAL ASSESSMENT

JUL 30 2004 11:57AM SNP RMD VC

NO. 597 P. 2/5



United States Department of the Interior
U.S. Fish and Wildlife Service
 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
 02-21-04-I-0018

July 23, 2004

Memorandum

To: Superintendent, Saguaro National Park, Tucson, Arizona
 From: Field Supervisor
 Subject: Cactus Forest Drive Rehabilitation Project



On June 25, 2004, we received your June 22, 2004, biological assessment (BA) and request for consultation on the effects of the Cactus Forest Drive Rehabilitation project in the Rincon Mountain District (RMD) of Saguaro National Park (SNP), Pima County, Arizona, to the endangered cactus ferruginous pygmy owl (*Glaucidium brasilianum cactorum*) (CFPO), pursuant to section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act). Proposed CFPO critical habitat occurs within the boundaries of much of the Tucson Mountain District (TMD) of SNP; however, proposed CFPO critical habitat does not occur in the RMD of SNP.

Scheduled to begin in the summer of 2005, the project is located in the RMD of SNP and includes repaving Cactus Forest Drive (an eight-mile loop road); reconstructing existing road shoulders; widening the road in one location (at Javelina Picnic Area); creating an uphill bicycle lane on two steeper portions of the road; eliminating some existing turnouts and improving others; improving drainage; and replacing or rehabilitating low-water crossings. The project footprint lies along the length of the road to a width of no more than four feet on either side of the present road, including existing pullouts and the Javelina Picnic Area.

The BA, with figures, maps, and great detail, clearly defines the entire project; includes more than 40 specific conservation measures that will be taken before, during, and after the project work; assigns specific responsibilities to specific individuals; and provides for CFPO surveys and revegetation results monitoring. Refer to the BA (pages eight through 11) for General, Soils, Vegetation, and Wildlife Conservation Measures. The CFPO-specific conservation measures are as follows (and on page 10 of the BA):

- Construction activities are anticipated to occur between May 15 and September 30 to avoid the majority of the CFPO breeding season (February 1-July 31, annually). Should a CFPO be heard or found during the 2004 or 2005 surveys prior to work beginning or during project work, you will immediately notify us and consultation reinitiation will begin.

Ms. Sarah Craighead

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- One saguaro (no cavities) will be removed; two large (10 to 15 feet tall) and small (shorter than four feet) saguaros will be removed and replanted.
- Thirty-nine trees will be removed; four of these are greater than six inches diameter breast height (dbh).
- Two hundred mesquite and palo verde tree saplings will be planted and watered with a minimum goal of 50 percent of their surviving for at least two years.
- Contractor-selected, noncommercial areas outside of the project limits (including, but not limited to, material sources, disposal sites, waste areas, haul roads, and staging areas) will not encroach upon any species or habitat protected under the Act. Written proof shall be satisfactory to the National Park Service and shall include:
 - A current list of all threatened or endangered species in the area from us.
 - An appropriate analysis leading to a determination that proposed project will have no effect on listed or candidate species, according to section 7 of the Act.

The 2004 survey efforts in proximity to SNP show three male CFPOs detected in northwest Tucson, one pair and one young detected near the Garcia Strip, seven CFPOs detected in Organ Pipe Cactus National Monument, and seven CFPOs detected in Altar Valley (which includes three pairs) (AGFD unpubl. data).

Within SNP, protocol surveys for CFPO have been conducted from 1994 in both districts (about 250 each). In 1995, one non-breeding CFPO was detected over a mile from the project area in RMD. An aural, but unconfirmed, detection occurred in April 2001, near the center of the area enclosed by the project road. Several follow-up visits at this location failed to further determine or detect CFPO presence. CFPO were not detected during the 2003 or 2004 surveys. Several survey routes are in and around the project area road. Surveys (with negative results) were conducted in February and May 2004. The third 2004 survey has not yet been completed. Surveys will be conducted again in 2005; this will result in three years of compliance surveys before project work begins. When the 2004 survey season is complete, 171 surveys will have been conducted in the RMD.

Dust and noise will occur on the road and at staging and equipment parking areas. These factors may affect unknown/undetected CFPO that may be foraging or passing through the project area or cause short-term impacts to CFPO prey species (lizards); however, these impacts will cease as work in each road section is completed. Conservation measures to minimize construction impacts to lizards, snakes, and other small animals are included in the Wildlife section of the BA.

Because park visitors will not be driving this road during construction, wildlife mortality is anticipated to be lower than typical, although the potential exists for workers-induced mortality to wildlife. Education and enforced speed limits will minimize this anticipated concern.

Work will occur during daylight hours only and is not anticipated to affect any bat species foraging in the area, including any lesser long-nosed bats that may forage in the area at night during the summer.

A total of 7.64 acres will be disturbed during the project work, with 7.23 acres revegetated and rehabilitated. The net loss of vegetated area is anticipated to be 0.41 acre.

JUL.30.2004 11:57AM SNP RMD VC

NO.597 P.4/5

Ms. Sarah Craighead

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One saguaro will be lost, and two large (10 to 15 feet) tall and several small (under four feet) tall saguaros will be relocated. Four trees (mesquite) with diameters greater than six inches dbh will be removed; the remaining 35 trees (mesquite, palo verde, acacia) to be removed are smaller than six inches dbh. These trees will be replaced at a three to one ratio.

Topsoil salvaged will be replaced in as nearly the same area as it was taken from as possible. Salvaged plants (all barrel, fishhook, and hedgehog cacti; all saguaros less than four feet tall, and a selected portion of prickly pear, cholla, and grasses) will be replanted after work is completed. An additional number (1,133) of nursery-grown, native tree species (200 of which will be mesquite and palo verde) will be planted and watered. Trees will be healthy saplings of native seed stock grown in elongated pots to encourage taproot growth. Protective cages will be placed over all replanted and planted trees and plants; pullouts that were obliterated will be restored by seeding of native species of shrubs and grasses. Microsites for plant establishment with plant materials previously cleared from the construction site (shrubs, grasses, and trees that were not salvaged) will be created to boost vegetation success.

If rainfall monitoring indicates that levels are trending below "normal", plants will be watered every three to four weeks, as needed, up to two years post-planting. Survival will be deemed successful if at least 50 percent of planted trees survive the first two years. Plantings will be regularly monitored and additional watering will occur as needed. If at any time the planted tree survival rate is less than 50 percent, additional trees will be grown and planted on site. Although vegetation distribution will be slightly altered in the short-term (by the removal of four large trees), long-term positive results are anticipated to occur due to the survival of at least 50 percent of the planted trees.

We concur with your determination that the proposed action may affect, but is not likely adversely affect, the CFPO. Proposed CFPO critical habitat has been designated but does not occur in the RMD where this proposed project is located; thus, it will not be affected.

We base this determination on the following:

- Since 1995 (when one non-breeding bird was detected over a mile from the project area), no confirmed detections have occurred in the project area or in the vicinity of the project area despite more than 100 surveys over several years' time.
- One saguaro will be removed; two others (10-15 feet tall) will be replanted.
- A maximum of 39 trees will be removed; four are greater than six inches dbh.
- Net loss of vegetation is expected to be about 0.41 acre.
- Removed trees will be replaced at a three to one ratio.

No further section 7 consultation on the effects to CFPO is required for this project at this time. Should the proposed action change, or should new information become available that indicates that the action may affect the CFPO in a manner or extent not considered in our review, you should reconsider whether reinitiation of consultation is appropriate.

JUL. 30. 2004 11:58AM SNP RMD VC

NO. 597 P. 5/5

Ms. Sarah Craighead

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Thank you for your continued consideration of the CFPO and its habitat on the lands you administer. If you have any questions or concerns about this consultation or the consultation process in general, please contact Thetis Gamberg (520) 670-6150 (x231) or Jim Rorabaugh (602) 242-0210 (x238) of my staff.


Steven L. Spangle

cc: Fish and Wildlife Service, Tucson Suboffice, AZ (Attn: Scott Richardson)
Regional Supervisor, Arizona Game and Fish Department, Tucson AZ
Assistant Field Supervisor, Fish and Wildlife Service, Tucson, AZ

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Received

JUN 28 2004

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N1621
June 22, 2004

Steve Spangle
Field Supervisor
Phoenix Field Office
United States Fish and Wildlife Service
2321 W. Royal Palm Road, Suite 103
Phoenix, Arizona 85021

Dear Mr. Spangle,

Enclosed is the Biological Assessment for "Cactus Forest Drive Rehabilitation Project". The USFWS consultation number is 02-21-04-I-0018. Saguaro National Park is the lead agency for this project.

In summer, 2005, Saguaro National Park plans to resurface and add improvements to the Cactus Forest Drive in its Rincon Mountain District. The Cactus Forest Drive is an eight-mile scenic tour loop that provides access to the park's prime resources. In addition to resurfacing the road, a portion of the road will be widened, a bike lane added in two places, several pullouts paved or resurfaced, and the remaining pullouts closed and restored. The project is necessary to increase visitor safety and enhance visitor experience.

The Park has determined that the proposed action will have no effect on the Pima pineapple cactus, American peregrine falcon, Mexican spotted owl, yellow-billed cuckoo, lesser long-nosed bat, or their habitats. The proposed action may affect, but is not likely to adversely affect, the cactus ferruginous pygmy-owl.

The Park requests concurrence with our determination of "no effect, not likely to adversely affect" the cactus ferruginous pygmy-owl.

Sincerely,


Sarah Craighead
Superintendent

Cc: Scott Richardson, USFWS, Tucson Sub-Office, 201 North Bonita, Suite 141, Tucson
AZ 85745

Received

JUN 28 2004

DSC-T

**BIOLOGICAL ASSESSMENT
OF THE
CACTUS FOREST DRIVE REHABILITATION
RINCON MOUNTAIN DISTRICT
SAGUARO NATIONAL PARK**

Pima County, Arizona
Township 14 South Range 16 East
Sections 17, 20, 21, 28, 29, 32, 33
USGS Tanque Verde Peak Quadrangle

SAGUARO NATIONAL PARK

3693 S. Old Spanish Trail
Tucson, Arizona 85730

Sandy Wolf
520-733-5171

June 2004

EXECUTIVE SUMMARY

This Biological Assessment was written to supplement Saguaro National Park's Environmental Assessment for the Cactus Forest Drive Rehabilitation Project. It is meant to assist Saguaro National Park with planning and implementing the road and pullout improvements proposed for summer 2005. It also provides the Arizona Ecological Service's Field Office of the U.S. Fish & Wildlife Service with assessments of how the road 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 summer, 2005, Saguaro National Park plans to resurface and add improvements to the Cactus Forest Drive in its Rincon Mountain District. The Cactus Forest Drive is an eight-mile scenic tour loop that provides access to the park's prime resources. The route is located on the west side of the Rincon Mountain District of Saguaro National Park in the Arizona Upland vegetation type. The majority of the route is one-way (Route 500), with the shorter portion between the park entrance and Javelina Picnic Area allowing two-way traffic (Route 100). In addition to resurfacing the road, a portion of the road will be widened, a bike lane added in two places, several pullouts paved or resurfaced, and the remaining pullouts closed and restored. The project is necessary to increase visitor safety and enhance visitor experience.

The road improvements will correct safety hazards for motorists, bicyclists, and pedestrians. Drainage system improvements throughout Cactus Forest Drive will alleviate poor drainage that has caused the majority of road damage.

Of 26 federally listed, candidate, or conservation agreement species of special status in Pima County, six species are considered in this document: Pima pineapple cactus, American peregrine falcon, Mexican spotted owl, yellow-billed cuckoo, lesser long-nosed bat, and cactus ferruginous pygmy-owl. This document includes species accounts for these six 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 Pima pineapple cactus, American peregrine falcon, Mexican spotted owl, yellow-billed cuckoo, lesser long-nosed bat, or their habitats. The proposed action may affect, but is not likely to adversely affect, the cactus ferruginous pygmy-owl. This determination was made based on current construction plans. If plans change so that there would be more impact on pygmy-owl habitat, the Park will keep USFWS appraised.

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INTRODUCTION

This Biological Assessment (BA) was written to supplement Saguaro National Park's Environmental Assessment (EA) for the Cactus Forest Drive Rehabilitation Project (engineering-environmental Management, Inc. 2003). It is meant to assist Saguaro National Park with planning and implementing this project, which is designed to improve the road surface and drainage, increase visitor safety, and enhance the auto-touring experience for visitors. 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.

This analysis was made based on current construction plans. If plans change so that there would be more impact on pygmy-owl habitat, the Park will keep USFWS apprised.

The species considered in this document are:

THREATENED, ENDANGERED, AND CANDIDATE SPECIES

Pima pineapple cactus (*Coryphantha scheeri* var. *robustispina*) **E**
 Lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*) **E**
 Mexican spotted owl (*Strix occidentalis lucida*) **T**
 Yellow-billed cuckoo (*Coccyzus americanus*) **C**
 Cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*) **E**
 American peregrine falcon (*Falco peregrinus anatum*) delisted but being monitored

CRITICAL HABITAT

The project area does not fall in designated or proposed Critical Habitat for any listed species in Pima County.

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 the Park's current annual compliance/survey efforts would provide sufficient coverage of the project. At that time, the project was to occur outside the breeding season and not disturb any saguaros or trees greater than six inches in diameter. However, project plans have changed since then, and it was determined that a Biological Assessment would be necessary, as well as two years of compliance surveys for cactus ferruginous pygmy-owls.

DESCRIPTION OF THE PROPOSED ACTION

In summer 2005, the National Park Service (NPS) proposes to rehabilitate Cactus Forest Drive along Route 500 and Route 100, on the west side of the Rincon Mountain District (Saguaro East) of Saguaro National Park, Pima County, Arizona, to improve the auto-touring experience on Cactus Forest Drive and opportunities for visitors to experience the beauty and character of individual cacti, the desert-to-mountain landscape, the seasonal water, and the views of the surrounding city (NPS 1988). The project would include repaving the entire length of the road, reconstructing shoulders, widening the road in one location to improve access to Javelina Picnic Area, establishing an uphill bicycle lane for steeper climbs on Route 500 in two locations, eliminating some turnouts and improving others, improving drainage controls, and replacing or rehabilitating low-water crossings. This action is needed because drainage control problems have caused deteriorating road edges and lateral cracking in the roadbed.

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 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 the sustainable design and ecologically sensitive use. Essentially, sustainability is living within the environment with the least long-term impact on the environment. The plan for Cactus Forest Drive rehabilitation supports the practice of sustainable planning, design, and use of Cactus Forest Drive.

Purpose/Need

The Rincon Mountain District (RMD) is managed as the main attraction for first-time visitors, with the focus on the saguaro forest and lower Sonoran Desert (NPS 1988). Cactus Forest Drive is a paved auto-tour loop of 8.4 miles that is the only paved road in the RMD (Figure 1). It begins at the main entrance and visitor center and is a two-way road to the Javelina Picnic Area (approximately 1.6 miles on Route 100), but is a one-way road over the remainder of its length (approximately 6.8 miles on Route 500). Both segments of Cactus Forest Drive, but especially the one-way loop, are popular with bicyclists and pedestrians throughout the year. The road is a narrow (12.5-19 feet wide), slow-speed (15 miles per hour) scenic drive in a Sonoran Desert landscape. Several turnouts, including those for wayside exhibits and the Cactus Forest Trail, are accessible from the road. Two picnic areas, Javelina and Mica View, are located off Cactus Forest Drive. Cactus Forest Trail bisects the Cactus Forest Drive auto-tour loop and additional trails can be accessed from the drive.

National Park Service 2001 Management Policies states 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 people 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. Poor drainage has

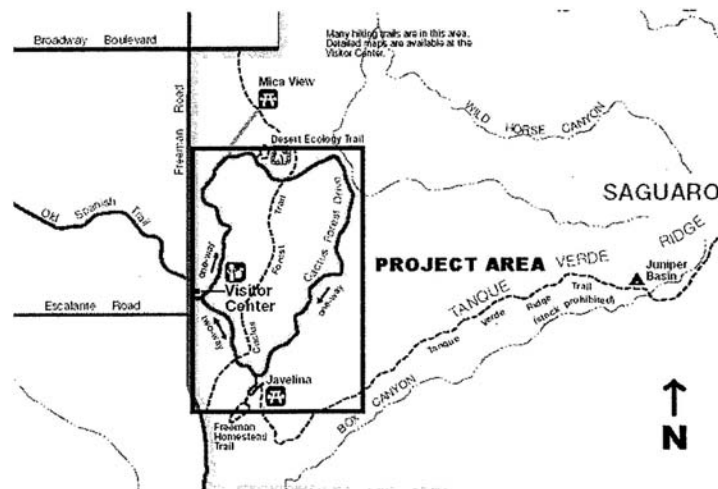


FIGURE 1. CACTUS FOREST DRIVE PROJECT AREA

caused deteriorating road edges and lateral cracking in the roadbed. Several pullouts and the Javelina Picnic Area have inadequate parking and access for disabled visitors. Bicyclists face unsafe conditions along the back stretch of the loop drive. This project is necessary to correct these conditions.

Funding

The project is funded by Federal Lands Highway Program through the National Park Service.

Timeline

The project is anticipated to begin 15 May, 2005, and end during the month of September, 2005. Due to high summer temperatures, park visitation is at its lowest point during this time of year. However, should the cactus ferruginous pygmy-owl be found during the remaining 2004 and 2005 surveys, construction could not begin until August, 2005 (after consultation and approval by USFWS), and would be completed by December 2005.

Description of project area

The project footprint is along the length of the drive to a width of up to four feet on either side of the present road. In addition, the footprint includes pullouts along the loop drive and the Javelina Picnic Area. Staging areas and turnarounds for construction equipment will be only in three existing pullouts that are designated for this purpose by the Park.

Construction techniques

Rehabilitation

Rehabilitation of Cactus Forest Loop Drive beginning and ending at the Saguaro East Visitor Center, a distance of 8.4 miles along Route 500 and Route 100, is intended to improve poor pavement conditions that have resulted from deteriorated and inadequate drainage infrastructure. Rehabilitation will improve the roadway within the existing alignment, and will include recycling a portion of the existing roadway surface and base; laying, leveling, and compacting this material; and applying a 2-inch asphaltic concrete overlay. Subexcavation of unsuitable subgrade material and backfill with free-draining sub-base will be performed in one location, if needed.

The one-way roadway (Route 500) will be rehabilitated on the existing road bench to an average width of 12.5 feet, as currently exists. It will continue to be used as a one-way auto route. Route 100, a two-way road, would be rehabilitated on the existing road bench to an average width of 19 feet. It will continue to be used as a two-way auto route. The road leading into the Javelina Picnic Area (Route 100) will be widened to 20 feet at one location because cars cannot safely pass each other under present conditions.

Shoulder Reconstruction

Road shoulders on both Route 500 and 100 will be improved to meet standard safety requirements. This would include the placement of aggregate shoulder materials, as necessary.

Bicycle Lane

On Route 500, a bicycle lane will be delineated at two locations.

Turnouts

Thirty-seven turnouts will be reworked on Route 500. On Route 100, five turnouts will be reworked. The purpose is to clearly delineate where parking is allowed by paving these areas. Some turnouts will provide more parking places than are currently available. All interpretive pullouts and trailhead parking lots will provide a parking place for disabled visitors.

Sixty-seven informal turnout locations, which provide unofficial access to cultural and natural resources along Cactus Forest Drive, will be totally eliminated or downsized. These areas will be revegetated with native species, resulting in the restoration of roadside habitat and the stabilization/protection of nearby archeological sites.

Drainage Improvements and Low-Water Crossings

Roadside drainage will be improved through construction of asphalt waterways and drainage channels. Some of the drainage channels will include curbing to eliminate the potential for water to short-cut the channel and flow along the roadway.

On Route 500, 12 asphalt low-water crossings will be replaced, as necessary. New low-water crossings will be constructed of concrete; no asphalt or chip and seal will be used. The outlets of the new low-water crossings will be protected with riprap. One low-water crossing will be raised by one foot, and another crossing, which tends to collect sediment, will be regraded to prevent sediment

build-up.

Areas of Interest

One area of Route 500 contains a series of stone walls constructed by the Civilian Conservation Corps. The drainage in this area will be improved to better preserve the wall structures. The existing drainage consists of concrete or asphalt-paved ditches (depending on the location) and curbing that runs right up to and against the walls. These drainage structures will be removed (including the asphalt that lies against the walls) and replaced with an acceptable drainage structure approved by SHPO.

The Javelina Picnic Area will be rehabilitated to better delineate parking, improve universal access, and improve drainage through the use of asphalt-paved ditches and waterways.

Vegetation salvage/removal/restoration in project area

Larger cacti, trees, and shrubs along the project site will be protected with construction fencing or flagging 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 39 trees will be removed or pruned as part of the construction effort; four of these are large mesquite trees over six inches in diameter at breast height (dbh). One saguaro will be removed. Two saguaros (10-15 feet high) and several small ones (< four feet high) will be relocated. Upon completion of construction, topsoil will be replaced and the area revegetated with salvaged and nursery-grown plants. Details on the mitigation measures and effects of the project on vegetation are given in the section on the cactus ferruginous pygmy-owl.

Mitigation measures

General Measures

- The National Park Service project manager will ensure that the project remains confined within the parameters established in the compliance documents and that mitigation measures are properly implemented.
- Construction zones outside of the existing disturbed area will be identified and fenced with construction fence or some similar material prior to any construction activity. Sensitive areas and sensitive vegetation will be fenced; fence holes will be at least 4-inches x 4-inches to allow reptiles to pass through without being entangled.
- All protection measures will be clearly stated in the construction specifications and workers will be instructed to avoid conducting activities beyond the construction zone as defined by the construction zone fencing. This does not exclude necessary temporary structures such as erosion control fencing.
- Construction equipment staging will occur within the roadway for active work areas or at designated turnouts.
- All tools, equipment, barricades, signs, surplus materials, and rubbish will be removed from the project work limits upon project completion. Any asphalt surfaces damaged due to work on the project will be repaired to original condition. All demolition debris will be removed from the project site, including all visible concrete and metal pieces.
- Contractors will be required to properly maintain construction equipment (i.e. mufflers) to minimize noise from use of the equipment.
- Contractor-selected, noncommercial areas outside of the project limits (including but not limited to material sources, disposal sites, waste areas, haul roads, and staging areas) will not encroach upon any regulated wetlands of the United States as defined by the U.S. Army Corps of Engineers, and as delineated by a wetlands specialist.
- To control fugitive dust, water sprinkling will occur, as needed, on active work areas where dirt or fine particles are exposed.
- Concrete and asphalt plants will be located outside Saguaro National Park. No overnight storage of these materials will be permitted.
- Construction debris will be immediately hauled from the park to an appropriate disposal location.

- Work will comply with Pima County Code Section 17.16.050.B.1, which states that opacity from fugitive emissions shall not exceed 20% in Pima County east of the Tohono O'odham Reservation.
- A hazardous spill plan will be in place, stating what actions would be taken in the case of a spill and preventive measures to be implemented, such as the placement of refueling facilities, storage, and handling of hazardous materials, etc.
- Silt fencing fabric will be inspected frequently and after every major storm. Accumulated sediments will be removed and moved back upstream when the fabric is estimated to be approximately 75% full. If captured silt exceeds 9 inches along silt fences, it will be removed by hand shovel or excavator and the fencing re-established if disturbed. Any damage or deterioration of the silt fence will be repaired or replaced immediately. A second silt fence may be installed uphill if there are signs of the fence clogging and acting as a barrier to flow, causing concentration of flows parallel to the fence.
- Equipment used on the project will be maintained free of external petroleum-based products while working at the project locations.
- Where appropriate, "environmentally friendly" grease, hydraulic oil, and bar and chain oil will be used. These lubricants are vegetable or mineral oil based, less toxic, and biodegradable.
- All equipment on the project will be maintained in a clean and well-functioning state to avoid or minimize contamination from automotive fluids; all equipment will be checked daily.
- Best management practices for drainage and sediment control, as identified and utilized by the Federal Highway Administration and the National Park Service, will 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 will 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 will be halted. During these work stoppage periods, project personnel will continue to check the silt fences and check dams, maintain the silt fences in effective condition, and remove accumulated sediment, if necessary.

Soils

- Erosion and sediment control will be required (see "General Measures").
- Topsoil (2-3 inches) will be removed from areas of construction and stored for later revegetation use. The topsoil will be redistributed in as near the original location as possible and supplemented with scarification, mulching, seeding, and/or planting with species native to the immediate area.

Vegetation

- A revegetation plan has been developed for disturbances outside of the existing road prism.
- Ground surface treatment will include grading to natural contours, replacing topsoil, ripping in heavily compacted areas, seeding, and planting.
- Revegetated areas will be monitored after construction to determine if revegetation efforts are successful or if additional remedial actions are necessary.
- Remedial actions could include installation of erosion-control structures, reseeding and/or replanting the area and controlling non-native plant species.
- In an effort to avoid introduction of non-native/noxious plant species, no imported topsoil or hay bales will be used during revegetation. On a case-by-case basis, the following materials may be used for any erosion-control dams that may be necessary: certified weed-free rice straw, cereal grain straw that has been fumigated to kill weed seed, and wood excelsior bales.
- All pullouts to be obliterated and revegetated will be double-ripped to a depth of 18 inches (unless significant cultural resources are in that location).

- Six trees (all < 6 inches DBH) have been removed already because they were identified as a safety hazard
- Undesirable plant species will be controlled in high-priority areas and other undesirable species will be monitored and controlled, as necessary. To prevent the introduction and minimize the spread of non-native vegetation and noxious weeds, the following measures will be implemented during construction:
 - Minimizing soil disturbance.
 - Pressure washing and/or steam cleaning all construction equipment to ensure that all equipment, machinery, rocks, gravel, or other materials are cleaned and weed free before entering Saguaro National Park.
 - Covering all haul trucks bringing asphalt or other fill materials from outside the park to prevent seed transport.
 - Limiting vehicle parking to existing roadways, parking lots, or access routes.
 - Limiting disturbance to roadsides and culvert areas, including limiting equipment to the roadbed area; no machinery or equipment should access areas outside the construction zone.
 - Obtaining all fill, rock, or additional topsoil from the project area, if possible. If not possible, obtaining weed-free sources from National Park Service-approved sources outside the park would be required.
 - Initiating revegetation of disturbed sites immediately following construction activities (Park will do).
 - Monitoring disturbed areas for up to three years following construction to identify growth of noxious weeds or non-native vegetation. Treatment of non-native vegetation will be completed in accordance with NPS-13, *Integrated Pest Management Guidelines*.
- To maximize vegetation restoration efforts after completion of construction activities, the following measures will be implemented:
 - Salvaging topsoil from construction areas for reuse during restoration on disturbed areas.
 - Salvaging native vegetation for subsequent replanting in disturbed areas.
 - Monitoring revegetation success for up to three years following construction; implementing remedial and control measures as needed.

Wildlife

- The contractor will be required to maintain strict garbage control so that scavengers (e.g., corvids) are not attracted to the project area. No food scraps will be discarded or fed to wildlife.
- All holes and trenches will be covered at night to prevent wildlife entrapment and drainage will be provided to prevent ponding of water.
- Trenches and holes will be checked for wildlife (e.g., tortoises, snakes) before backfilling. A Park resource specialist will be contacted to remove wildlife such as tortoises, gila monsters, or snakes. Contractors may remove lizards.
- During blading operations, equipment operators will be instructed to prevent harm to wildlife.

Threatened and Endangered Species and Species of Concern

- Construction activities are anticipated to take place between May 15 and September 30 to avoid the greater part of the cactus ferruginous pygmy-owl breeding season (February 1-July 31). However, should a cactus ferruginous pygmy-owl be found during the spring 2005 survey, a new analysis of effects would be written, and a new effects determination made. If appropriate, consultation with USFWS would occur. Construction, if approved, could not begin until August 1.
- Only one saguaro will be lost (it has no cavities). Two other large (10-15 feet tall) and several small (< 4 feet) saguaros will be moved.
- Thirty-nine trees will be removed; four of these are over 6 inches dbh. Two hundred trees will be planted.
- Contractor-selected, noncommercial areas outside of the project limits (including but not limited to material sources, disposal sites, waste areas, haul roads, and staging areas) will not encroach upon any species protected under the Endangered Species Act of 1973, as amended. Written proof shall be satisfactory to the National Park Service, and shall include:
 - A current list of all threatened or endangered species in the area from the U.S. Fish and Wildlife Service.
 - A “no effect” determination according to section 7 of the Endangered Species Act from a biological specialist.

Cultural Resources

- Should unanticipated archeological resources be discovered during construction, work in the area of the discovery will be halted, and the site secured. The National Park Service will follow the appropriate provisions of the implementing regulations for section 106 of the National Historic Preservation Act, 36 CFR Part 800.
- Should human remains or cultural items subject to the Native American Graves Protection and Repatriation Act of 1990 be discovered, the National Park Service will follow the appropriate provisions of the act and its implementing regulations, 43 CFR Part 10.
- Paleontological remains and archeological specimens found within the construction area will only be removed by the National Park Service or their designated representatives.
- Contractor-selected, noncommercial areas outside of the project limits (including but not limited to material sources, disposal sites, waste areas, haul roads, and staging areas) will not encroach upon sites listed or eligible for listing in the National Register of Historic Places. Written proof satisfactory to the National Park Service and the Arizona State Historic Preservation Office shall document, for compliance with section 106 of the National Historic Preservation Act, that no historic properties will be affected because:
 - there are no historic resources present
 - there is no effect to historic properties present

Visitor Experience

- Construction efforts will begin May 15th and end by September 30th to avoid the spring and fall peak tourist seasons.
- For areas leading up to the visitor center, a traffic and bicyclist management plan will be required from the contractor. This plan will also include information on how the public will be notified of road construction and signs to be placed to warn motorists.

DESCRIPTION OF THE AFFECTED ENVIRONMENT

The project area is located in the Rincon Mountain District of Saguaro National Park in Pima County, Arizona, east of the city of Tucson. Elevation along the Cactus Forest Drive is approximately 2800-3220 feet. The vegetative community within the project area is Arizona Upland subdivision of Sonoran Desertscrub (Brown 1994). Within this community, two vegetation types were identified: Sonoran Desertscrub and Xeroriparian Mixed Scrub. The project area has a diverse assemblage of native plant species and undisturbed to lightly developed desert surroundings. Native vegetation within the upland habitat is dominated by foothill paloverde (*Cercidium microphyllum*), velvet mesquite (*Prosopis velutina*), ocotillo (*Fouquieria splendens*), and many scattered mature saguaros (*Carnegie gigantea*). Mid-story and understory native plants include: creosote (*Larrea tridentata*), brittlebush (*Encelia farinosa*), fairy duster (*Calliandra eriophylla*), cholla and prickly pear cactus (*Opuntia* spp.), barrel cactus (*Ferocactus wislizeni*), and pincushion cactus (*Mammillaria microcarpa*). The Cactus Forest Drive crosses through many washes that are characterized with Xeroriparian Mixed Scrub vegetation. In general, this vegetation type is similar to what is found in upland areas but plants usually occur in higher densities. Plant species within the washes are dominated by foothill paloverde, desert hackberry (*Celtis pallida*), mesquite, catclaw acacia (*Acacia constricta*), canyon ragweed (*Ambrosia ambrosioides*), and desert broom (*Baccharis sarothroides*).

Composition of vegetation varies along the length of Cactus Forest Drive. Mesquite and paloverde trees, interspersed with areas of dense creosote bush, triangle-leaf bursage, and prickly pear cactus, dominate higher ground along the western and northern portions of the road. There are many scattered mature saguaros present. Mesquite densities increase in and around the wash crossings, where there is also acacia and desert hackberry. The topography becomes steeper towards the east, and saguaros can be found in higher densities among mesquite and paloverde trees. There are scattered stands of ocotillo. Along the southern portion of Cactus Forest Drive, mesquite and

fields of creosote bush and prickly pear cactus dominate the vegetation. Vegetation along the road to Mica and Javelina Picnic areas is similar to the western portion of Cactus Forest Drive, except that the Javelina Picnic Area road has several large stands of ocotillo.

EXPECTED EFFECTS/RESULTS OF THE PROPOSED ACTION

Rehabilitation of Cactus Forest Drive will provide the conditions and service life associated with a new road. Improvements to the road surface and shoulders, as well as the creation of a bicycle lane, will have beneficial effects on health and safety of visitors. These improvements will reduce the potential for a bicyclist to hit a pothole or other cracked surface, causing a fall that may result in an injury. The creation of the bicycle lane will reduce the potential for bicyclists to be crowded out by motorists. Shoulder improvements will also provide a safer surface for bicyclists and a wider shoulder for pedestrians along the road. Expansion and improvement of several pullouts will increase opportunities for interpretation of Park resources. As a result of the project, the auto-touring experience of visitors should be enhanced.

Turnouts will be paved so that parking areas are clearly delineated to prevent disturbance to vegetation by visitors. Although some parking areas will be expanded, the total number of parking places along the loop drive will be decreased, and obliterated pullouts will be revegetated with native species.

There will be dust and noise at the construction site and staging areas. These factors may affect unknown/undetected cactus ferruginous pygmy-owls in or passing through the area or cause short-term impacts to other wildlife species; however, these impacts would disappear as construction is completed. Because there will be no visitors traveling the drive during the project, roadkill of wildlife is expected to be much less than usual, although the potential exists for roadkill by workers. Work will occur only during the day. Foraging bats, if they occur in the project area, will therefore not be affected.

In most areas where vegetation is removed, loss of vegetation will be temporary because plants will be salvaged and replanted after construction. Approximately 39 trees will be removed; four of these are large mesquite trees over six inches dbh. One saguaro will be removed. The loss of these trees and the saguaro is not expected to affect any endangered species. When construction is complete, all disturbed soil areas will be restored and revegetated with native species, and measures will be taken to minimize invasion by non-native species. In addition, many pullouts will be obliterated and restored with natural vegetation. Net loss of vegetated areas for the project will be approximately 0.4 acres. Trees will be replaced at a 3:1 ratio to trees removed and will result in long-term enhancement of cactus ferruginous pygmy-owl habitat.

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 historical records for jaguars in the Rincon Mountains before the area was designated as a national park, but this species has been extirpated since then, and habitat does not exist in the project area. The Gila

topminnow also is considered extirpated in the Park (Weedman and Young 1995). Included on this list are 15 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 Rincon Mountain District of Saguaro National Park (Huachuca water-umbel, Kearney's blue star, Acuna cactus, Nichol Turk's head cactus, Sonoran pronghorn, San Xavier talussnail, desert pupfish, loach minnow, Gila chub, spikedace, Sonoyta mud turtle, bald eagle, brown pelican, masked bobwhite, and southwestern willow flycatcher). Despite general botanical surveys of the area (Bowers and McLaughlin 1987), and intensive fire effects vegetation plot work (Schon pers. comm.), Goodding onion has not been recorded in the Rincon Mountains, and there is no habitat in the project area. Chiricahua leopard frogs have not been recorded in Saguaro National Park. Although lowland leopard frogs have been documented below 4,500 feet in many drainages in the Rincon Mountains, we have not located any Chiricahua leopard frogs. There is no habitat for Chiricahua leopard frogs in the project area. The proposed action was determined to have no effect on the listed species above, and species accounts are not provided in this document.

Five species, listed as threatened, endangered, or candidate, occur or may occur in the RMD: Pima pineapple cactus, Mexican spotted owl, yellow-billed cuckoo, cactus ferruginous pygmy-owl, and lesser long-nosed bat. The American peregrine falcon was delisted in 1999 but is still being monitored (USFWS 1999). This section includes full species accounts and effects determinations for these six species.

Species Accounts

Pima pineapple cactus (*Coryphantha scheeri* var. *robustispina*)

The Pima pineapple cactus is hemispherical, growing 4-18 inches tall and 3-7 inches in diameter. The central spine in a cluster is stout, and usually hooked and straw colored; it is surrounded by 6-15 straight radial spines (USFWS 1993a). Flowers are yellow or rarely, white, and appear in July (USFWS 1993a). This species can be confused with juvenile barrel cactus (*Ferocactus*). The cactus occurs in alluvial valleys or on hillsides in rocky to sandy or silty soils in semi-desert grassland and Sonoran desert-scrub, at elevations of 2300-4500 feet (USFWS 1993a). Threats to the plant include urbanization, mining, overgrazing, and exotic grasses such as Lehmann lovegrass (USFWS 1993a).

The project area is at the northern edge of the range of this cactus and potential for habitat is low. The Pima pineapple cactus has never been recorded in the RMD. Many vegetation transects were conducted in the district by Pam Anning (NPS BioTech); Pima pineapple cactus were not observed. It has never been observed during extensive vegetation work along Cactus Forest Drive; however surveys conducted specifically to look for this species have not occurred in the vicinity of the project area. Although it is unlikely that the cactus occurs in the project area, the area will be surveyed specifically for Pima pineapple cactus in 2004 by Park resource staff. If any plants are found, the Park will notify and consult with USFWS on how to proceed.

Determination:

We anticipate that the proposed action will not affect any Pima pineapple cactus. We determine that this action will have *no effect* on Pima pineapple cactus or their habitat.

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

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, and southern Arizona and New Mexico in the United States (USFWS 1995a). 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 1995a). Beginning mid-July, bats appear in caves and mines in southeastern Arizona, forage on agave blooms, and leave 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 individuals since 1991) colony of lesser long-nosed bats roosting in a cave in the RMD, over a mile from the project area (Sidner 1991, Sidner & Davis 1994).

Determination:

There are no roosts in the project area. There are no agaves in the project area, and only one saguaro will be lost during the project. Work will take place during the day only. The proposed action, therefore, will not affect 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.

Mexican spotted owl (*Strix occidentalis lucida*)

The Mexican spotted owl is one of three spotted owl subspecies, and is listed as threatened by both the USFWS and the AGFD (USFWS - 58 FR 14248, AGFD 1988). Spotted owls are large (relative to other North American owls), dark-eyed owls that lack ear tufts, and are generally brown with heavy white to beige spotting. The Mexican subspecies is disjunctly distributed from southern Mexico northward into southern Utah and central Colorado (USFWS 1995b). Mexican spotted owls occupy a variety of habitat types ranging from dense mixed-conifer forests to steep-walled, rocky canyons (USFWS 1995b). In southern Arizona they typically occur in mixed-conifer, Madrean pine-oak and Arizona cypress forests, encinal oak woodlands, and riparian forests (USFWS 1995b). Nest sites are generally located in closed-canopy forests or steep-walled canyons. Occupied forest habitats generally contain mature old-growth stands and uneven-aged stands that are vertically complex with dense canopies (USFWS 1995b). Little published data exists concerning foraging habitat for Mexican spotted owls; however, it appears that foraging habitats generally have big logs, dense canopies, and large, densely distributed trees and snags (USFWS 1995b).

Mexican spotted owl surveys in Saguaro National Park since 1992 have documented five territories within the Park (Berner and Mannan 1992, Bailey 1993, Kline 1994, Willey 1997, Knipps 1999, Jurgensen 2002). These territories are consistently occupied every year, though sometimes only by one bird or a non-breeding pair. Protected Activity Centers (PAC) have been established for each of these territories.

Determination:

The PAC nearest to the project area is about seven miles away. The project area does not lie within critical habitat. There is no habitat for spotted owls in the project area because of its elevation and vegetation association. The proposed action, therefore, will not affect any Mexican spotted owl roosts or foraging habitat. We determine that this action will have *no effect* on Mexican spotted owls or their habitat.

Yellow-billed cuckoo (*Coccyzus americanus*)

The yellow-billed cuckoo is a medium sized bird with a slender, long-tailed profile. It has a slightly down-curved bill, which is blue-black with yellow on the lower half of the bill. Plumage is grayish-brown above and white below, with rufous primary flight feathers. It is found in large blocks of riparian woodlands (cottonwood, willow, or tamarisk galleries) and feeds exclusively on insects (USFWS 2001).

In southeastern Arizona, the yellow-billed cuckoo is a summer resident in tall, dense, riparian growth, mostly in the San Pedro, Patagonia-Sonoita Creek, and Arivaca Creek drainages (Taylor 1995). In the RMD it is considered a rare transient; there was a recent sighting at Rincon Creek (NPS files), which is about three miles from the project area. There is no habitat in the project area.

Determination:

The proposed action, therefore, will not affect any yellow-billed cuckoos nesting or foraging habitat. We determine that this action will have *no effect* on yellow-billed cuckoos 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). These nests are in the Rincon Mountains, at elevations above 6000 feet, and over eight miles from the project area. Peregrine falcons are occasionally seen at lower elevations in winter, and may occur in the project area at this time.

Determination:

No nesting habitat for peregrine falcons is in or near the project area. Birds are only occasionally seen in the project area and then only in winter. The project will occur in summer, therefore the proposed action 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 the assumption that no pygmy-owls will be located on any remaining surveys in 2004 or 2005 in the project area. No owls were detected in surveys conducted in 2003 or 2004. If an owl is detected during the 2005 surveys, during the project, or AGFD tracks a transmitted 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 inches 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 1993b). 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 1993b), 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.

In 2004, there were three male pygmy-owls reported in northwest Tucson 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)

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 RMD every year since 2001; when the 2004 survey season is complete, 171 surveys will have been conducted. Several of these survey routes are in the vicinity of the project area (Figure 2). All of these surveys followed protocols specified by AGFD and the USFWS at the time.

There was a past detection in March, 1984 on the west side of the loop drive. There was also a confirmed detection on October 12, 1995 in the Rincon Mountain District, a little over a mile southeast of the loop drive. There was a possible, but unconfirmed, aural detection in April, 2001 near the center of the area enclosed by the loop drive. Several follow-up visits at this location failed to detect an owl.

NPS contracted SWCA to conduct project clearance surveys for pygmy-owls in 2003 and 2004. Thirty-eight call stations for CFPO were established along the project route (Figure 2). Owl surveyors traveled between calling stations, which were placed approximately 400 meters apart, on mountain bicycles for the three survey periods. No owls were detected and no birds responded to

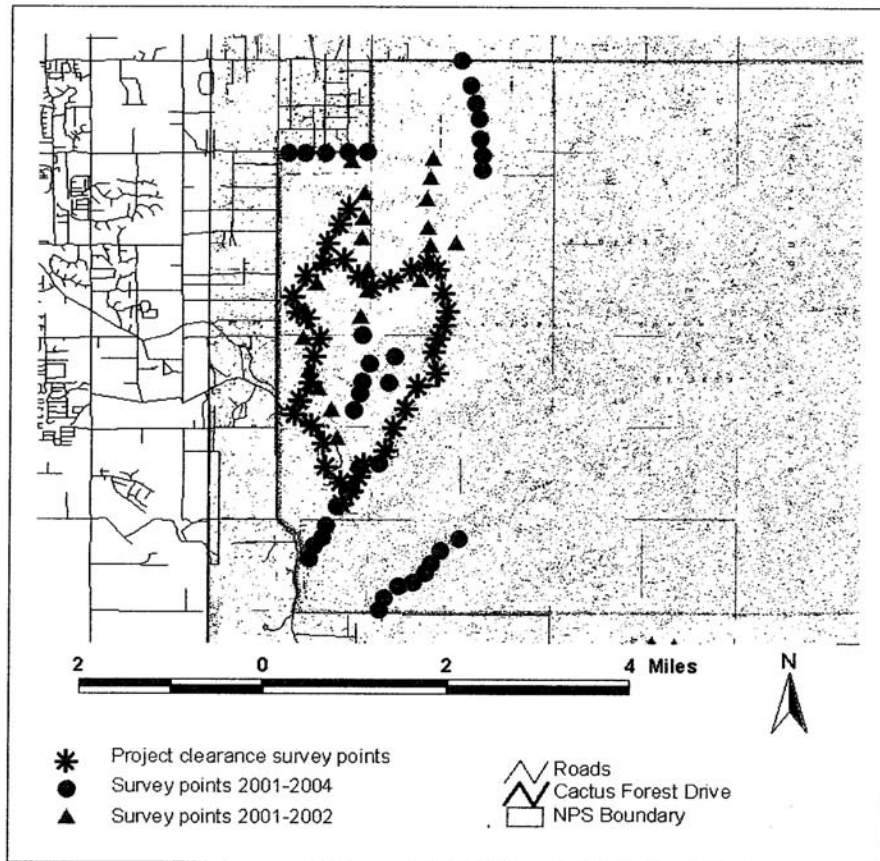


Figure 2. Survey points for the cactus ferruginous pygmy-owl in or near the project area.

taped calls on surveys conducted 10-12 April, 15-17 May, and 17-18 June, 2003 (SWCA 2003). Surveys, with negative results, were conducted 25-26 February, and 13-14 May 2004 (T. Ferguson, pers. comm.). The third 2004 survey has not been completed at time of writing. Surveys also will be conducted in 2005 per USFWS protocol; this will give three years of compliance surveys before work begins.

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 six inches at 4.5 feet above the ground
- multilayered vegetation
- vegetation providing mid-story and canopy level cover (primarily trees over six 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.

Almost all 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. Only one saguaro will be lost, and two large (10-15 feet tall) and several small (under 4 feet tall) saguaros will be moved. Four trees (mesquite) with diameters over six inches will be removed. The remaining 35 trees (mesquite, paloverde, acacia) to be removed are small.

A total of 7.64 acres will be disturbed during the construction; however, 7.23 acres will be restored through revegetation. The net loss of vegetated area will therefore be only 0.41 acres. After construction, topsoil salvaged before construction will be replaced. The Park's restoration crew will replant those plants salvaged (all barrel cacti, fishhook and hedgehog cacti, and saguaros less than four feet high, and a portion of prickly pear, cholla, and grasses) before construction. They will also plant 1,133 nursery-grown plants, 200 of which will be trees (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 replanted areas and pullouts to be obliterated and restored 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 50% of trees planted will survive the first two years. This survival rate will be achieved by monitoring and follow-up watering. If at any time, the survival rate is less than 50%, additional trees will be grown and planted on site. Although habitat will be affected in the short-term by the removal of four large trees, long-term results should be beneficial when the 100 (assuming 50% survival) planted trees reach maturity.

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 currently occupied by pygmy-owls in northwest Tucson become unsuitable through land-use changes, owls may disperse to the remaining large areas of natural desert, such as the Rincon Mountain District of Saguaro National Park. It is therefore puzzling why no owls have been detected in the RMD in recent years, despite an extensive survey effort every year. Possible reasons may be site tenacity by adult owls, but no reproduction, or failure of dispersing young to survive.

The non-native invasive plant species found in the Tucson area include two perennial bunch grasses that are of specific concern within Saguaro National Park: buffelgrass (*Pennisetum ciliare*) and fountain grass (*Pennisetum setaceum*). These plants crowd out native plants and alter ecosystem functions such as nutrient cycling, hydrology, and most importantly, fire regime. The Arizona Upland is not a fire adapted community; there is high post-fire mortality for some of the community's most important floral species, such as the saguaro, foothill paloverde, and desert ironwood. The presence of buffel and fountain grass is believed to fuel larger and more frequent wildfires. Both grasses have been observed along Cactus Forest Drive; buffelgrass has been subsequently eradicated along the Cactus Forest Trail, which bisects the loop drive, by Park resource staff. Control of buffelgrass, fountain grass, and other exotic plants is an ongoing activity along Cactus Forest Drive. The removal of exotics allows native plants to re-establish, which may enhance habitat for pygmy-owls.

Determination:

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

- Since 1995 when one non-breeding bird was detected over a mile from the project area, there have been no confirmed detections in the project area or in the vicinity of the project area despite many surveys.
- Only one saguaro will be removed permanently; two others (10-15 feet high) will be moved and replanted.
- A maximum of 39 trees will be removed; only four are over six inches dbh.
- We plan to implement the following mitigation procedures in order to prevent or minimize potential impacts:
 - The disturbed area is as small as possible and will be restored using the best methods currently available, beginning as soon as construction is completed
 - A total of 7.64 acres of ground will be disturbed; however, a total of 7.23 acres will be revegetated (this includes areas disturbed during work and old pullouts that are obliterated and revegetated)
 - Trees removed will be replaced at a 3:1 ratio. This will result in long-term enhancement of habitat

This determination is contingent on detecting no owls on remaining project clearance surveys in 2004 and 2005. Should an owl be detected, we will immediately inform and consult with USFWS.

CONSULTATION AND COORDINATION

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APPENDIX D

CULTURAL RESOURCES CONSULTATION AND COORDINATION



United States Department of the Interior

NATIONAL PARK SERVICE

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



IN REPLY REFER

H4217

March 24, 2004

Mr. Wayne Taylor, Jr., Chairperson
Hopi Tribe
P.O. Box 123
Kykotsmobi, Arizona 86039

Dear Chairman Taylor,

Reference: Saguaro National Park - Repaving of Cactus Forest Loop Drive
Subject: Compliance with Section 106 of the National Historic Preservation Act and National Environmental Policy Act (NEPA)

Saguaro National Park is planning to rehabilitate eight miles of the Cactus Forest Loop Drive, in the Rincon Mountain (east) District of Saguaro National Park, Pima County, Arizona. This proposal consists of milling and overlay of a 2" asphalt concrete mat over the existing Cactus Forest Loop Drive. This eight-mile one-way scenic road tours the lower elevations of the west side of the Rincon Mountain District. The route is located beyond the Visitor's Center, off of Old Spanish Trail. It has existed since at least the 1930s and parts of it were built by the Civilian Conservation Corps. The road is currently in poor condition, and limited repair activities are not cost effective. The work is expected to occur between May, 2005 and September, 2005.

During the planning for this project, archeologists have identified nine archeological sites which may be impacted by grading along the road shoulders. We are proposing to conduct archeological testing of these nine sites to learn more about the resources, so that disturbance can be avoided or appropriate mitigation can be developed. In accordance with NEPA and 36 CFR 800 requirements, we are soliciting your comments and invite you to review the proposed testing. Please contact us by April 22, 2005 with any concerns or comments. An Environmental Assessment is being prepared and will be sent to you for comment within a few months.

If you have questions, need more information, or want to express your concerns, please contact me at the above address. I would also be happy to meet with you to discuss this project. To arrange a meeting, please contact me through my email address, Sarah_Craighead@nps.gov, or by telephone at (520) 733-5101.

We look forward to consulting with you on this project.

Sincerely,

for Sarah Craighead
Superintendent

TAKE PRIDE
IN AMERICA

Enclosure: Archeological Testing at Nine Sites on Cactus Forest Drive

Identical letter sent to the following recipients:

Mr. Terry O. Enos, Chairperson, Ak-Chin Indian Community Council
Dr. Clinton M. Pattea, President, Fort McDowell Yavapai Nation
Mr. Richard P. Narcia, Governor, Gila River Indian Community Council
Mr. Robert Valencia, Chairperson, Pascua Yaqui Tribe
Ms. Joni M. Ramos, President, Salt River Pima-Maricopa Indian Community
Ms. Vivian Juan-Saunders, Chairperson, Tohono O'odham Nation
Mr. Malcom Bowekaty, Governor, Zuni Pueblo

TAKE PRIDE
IN AMERICA 



"Managing and conserving natural, cultural, and recreational resources"

Received

AUG 10 2004

DSC-T

May 4, 2004

Susan J. Wells, Acting Chief, Archaeology
Western Archaeological and Conservation Center
DOI-National Park Service
255 N. Commerce Loop Drive
Tucson, AZ 85745

ATTN: Loy Neff, Archaeologist

Janet Napolitano
Governor

State Parks
Board Members

Chair
John U. Hays
Yarnell

Elizabeth Stewart
Tempe

William C. Porter
Kingman

William Cordasco
Flagstaff

Gabriel Beechum
Casa Grande

Suzanne Pfister
Phoenix

Mark Winkleman
State Land
Commissioner

Kenneth E. Travous
Executive Director

Arizona State Parks
1300 W. Washington
Phoenix, AZ 85007

Tel & TTY: 602.542.4174
www.azstateparks.com

800.285.3703 from
(520 & 928) area codes

General Fax:
602.542.4180

Director's Office Fax:
602.542.4188

Re: Phase I Archaeological Testing Plan for Proposed Repaving of the Cactus Forest Loop Drive; Saguaro National Park; DOI-NPS; SHPO-2003-2266(19736)

Dear Ms. Wells:

Thank you for providing us with a revised testing plan for the above proposed undertaking. Pursuant to the Service-wide Programmatic Agreement, I have reviewed the document and find it to be thorough and well conceived. It adequately addresses our comments as provided to you in our April 6 and April 15, 2004 letters. Our only comment is that the Agency should consult with the tribes at each point in the process that the Agency consults with SHPO (see especially pages 12 and 28).

We look forward to future consultations with the Agency on the historic CCC resources related to the road; Dr. Bill Collins, Deputy SHPO, will be your contact in this office for that project review/technical assistance. Do you have any idea when the data recovery plan for these historic features will be available for SHPO review?

We are currently in the process of reviewing the draft Memorandum of Agreement (MOA) that you sent to us. We will have comments available later this week.

We look forward to reviewing the draft Phase I testing report for the proposed repaving of the Cactus Forest Loop Drive. We greatly appreciate the Agency's responsiveness and positive attitude throughout this consultation process – you and your staff are truly a pleasure with which to work! If you have any questions or concerns, please feel free to contact me at 602/542-7138, or e-mail me at ahoward@pr.state.az.us.

Sincerely,

Ann Valdo Howard
Public Archaeology Programs Manager/Archaeologist
State Historic Preservation Office



United States Department of the Interior

NATIONAL PARK SERVICE
Western Archeological and Conservation Center
255 N. Commerce Loop Drive
Tucson, Arizona 85745



Received
AUG 10 2004

DSC-T

IN REPLY REFER TO:

May 14, 2004

Memo to: Director, Office of Federal Agency Programs, Advisory Council on Historic Preservation

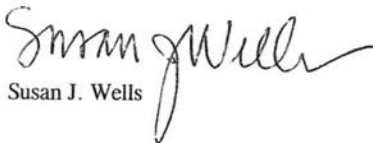
From: Acting Chief, Western Archeological and Conservation Center, National Park Service

Subject: Memorandum of Agreement for recovery of significant information between Saguaro National Park and the Arizona State Historic Preservation Officer

Enclosed please find an executed MOA for recovery of significant information between Saguaro National Park and the Arizona State Historic Preservation Officer. The MOA addresses Data Testing as Phase I Data Recovery in Support of Proposed Repaving of the Cactus Forest Loop Drive, Saguaro National Park, Arizona

Attached is the *Archeological Research Design and Plan for Data Testing as Phase I Data Recovery at Nine Sites on Cactus Forest Drive, Saguaro National Park, Rincon Mountain District, Arizona* prepared April, 2004 by Loy C. Neff, Susan J. Wells, and Charny L. White, Western Archeological and Conservation Center, NPS, Tucson.

If you require additional information please contact me at the above address or at 520-670-6501 ext. 238 or susan_wells@nps.gov.


Susan J. Wells



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

May 11, 2004, 2004

Received

AUG 10 2004

DSC-T

MEMORANDUM OF AGREEMENT FOR RECOVERY OF SIGNIFICANT INFORMATION BETWEEN SAGUARO NATIONAL PARK AND THE ARIZONA STATE HISTORIC PRESERVATION OFFICER

FROM ARCHEOLOGICAL SITES: AZ BB:14:44, 78, 141, 163, 168, 169, 202, 203, and
284(ASM)

UNDERTAKING: Data Testing as Phase I Data Recovery in Support of Proposed Repaving of
the Cactus Forest Loop Drive, Saguaro National Park

STATE: Arizona

AGENCY: National Park Service, Saguaro National Park

Whereas, in accordance with 36 CFR Part 800, the National Park Service (NPS) acknowledges and accepts the advice and conditions outlined in ACHP's "Recommended Approach for Consultation on the Recovery of Significant Information from Archeological Sites," published in the Federal Register on June 17, 1999; and

Whereas, the Arizona State Historic Preservation Officer (SHPO) and NPS agree that the above listed sites are eligible for listing on the NRHP under criterion D as stated in the SHPO consultation letter to NPS dated April 6, 2004.

Whereas, the consulting parties agree that recovery of significant information from the archeological sites listed above may be done in accordance with the published guidance; and

Whereas, the consulting parties agree that it is in the public interest to expend funds to implement this project through the recovery of significant information from archeological sites to mitigate the adverse effects of the project; and



Whereas, the consulting parties agree that Indian Tribes that may attach religious or cultural importance to the affected property have been consulted and their comments have been addressed through consultation; and

Whereas, to the best of the consulting parties' knowledge and belief, no human remains, associated or unassociated funerary objects or sacred objects, or objects of cultural patrimony as defined in the Native American Graves Protection and Repatriation Act (25 U.S.C. 3001) are expected to be encountered; and

Whereas, the SHPO is authorized to enter into this agreement in order to fulfill its role of advising and assisting Federal agencies in carrying out their Section 106 responsibilities under the following Federal statute: Sections 101 and 106 of the National Historic Preservation Act of 1966, as amended, 16 U.S.C. 470, and pursuant to 36 CFR Part 800, the regulations implementing Section 106, at 800.2 (c)(1)(i) and 800.6(b);

Now, therefore, the National Park Service, Saguaro National Park, shall ensure that the following terms and conditions, including the appended Archeological Data Recovery Plan, will be implemented in a timely manner and with adequate resources in compliance with the National Historic Preservation Act of 1966 (16 U.S.C. 470).

STIPULATIONS

The NPS will ensure that the following measures are carried out.

I. Native American Graves Protection and Repatriation (NAGPRA)

Although the likelihood of discovering human remains is remote, the NPS shall ensure that any burial site, human remains, funerary objects, sacred objects, and objects of cultural patrimony encountered during the site work are treated in a manner consistent with applicable Federal law, including, but not limited to, the Native American Graves Protection and Repatriation Act of 1990.

II. Failure to Carry Out the Agreement

Failure by NPS to carry out the terms of this agreement requires that the NPS again request SHPO comment in accordance with 36 CFR 800. If NPS does not carry out the terms of the agreement, it will not take or sanction any action or make any irreversible commitment that would result in an adverse effect to culturally significant resources at the sites without first complying with the 36 CFR 800 requirements regarding SHPO and Council participation.

III. Dispute Resolution

Should the SHPO object within 30 days to any actions proposed pursuant to this agreement, the NPS shall consult with the SHPO to address the objection. If the NPS or the SHPO determine that the objection cannot be resolved, the NPS will forward all documentation relevant to the dispute to the Council. Within 30 days after receipt of all pertinent documentation, the Council will either:



A. provide the NPS with recommendations, which the NPS will take into account in reaching a final decision regarding the dispute; or

B. notify the NPS that it will comment pursuant to 36 CFR 800.6(b) and proceed to comment. Any such Council comments will be taken into account by NPS with reference only to the subject of the dispute. NPS's responsibility to carry out all actions under this agreement that are not the subject of the dispute will remain unchanged.

IV. Public Objection

At any time during implementation of the measures stipulated in this agreement regarding cultural resources, should any objection to any such measures or their manner of implementation be raised by a member of the public, the NPS shall take the objection into account and consult as needed with the objecting party, the SHPO, or the Council to resolve the objection. NPS will notify the SHPO of any such objection.

V. Other Terms and Conditions

A. Modification, amendment, or termination of this agreement as necessary shall be accomplished by the signatories in the same manner as the original agreement.

B. Termination: Either signatory to this agreement may terminate it by providing thirty (30) days notice to the other party. The signatories will consult during the period prior to termination to seek agreement on amendments or other actions that would avoid termination. In the event of termination, the NPS shall comply with the *Servicewide Programmatic Agreement for Compliance with Section 106 of the National Historic Preservation Act* (1995) with regard to individual undertakings that otherwise would be covered by this agreement. One of the reasons the SHPO may terminate this agreement would be upon finding that a SHPO employee that was significantly involved in the creation of this agreement is, at any time the agreement is in effect but no later than three years after its execution, an employee or consultant to any other party in the agreement.

C. Non-Availability of Funds: This agreement shall be subject to available funding, and nothing in this agreement shall bind the State or Federal agencies to expenditures in excess of funds authorized and appropriated for the purposes outlined in this agreement.

D. This agreement shall be null and void if its terms are not carried out within 5 (five) years from the date of its execution. unless the signatories agree in writing to an extension for carrying out its terms.

VI. Execution

Execution and implementation of this agreement satisfies the National Park Service's Section 106 responsibilities for all Projects related to the Data Testing as Phase I Data Recovery in Support of Proposed Repaving of the Cactus Forest Loop Drive, Saguaro National Park, that are treated in conformance with the stipulations herein.



National Park Service Official:

Sarah Craighead

Ms. Sarah Craighead, Superintendent, Saguaro National Park

5/3/04

Date

Arizona State Historic Preservation Officer:

Mr. James Garrison

Date

Attachment:

Archeological Research Design and Plan for Data Testing as Phase I Data Recovery at Nine Sites on Cactus Forest Drive, Saguaro National Park, Rincon Mountain District, Arizona, prepared April 2004 by Loy C. Neff, Susan J. Wells, and Charny L. White, Western Archeological and Conservation Center, NPS, Tucson.

N.B. Arizona SHPO reviewed and concurred with this testing plan May 4, 2004.





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.

