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ACRONYMS AND ABBREVIATIONS

ABAAS	Architectural Barriers Act Accessibility Standards
ADA	Americans with Disabilities Act
ADT	average daily traffic
ADOT	Arizona Department of Transportation
BMPs	Best Management Practices
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon monoxide
CNG	compressed natural gas
CUA	commercial use authorization
CVIP	Canyon View Information Plaza
DSC	Denver Service Center
EIS	environmental impact statement
FEIS	final environmental impact statement
FHWA	Federal Highway Administration
FONSI	finding of no significant impact
FY	fiscal year
GMP	general management plan
HPS	high-pressure sodium
ITS	intelligent transportation systems
LED	light-emitting diode
LNG	liquefied natural gas
LRCP	Light Rail Corridor Project
MOA	Memorandum of Agreement
NEPA	National Environmental Policy Act
NHL	national historic landmark
NO _x	nitrogen oxides
NPS	National Park Service
PEPC	Planning, Environment and Public Comment
PM ₁₀	particulate matter (less than 10 micrometers in diameter)
RV	recreational vehicle
SHPO	state historic preservation officer
SR	State Route
TCP	traditional cultural property
USC	U.S. Code
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
VMT	vehicle miles traveled
VOC	volatile organic compounds (represented by hydrocarbons)

CHAPTER 1. PURPOSE OF AND NEED FOR ACTION

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INTRODUCTION

The National Park Service (NPS), in cooperation with the U.S. Forest Service (USFS), is proposing a South Rim visitor transportation plan for Grand Canyon National Park to address the most pressing traffic, parking, and visitor access issues in Grand Canyon Village (Figure 1). This environmental assessment / assessment of effect for the transportation plan evaluates four alternatives — the no-action alternative and three action alternatives.

All of the action alternatives include options for

- new visitor and tour bus parking
- enhancement of the park shuttle bus system
- modifications to the South Entrance Station
- improvements to passenger loading and unloading operations for the Grand Canyon Railway
- visitor access improvements at Yaki Point
- improvements to visitor access and amenities at Mather Point and the Canyon View Information Plaza (CVIP)
- transportation operational strategies to improve the utilization of visitor transportation facilities and services, to provide useful information to visitors, and to support ongoing management of the transportation system to meet evolving visitor needs

The purpose of this document is to disclose the expected effects on the human environment of implementing a transportation plan. The human environment and historic properties are defined as the natural and physical environment and the relationship of people to that environment. Because Kaibab National Forest is adjoining federal land that may be affected by actions under the

proposed alternatives, the U.S. Forest Service is a cooperating agency in the development of this document.

The project area extends east from Grand Canyon Village to include Yaki Point and the South Kaibab trailhead, south to the gateway community of Tusayan, and west to the beginning of Hermit Road. Shuttle bus service on Hermit Road is also included in the plan (Figure 2). The transportation plan recommends operational and visitor information strategies that would extend beyond the immediate project area along the major travel routes to the South Rim.

PURPOSE OF THE PLAN

The purpose of the South Rim visitor transportation plan is to address the park's most pressing transportation issues by improving visitor transportation facilities and services, such as parking and shuttle buses, and making the most effective use of existing visitor facilities and services. The actions implemented through this plan would serve to accommodate current and anticipated future levels of visitation to the South Rim, enhance visitor experiences, and protect park resources. The actions would be affordable within available park recreation fee revenues and would be adaptively managed to respond to visitation changes through the life of the plan (to approximately 2020). This project will not preclude other future transportation systems from being implemented, including those that may be required for substantial increases in visitation.

APPROPRIATE USE

The proposed project is considered an appropriate use as defined in the NPS *Management Policies 2006* because it would be suited to the exceptional natural and cultural resources found in Grand Canyon National Park and it would foster an understanding of and appre-

ciation for park resources and values (NPS 2006d). The actions proposed in this plan are also evaluated for consistency with applicable regulatory measures, consistency with the park's 1995 *General Management Plan*, actual and potential effects to park resources and values, total project cost, and the public interest that would be served. If unanticipated and unacceptable impacts were identified, the superintendent would reevaluate the purpose and need to further manage, limit, or discontinue the use.

NEED FOR ACTION

A flexible visitor transportation plan for the South Rim is needed to respond to changes in visitation levels and visitor travel needs through the year 2020, to improve visitor experience and safety, to enhance traffic flow, to provide adequate parking capacity, and to improve information that directs visitors through the park. Resources currently damaged by parking in nondesignated areas also need to be restored and protected. More specifically, actions in this plan are needed for the following reasons:

- The visitor center at the Canyon View Information Plaza is accessible only by tour bus, shuttle bus, bicycle, or on foot from Mather Point, and it is not easily accessible to visitors in personal vehicles. Consequently, many visitors never



Many visitors never visit Canyon View Information Plaza, the park's primary information and orientation facility.



Visitation along the South Rim is congested at some locations, limiting opportunities for visitors to experience solitude and quiet enjoyment.

visit the plaza, which is the park's primary information and orientation facility.

- Parking demand substantially exceeds capacity for private automobiles and recreational vehicles during current peak visitation, resulting in large numbers of vehicles parked along roadsides, particularly at Mather Point. Visitors often park in nondesignated areas along the South Entrance Road, causing damage to resources and resulting in safety risks, especially where people park along the roadside and walk between parked cars and cross through moving traffic. Similar problems occur at other areas, such as Yavapai Observation Station or Desert View Drive near the South Kaibab trailhead, and within Grand Canyon Village at certain times of the year. Visitors circulate on South Rim roads in search of parking, resulting in congestion and visitor frustration.
- The Canyon View Information Plaza lacks amenities typically associated with a staging point for park trips, such as supply of basic food and drink items and in-depth interpretive information about Grand Canyon National Park.
- Visitors are confused about where to go and what transportation mode choices are available (for example, where to see

FIGURE 1. PROJECT VICINITY

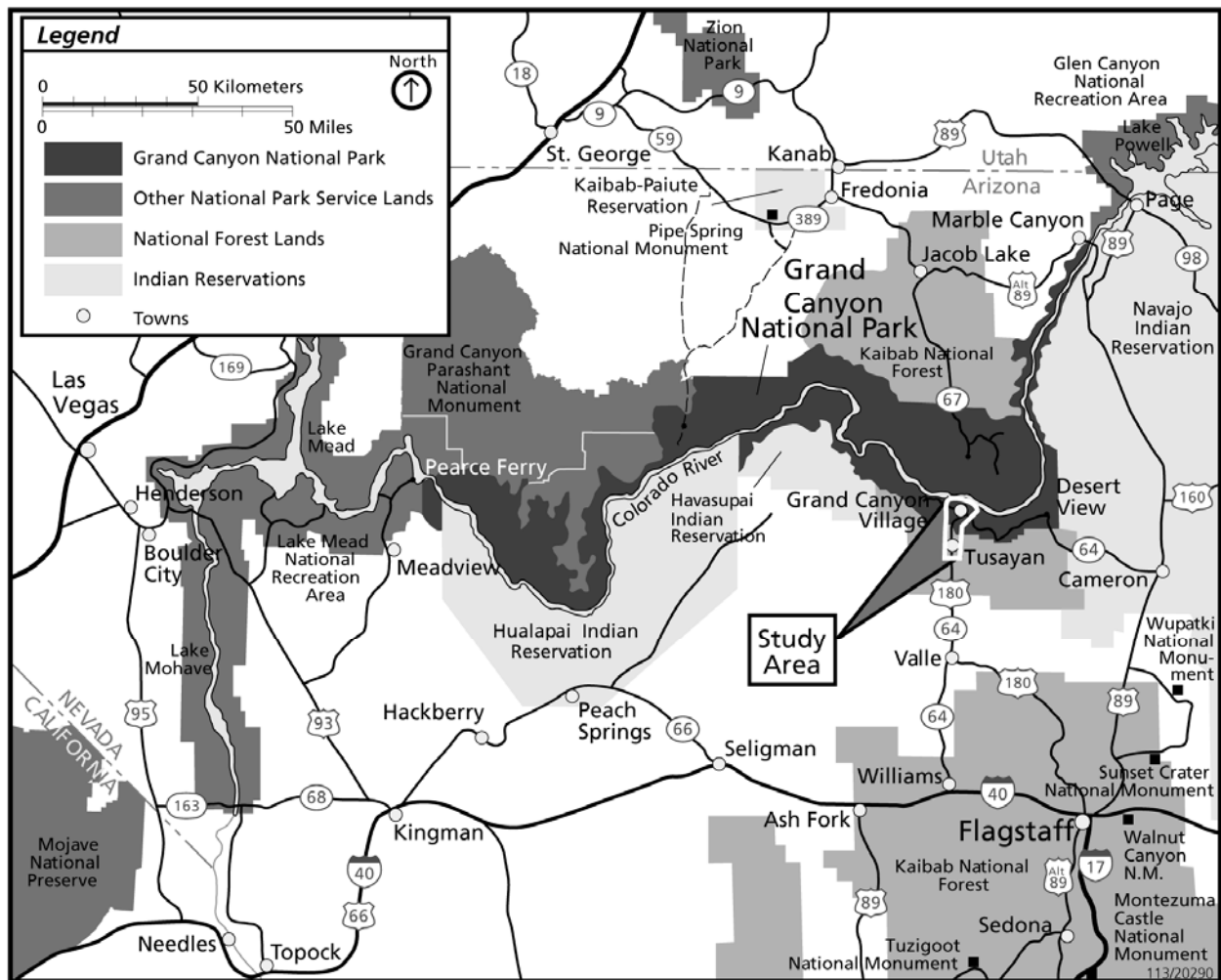
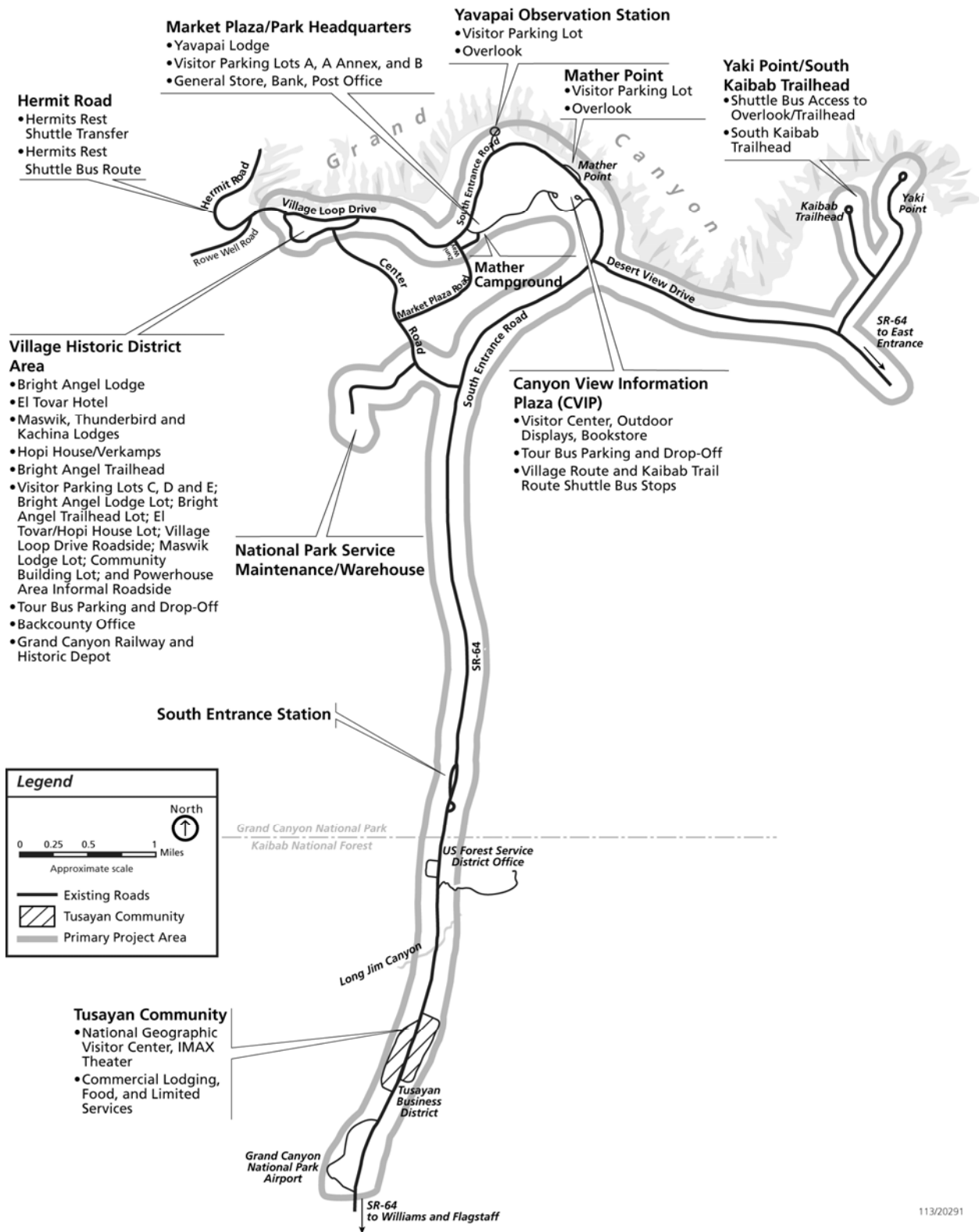


FIGURE 2. PROJECT AREA



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the canyon, how to get to the visitor center, and where to board the shuttle bus system). Directional signing is inadequate at many locations, such as the intersection of Center Road and the South Entrance Road and along access roads to Grand Canyon Village.

- Demand for service on the Hermits Rest shuttle bus route frequently exceeds capacity, resulting in long waits for visitors. Portions of the Village shuttle bus route are also overcrowded and the route is indirect and inefficient for many users.
- The existing transportation system is a navigation challenge for those who speak and read other languages and for those individuals with special needs, such as mobility and other impairments.
- Tour bus parking is inadequate and opportunities for tour bus visitors to access the South Rim are limited.
- Visitation along the South Rim is congested at some locations, limiting visitor opportunities to experience solitude and quiet enjoyment. Vehicle traffic and the attendant noise and visual intrusion affect many visitors' experiences.
- The mix of tour buses, vehicles, and pedestrians create heavy congestion at Bright Angel Lodge and near the Grand Canyon Depot when passengers are unloading from the Grand Canyon Railway, causing safety risks and disrupting traffic flow.
- Recent improvements at the South Entrance Station have resulted in improved service and reduced wait times. However, if visitation increases, long waits could again occur at the entrance station, resulting in visitor frustration.
- Facilities to support park fee collection operations are lacking at the South Entrance Station.



Demand for the Hermits Rest shuttle bus route frequently exceeds capacity, resulting in long waits for visitors.

OBJECTIVES

As stated in *Director's Order #12: Conservation Planning, Environmental Impact Analysis, and Decision-making*, objectives are "what must be achieved to a large degree for the action to be considered a success" (NPS 2001b). Objectives are grounded in the park's enabling legislation and are compatible with direction and guidance provided by the park's 1995 *General Management Plan* (NPS 1995b). The following are the primary objectives for the South Rim visitor transportation plan by the year 2020:

- Improve private vehicle parking as needed to meet current and future visitor demand.
- Sustain the improved visitor experience at the South Entrance Station by providing capacity to meet future increases in visitor, employee, resident, and commercial traffic.
- Reduce overall vehicle traffic through Grand Canyon Village in 2020 by 15%–25% during peak periods.
- Provide a variety of means to travel to the Canyon View Visitors Center to afford all visitors the opportunity to receive park information and orientation soon after their arrival.

- Improve and increase tour bus parking and access to the rim to better accommodate current and future demand.
- Restore areas damaged by improper vehicle parking in nondesignated areas and social trailing in places such as Mather Point; encourage best management practices to reduce or avoid resource damage.
- Reduce safety risks due to conflicts between pedestrians, parked vehicles, and moving traffic near Mather Point and elsewhere in Grand Canyon Village.
- Protect and enhance sensitive park resources through implementation of transportation facility improvements.
- Provide visitors with enhanced opportunities to stage (or plan) their visit at Canyon View Information Plaza, including access to improved information about trip planning, park orientation, and travel mode choices and the ability to obtain basic (or limited) pre-packaged food and drinks.
- Provide enhanced access to interpretive information so visitors gain a better appreciation for the values of Grand Canyon National Park.
- Provide support facilities as needed to operate and manage the transportation system, including park fee collection operations at the South Entrance Station.
- Improve shuttle bus service throughout the South Rim.
- Work with gateway communities to achieve mutual transportation goals.

PLANNING FRAMEWORK

The following guidelines comprise the planning framework. These guidelines focus the content of the plan and associated analyses.

Planning Time Horizon

The life of the transportation plan is proposed to extend through the year 2020, assuming a modest increase in visitation consistent with long-term trends in visitation growth. The National Park Service would implement improvements in phases to initially address existing needs and then accommodate future visitation increases through a combination of adaptive management strategies and additional facilities. Should visitation grow faster than anticipated through the year 2020, other transportation system measures — outside the scope of this project — would need to be considered.

Visitation Growth

Based on the trends evident at the time, the 1995 *General Management Plan* forecast that parkwide visitation would reach 6.85 million people per year by 2010. Subsequently, various events and factors have caused visitation to stop growing. From a high of 4,958,000 annual visits in 1995, visitation declined to 4,356,000 in 2006. The patterns in visitation at Grand Canyon from the mid-1990s through 2007 are similar to those experienced at other western units of the national park system (NPS 2006c). The reasons for the change in visitation patterns to national parks between the 1990s and the present have not been studied comprehensively. Many factors, including weather patterns, wildland fires, economic conditions, and competition from other domestic and overseas recreational destinations, could be factors. Another factor may be the perception that since the mid-1990s national parks are crowded. Articles in the popular media in the 1990s highlighted congestion problems in large western park units. Prominent park plans prepared in the 1990s, including the Grand Canyon *General Management Plan* and the *Yosemite Valley Plan*, attempted to address the effects of vehicle congestion and crowding.

Based on current trends, it is assumed for the purposes of this plan that visitation would remain relatively unchanged from the present

until improvements envisioned in the first phase of this visitor transportation plan were completed in 2010. It is also assumed that after the transportation improvements were in place, visitation growth would resume at the average rate experienced between 1960 and 2001, resulting in 5.48 million visitors in 2020. This represents an overall increase in annual park visitation of 23% between 2005 and 2020 (NPS 2007d).

The improvements considered in this environmental assessment / assessment of effect for the South Rim visitor transportation plan would be implemented in phases, with an adaptive management approach being used to refine the phasing plan over time. (See page **Error! Bookmark not defined.** in Chapter 2 for a description of adaptive management.) If visitation increases faster or slower than projected in this plan, the implementation phases would be adjusted accordingly.

Design Day

Visitation and transportation conditions in the plan were analyzed for a *design day* that was selected to represent typically busy conditions during the peak visitation season. The tenth highest visitation day of the year was selected as the design day. Infrastructure improvements such as additional parking spaces and increased shuttle bus capacity in the plan are designed to accommodate levels of visitation on the design day. Based on trends observed in the late 1980s and early 1990s, visitation in the peak season is expected to grow somewhat slower than annual visitation. The design day in 2020 is forecast to have 20% higher visitation than the design day in 2005. About 4% of visitors to the South Rim would be expected to visit on one of the nine days with higher visitation than the design day and be affected by the operational and management agencies.

To meet visitor needs when visitation is higher than the design day, operational and management strategies described in the plan alternatives would be implemented on those days.

Visitor-Focused Transportation System

The primary focus for improvements is to enhance the park visitor experience and reduce exposure of visitors to hazards associated with roadside parking and pedestrians crossing major vehicle travel routes. Thus, shuttle bus, parking, and transportation management improvements would primarily focus on visitors, even though all users (including residents and employees) would be expected to benefit.

Travel Modes

Travel modes considered in this document include visitor and employee vehicles, shuttle buses, tour buses, the Grand Canyon Railway train service, as well as pedestrian and bicycle travel.

Geographic Area

The South Rim visitor transportation plan encompasses areas affected by existing traffic and parking congestion, as well as the proposed locations of infrastructure and transportation service improvements. The South Rim is generally defined as the portion of Grand Canyon National Park bordered by the eastern park boundary, the southern canyon rim, Hermits Rest, and the southern park boundary. The project area includes the portion of the South Rim from Yaki Point on the east to the beginning of Hermit Road near Bright Angel Lodge on the west, and from the canyon rim on the north to the park boundary on the south. For the purposes of this transportation plan, visitors who enter the park at the South or East entrances are considered to be traveling to and within the South Rim. The project area also includes national forest system lands in Kaibab National Forest south of Grand Canyon National Park and just north of the community of Tusayan, adjacent to Arizona State Route 64 (SR 64) (see Figure 2). The plan also addresses shuttle bus service along Hermit Road west to Hermits Rest.

Grand Canyon Village generally refers to the area bounded on the west by Rowe Well Road; on the south by Center Road, including the helibase and landfill areas; on the east by the South Entrance Road, but including Yaki Point and the South Kaibab trailhead area; and on the north by the canyon rim. The visitor center at Canyon View Information Plaza and the existing parking area and overlook at Mather Point are within Grand Canyon Village. Many visitors make their first stop within the project area at Mather Point. For the purposes of the transportation plan, visitor trips that enter Grand Canyon Village on the South Entrance Road, Desert View Drive, or Center Road are considered to be trips *to* Grand Canyon Village. Visitor trips that extend to the west of Mather Point are considered to be trips *through* Grand Canyon Village.

The Grand Canyon Village National Historic Landmark District (hereafter referred to as Village Historic District) is part of Grand Canyon Village and refers to the area including the canyon rim between Verkamps Curio Shop on the east and the beginning of Hermit Road on the west, the train depot, and other park and concessioner facilities near the railroad tracks. Maswik Lodge, the Backcountry Office, and parking lot E are major visitor destinations adjacent to, but technically not within the Village Historic District. For the purposes of the transportation plan, the term ‘Village Historic District area’ is used to describe the combined major visitor destinations on and near the canyon rim between Verkamps Curio Shop and Maswik Lodge, including Bright Angel Lodge, Thunderbird Lodge, Kachina Lodge, El Tovar Hotel, and various parking lots and other visitor facilities served by Village Loop Drive.

Proposed transportation management strategies would be applied within the project area but would also extend along major roadways leading to the gateway communities of Tusayan, Cameron, Valle, Flagstaff, and Williams. Informational services (such as variable messaging signs, website information,

printed media, etc.) would be considered regionally and beyond.

Cost

Implementation of the transportation plan and its associated operations would be affordable within available funding. Project costs would be financed from the park’s recreation fee revenues. Improvements proposed in this plan would be implemented in phases over time, within available funding, and in response to evolving visitor transportation needs. Through adaptive management the park would monitor conditions and schedule ongoing facility and service improvements to best meet visitor needs as they changed over time.

BACKGROUND

Transportation Planning

Traffic and parking problems have affected Grand Canyon National Park since cars overtook trains as the primary means of arrival in 1926. One response to the post World War II boom in visitation was to build more roads and parking. For example, a new South Entrance Road and the parking area at Mather Point were constructed in 1954 and other improvements in the park were completed by the early 1960s. As annual park visitation was nearing 3 million in 1974, a free seasonal shuttle bus service in Grand Canyon Village and along Hermit Road was initiated.

Between 1985 and 1993 annual visitation grew from approximately 2.5 million to nearly 5 million visitors per year. In 1995 the park adopted a *General Management Plan* (NPS 1995b) after a *Final Environmental Impact Statement* (NPS 1995a) and a “Record of Decision” had been completed. However, many of the proposed facility modifications and improvements in the *General Management Plan* were predicated on visitation increasing at higher rates than have actually been realized. One of the plan’s major

proposals was to change the primary transportation system for day visitors* within Grand Canyon Village from automobiles to mass transit. The transportation system described in the *General Management Plan* included a large parking facility (up to 2,600 vehicles) that would be built north of Tusayan and south of the park boundary and that would be served by a seasonally operated mass transit system. An additional parking area would be built at Mather Point for up to 1,225 cars/recreation vehicles (RVs) and 60 tour buses. Under this proposal, 100% of day visitor automobiles would be removed from the Historic Village District by 2010, and a shuttle bus system would operate year-round from Mather Point through Grand Canyon Village.

A 1997 *Environmental Assessment, Mather Point Orientation / Transit Center and Transit System* (NPS 1997a) evaluated a range of options for mass transit, and subsequent to the “Finding of No Significant Impact” the park decided to pursue light rail as the form of mass transit service from parking areas to major visitor attractions, to locate all the day visitor parking north of Tusayan, to eliminate parking at Mather Point, and to operate the main mass transit route from north of Tusayan to Mather Point and on to Grand Canyon Village on a year-round basis. Major mass transit stations were proposed at the parking area north of Tusayan, at Mather Point, and in the Village Historic District, with the light rail line connecting the three stations. A visitor orientation and contact facility, called the Canyon View Information Plaza, was designed to accompany the Mather Point transit station. It was anticipated that all day visitors to the South Rim area would use the light rail system to travel into the park and move between the major activity areas. Shuttle buses would complement the light rail system, allowing visitors to travel to all of the primary view points and visitor services.

* Day visitors are those visitors who arrive at and depart from the park on the same day; they do not stay overnight in the park.

About the time the 1995 *General Management Plan* and the 1997 Mather Point *Environmental Assessment* were being prepared, the U.S. Forest Service (USFS) was preparing a *Final Environmental Impact Statement for Tusayan Growth* (USFS 1999). The project’s “Record of Decision” permitted the construction of an NPS transportation staging area on USFS lands north of Tusayan, with a mass transit corridor leading from it into the park. However, the “Record of Decision” was overturned, and the *Environmental Impact Statement* was remanded to the Forest Service.

In October 2000 the Canyon View Information Plaza was dedicated, and the National Park Service was ready to release a prospectus/request for proposals for the Grand Canyon bus and light rail transit system. However, due to fluctuating and sometimes decreasing visitation between 1993 and 2000, and the rising estimated costs of a light rail system, Congress passed legislation requiring the Secretary of the Interior to report on bus alternatives to light rail transit before proceeding with the request for proposals.

The *Report to Congress on Transit Alternatives* (NPS 2004b) evaluated five combinations of bus and light rail systems, all of which would provide mass transit service from Tusayan to the Canyon View Information Plaza and Grand Canyon Village. Under these options all day visitors would be required to use the mass transit system. A regional rail system was also evaluated, with a first phase that included a high-speed express train from Williams to Grand Canyon Village, and a second phase that included a light rail system from Tusayan to the Canyon View Information Plaza.

After considering options for a comprehensive mass transit system that would serve all day visitors to Grand Canyon Village, the National Park Service concluded that the high cost of any alternative and the recent lack of visitation growth would make the system difficult to implement in the near term. Recognizing the severe transportation problems within Grand Canyon Village during peak seasons,

the National Park Service developed a potential interim solution, referred to as option A, and included it in the *Report to Congress on Transit Alternatives*.

Option A would reduce day visitor traffic, as would the other options, but it focused on the park's most pressing transportation needs and included a voluntary rather than a mandatory shuttle bus system for day visitors. The proposal included a parking facility at the Canyon View Information Plaza, a parking facility north of Tusayan, expanded bus transit between the two parking facilities, and a dedicated bypass lane from the facility north of Tusayan to a location north of the South Entrance Station for use by buses and park residents. It was assumed that many day visitors would drive into the park and use existing parking facilities within Grand Canyon Village during their visits. The projected cost of option A was considerably less than the other five options or the regional rail option, making implementation of this option feasible given available funding.

The *Report to Congress on Transit Alternatives* was transmitted to Congress in June 2005. During congressional briefings the National Park Service received strong support for an alternative similar to option A, recognizing that additional planning would need to occur before implementation. In December 2005 the NPS director approved the use of the park's recreation fee revenues (i.e., entrance fee receipts) to begin transportation planning and compliance in accordance with the National Environmental Policy Act (NEPA) for a South Rim visitor transportation system.

This environmental assessment / assessment of effect for the South Rim visitor transportation plan is the culmination of all of these past efforts. The alternatives in this document have been crafted for the near-term (through 2020), but they preserve the opportunity to implement an expanded mass transit system as envisioned in the *General Management Plan* if required by future visitation growth.

Shuttle Bus Maintenance Facility

Following the completion of the 1997 *Mather Point Environmental Assessment* and the "Finding of No Significant Impact," the National Park Service prepared a *South Rim Maintenance, Warehouse, and Transportation Facilities Environmental Assessment* (NPS 1999b) and a "Finding of No Significant Impact." As a result, a new NPS facility was built in 2003 south of the existing shuttle bus maintenance site to accommodate general park maintenance functions, material storage, and related offices. A new transportation maintenance facility to serve both the South Rim shuttle bus operation and the Tusayan/NPS light rail operation was identified for this same area in the 1999 *Environmental Assessment* but was never built. The bus maintenance facility that is part of all action alternatives in this document is proposed for the same area identified in the 1999 *Environmental Assessment*; however, it would be substantially smaller than the site previously studied and would thus have a reduced area of disturbance. The evaluation of the bus maintenance facility in the 1999 *Environmental Assessment* is incorporated by reference into this document.

MANAGEMENT AND PLANNING HISTORY

LEGISLATIVE HISTORY

President Theodore Roosevelt, by presidential proclamation, reserved land in the Grand Canyon of Arizona as Grand Canyon National Monument on January 11, 1908. On February 26, 1919, Congress dedicated and set apart Grand Canyon National Park “as a public park for the benefit and enjoyment of the people” (Grand Canyon National Park Establishment Act, 40 Stat 1175). Over the years the park has been enlarged and its boundaries revised, most recently on January 3, 1975, when Congress recognized “that the entire Grand Canyon, from the mouth of the Paria River to the Grand Wash Cliffs, including tributary side canyons and surrounding plateaus, is a natural feature of national and international significance” (Grand Canyon National Park Enlargement Act, Public Law 93-620).

The Grand Canyon was designated as a world heritage site on October 26, 1979, under the theme “natural landscape, eroded.” The site meets all four natural criteria for a world heritage site — geological processes, ecological and biological processes, exceptional natural beauty, and conservation of biological diversity.

PARK PURPOSE AND SIGNIFICANCE

Congress generally establishes national park system units to fulfill specific purposes. A park’s purpose is the foundation for decisions to conserve resources while providing for the “enjoyment of future generations.” The purpose of Grand Canyon National Park is based on the park’s enabling legislation and the legislation governing the National Park Service, as also restated in the 1995 *General Management Plan*. As a place of national and global importance, Grand Canyon National Park is to be managed to:

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

Park significance statements capture the essence of a national park’s importance to our country’s natural and cultural heritage. Grand Canyon National Park is significant because it is an ecological refuge, it contains a diversity of geological features, it serves as a natural gene pool, it contains an extensive archeological record, it has rich tribal affiliations, it offers exceptional scenic vistas, and it provides one of the world’s premier river experiences.

PARK PLANNING DOCUMENTS AND OTHER RELEVANT PROJECTS

The purpose, need, and objectives of the South Rim visitor transportation plan are consistent with the direction of the 1995 *General Management Plan*. The transportation plan is also compatible with the objectives of other recent park planning documents. Other relevant documents and projects include the following:

- *South Entrance Road Improvements Environmental Assessment* (NPS 2007c) and “Finding of No Significant Impact”
- *Greenway Trail, Phase III, Environmental Assessment* (NPS 2002b) and “Finding of No Significant Impact”
- “Greenway Trail, Phase V, Environmental Assessment” (in progress)
- “Sign Plan for the South Rim” (in progress)

- *Bright Angel Trailhead Design Plan Environmental Assessment* (NPS 2007a)
- *Hermit Road Rehabilitation Environmental Assessment* (NPS 2006b) and “Finding of No Significant Impact”

Together with this document, these plans contribute to fulfilling the vision and objectives of the *General Management Plan* related to transportation on the South Rim, as outlined below.

General Management Plan

The 1995 *General Management Plan* provides general and programmatic direction and guidance for management of resources, visitor use, and general development within the park. The plan outlines vision statements for the entire park, as well as for the South Rim, that convey the essence of the park’s qualities and desired future conditions. Management objectives are derived from these vision statements.

The project area for the South Rim transportation plan is within both the development zone and the transportation subzone for the South Rim. Development zones include lands that are managed to provide and maintain facilities serving park managers and visitors, including areas where park development or intensive use may substantially alter the natural environment or the setting for culturally significant resources (NPS 1995b). Transportation subzones connect development zones and include primarily paved road corridors and trail corridors to a width appropriate for safe travel (NPS 1995b).

Grand Canyon Village, which is part of the development zone, includes the Village Historic District, Market Plaza, Canyon View Information Plaza, and the South Kaibab trailhead, along with other areas. The South Entrance Road and the South Entrance Station are part of the South Entrance Road Transportation Subzone; the Yaki Point Road from Desert View Drive to Yaki Point/South Kaibab Trailhead is part of the Desert View Drive Transportation Subzone; and Hermit

Road is part of the West Rim Drive Transportation Subzone.

As described under “Transportation Planning” (page 10), the *General Management Plan* proposed providing up to 2,600 parking spaces north of Tusayan and up to 1,225 parking spaces near Mather Point. Also, all day visitors would travel throughout Grand Canyon Village by foot, bicycle, or mass transit.

The alternatives considered in this visitor transportation plan and environmental assessment / assessment of effect would initiate or complete important elements of the transportation component of the *General Management Plan*, including the following (see Appendix A for more detail):

- an emphasis on mass transit, biking, and hiking as alternate means of transportation for park visitors in Grand Canyon Village by providing a convenient, attractive, and energy-efficient mass transit system serving the developed areas from Hermits Rest to Yaki Point
- consideration of parking facilities for day visitor use north of Tusayan, served by a shuttle bus system
- development of parking facilities for day visitor use and tour buses near Mather Point
- connection of the Tusayan and Canyon View Information Plaza parking facilities by way of a multi-use greenway trail
- improvement of the sense of arrival for visitors and establishing the Canyon View Information Plaza as the primary location for visitors to be oriented to the South Rim
- convenient multi-use trail and mass transit connections from the Canyon View Information Plaza to other visitor use areas

Because visitation has not increased to the extent previously forecast, the National Park Service no longer believes that all private

vehicle traffic associated with day visitors must be eliminated from the Village Historic District area between now and 2020 in order to substantially reduce congestion and improve the visitor experience. Removing 15%–25% of expected private vehicle traffic from this area by providing parking at Canyon View Information Plaza and north of Tusayan, along with increasing shuttle bus service, and providing expanded tour bus parking elsewhere in Grand Canyon Village, are expected to eliminate current parking congestion and to substantially improve traffic flow.

If visitation grows faster than anticipated during the life of this plan, and if it is necessary to meet transportation needs beyond the current planning horizon, additional transportation components proposed in the *General Management Plan* could be implemented, such as adding parking facilities and expanding mass transit service. Additional components of the *General Management Plan* or subsequent plans will be implemented as needed.

South Entrance Road Improvements

Grand Canyon National Park is working collaboratively with the Arizona Department of Transportation (ADOT) to increase roadway capacity on SR 64 to address the congestion and safety issues that can occur during the high visitor use season at the south entrance to the park. The project includes constructing two additional northbound lanes, approximately 1 mile long, and a 0.5 mile bypass lane. These improvements to SR 64 would complement the short-term improvements recently implemented at the South Entrance Station and would help sustain the improved visitor experience at the station.

Greenway Trail Phases III and V

The Grand Canyon Greenway is a series of proposed multi-use trails on both the North and South Rims of Grand Canyon National Park. As planned, the Greenway Trail will eventually total 73 miles. On the South Rim

the Greenway Trail is an important component of the park's plan to reduce vehicle use in the park. Phase III of the Greenway Trail would provide a pedestrian/bicycle/equestrian trail from Canyon View Information Plaza to the park boundary. At the park boundary, the Greenway Trail would connect with the trail from Tusayan that is reevaluated in this environmental assessment. Phase V would involve constructing an approximately 1-mile paved trail from Pipe Creek Vista (an overlook along Desert View Drive) to the South Kaibab trailhead, thus connecting the paved rim trail from Mather Point to the trailhead. Completing both of these phases would contribute to the park's overall trail system, providing expanded opportunities for nonmotorized travel.

Sign Plan for the South Rim

A draft sign plan has been prepared to improve signage and visitor wayfinding on the South Rim. (Wayfinding refers to the ways in which visitors orient themselves and navigate from place to place in the park.) The draft plan recommends a comprehensive signage program for vehicular travel routes, including revised and consistent place names that would be more easily understood by visitors, and more understandable directions to key features such as canyon views, the visitor center, visitor services, and overnight accommodations. The draft sign plan would be updated to be consistent with the recommendations of this South Rim visitor transportation plan following completion of this environmental assessment.

Bright Angel Trailhead Improvements

A design plan is proposed for the Bright Angel trailhead area, located within the Village Historic District. Proposed actions include developing new restrooms and a plaza area near the primary trailhead; enhancing trail connections and wayfinding to existing rim trails; and differentiating vehicle circulation from pedestrian zones within the parking area. Future phases could include hardening the parking

area surface and delineating parking spaces for approximately 79 vehicles.

Hermit Road Rehabilitation

Rehabilitation of the 7-mile-long Hermit Road is expected to begin in March 2008. Hermit Road is on the South Rim between the Village Historic District area and Hermits Rest. Proposed actions include widening and resurfacing the road; improving existing trails, overlooks, and shuttle bus stops; and constructing a multi-use trail.

SCOPING

As required by the National Environmental Policy Act, the National Park Service conducted scoping for this visitor transportation plan with park staff, the public, associated Native American tribes, and local, state, and federal agencies. These scoping activities and the comments provided are summarized below. More specific information on meeting locations, dates, and outcomes; the methods for contacting these groups; and the responses of individuals and groups is detailed in “Chapter 4. Consultation and Coordination” and Appendix B.

Internal Scoping

Internal scoping to identify NPS and USFS concerns began in February 2006 with a scoping session at the park attended by the park interdisciplinary team, park managers, and resource staff; staff from the National Park Service’s Denver Service Center; USFS representatives, and Federal Highway Administration (FHWA) representatives. An initial statement of the plan’s purpose and need, and objectives for the project, were discussed.

Preliminary alternative concepts and impact topics were discussed in May 2006, and a Value Analysis/Choosing by Advantages*

* Choosing by Advantages is a method of identifying the advantages of proposed actions and weighing these against the cost of the actions.

workshop was held in late February into early March 2007 to begin identification of the agency’s preferred alternative and to determine the range of action alternatives for evaluation in the environmental assessment / assessment of effect (NPS 2007h).

Interdisciplinary team meetings and discussions occurred throughout the planning process with NPS and USFS staff, as well as during internal reviews of this document.

Public Scoping

The National Park Service began public scoping in March 2006 with distribution of a letter that provided background information on transportation planning and asked for comments on draft purpose and need statements, project objectives, and preliminary alternative concepts. The letter was distributed to approximately 600 individuals and organizations, including state and federal agencies and associated Native American tribes. In addition, a press release announced the project, and the letter was posted on park and NPS websites. Four public open house meetings were held during April 2006 in Arizona and Nevada to provide information and elicit comments on the project.

The National Park Service received approximately 300 comments in response. The comments, which are summarized in Appendix B, were used to confirm the project purpose and need, to identify additional issues to be analyzed, and to develop the range of project alternatives. A predominant theme of the comments related to the need for transportation improvements on the South Rim while ensuring the protection of natural and cultural resources. Other comments related to types of transit service that should be provided, the need for improvements to the South Entrance Station, and preferences for balancing personal vehicle, tour bus, shuttle bus, and train transportation needs within the South Rim area.

In August 2006 a newsletter was distributed to approximately 600 individuals, organizations,

agencies, and tribes. It described the preliminary alternatives and requested information about issues and concerns. Approximately 55 comments were received and included topics such as visitation forecasting, traffic reduction assumptions in Grand Canyon Village, the need for incentives related to transit, maximizing the use of existing parking facilities, connectivity for bicyclists and pedestrians in the park transportation system, provision of additional tour bus access, and sharing parking facilities in Tusayan and at Mather Point (see Appendix B). Comments were reviewed and considered during refinement of the alternatives that are considered in this document.

Scoping with Agencies and Tribes

During public scoping in March 2006 and August 2006, the National Park Service contacted agencies with a particular interest in the project, including the U.S. Forest Service, the State Historic Preservation Office (SHPO), all associated Native American tribes, and the U.S. Fish and Wildlife Service (USFWS) to initiate consultation and solicit issues and concerns. As a cooperating agency, the U.S.

Forest Service has also participated in internal scoping and workshops, provided relevant resource data, and reviewed internal drafts of this document.

In March 2006 park staff initiated consultation under section 106 of the National Historic Preservation Act through contacts with the State Historic Preservation Office, the Advisory Council on Historic Preservation, and all associated Native American tribes. This was followed up with the newsletter and a project status report in August 2006. Park staff have held several meetings with individual tribes and with the State Historic Preservation Office to discuss the project (see “Chapter 4. Consultation and Coordination”).

The park initiated informal consultation under section 7 of the Endangered Species Act through contacts with the U. S. Fish and Wildlife Service, distribution of both the March 2006 scoping letter and the August 2006 newsletter, and holding several meetings to discuss the status of the project and the potential for impacts to federally listed endangered or threatened species (see Chapter 4 for details of these discussions).

ISSUES AND IMPACT TOPICS

An evaluation of the comments received during internal, public, and agency scoping resulted in the identification of issues related to park resources, socioeconomic conditions, and visitor experiences. The preliminary project proposal, as described in the March 2006 scoping letter, could result in the following types of concerns:

- New resource disturbance could occur on the South Rim and on national forest system lands near Tusayan from the development of parking areas, roads, and trails. This disturbance could cause adverse impacts to archeological and historic resources, vegetation, wildlife, visual resources, watersheds, air quality, and other resources.
- Impacts to cultural resources, including ethnographic resources associated with Native American tribes, could result.
- The economic vitality of gateway communities, such as Tusayan, could be affected by potential increases in air pollution, noise, traffic, vandalism, and demands on community services (i.e., sanitation, water supply, fire protection, law enforcement, emergency medical, and snow removal) as a result of new visitor parking and transit staging.
- Increased noise could further diminish opportunities for solitude in some locations, such as Mather Point.
- Area businesses and tour bus operators could be affected by changes in vehicular access and shuttle or transit operations, as well as traffic congestion in the park.
- The experiences of hikers, pedestrians, and other recreational park users could be affected by changing or moving parking farther from the rim, increasing the walking distance between parking and

the rim, and changes in access for people with disabilities.

- Visitor experiences could be affected by factors related to the plan, such as availability of information related to parking and shuttles.

Identified issues were used to help formulate alternatives and mitigation measures. Impact topics were then selected for detailed analysis based on these and other concerns and comments raised during scoping, as well as by the requirements of laws, regulations, and policies. The environmental consequences are used in the comparison of the alternatives. A summary of the impact topics and rationale for selection or dismissal are provided below.

IMPACT TOPICS ANALYZED IN DETAIL

Cultural Resources

The 1916 NPS Organic Act, the 1966 National Historic Preservation Act, as amended, the National Environmental Policy Act, and the *NPS Management Policies 2006* require the consideration of impacts on cultural resources, which include archeological sites, ethnographic resources, historic structures, and historic districts/cultural landscapes. NPS *Director's Order #28: Cultural Resource Management* (NPS 1998a) defines structures as material assemblies that extend the limits of human capability. They can include buildings, bridges, monuments, statues, and other items. Historic districts are defined as a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development (36 CFR, Part 60.3). A cultural landscape is a geographic area that includes both cultural and natural resources associated with a historic event, activity, or person; or exhibiting other cultural or aesthetic values (NPS 2006d). Historic districts can be formed by various combinations of structures, cultural

landscapes, and ethnographic and archeological resources. (Museum collections must also be considered per this guidance; however, the topic of museum collections is discussed in “Impact Topics Dismissed from Further Analysis”.)

Archeological Resources

The proposed project actions could affect both known and unknown archeological resources in the project area. Resources could either be affected directly as a result of construction impacts or indirectly through activities such as social trailing and erosion.

Historic Structures and Historic Districts / Cultural Landscapes

The project area includes the Grand Canyon Village National Historic Landmark District (Village Historic District); the Grand Canyon Depot National Historic Landmark; the Moqui Ranger Station (more commonly known as the Tusayan Ranger Station), which is listed on the National Register of Historic Places; and the Mather Point overlook, which may be eligible for listing on the National Register of Historic Places. Proposed project actions could affect these historic resources by introducing new features, or by potentially removing or modifying contributing historic features.

Ethnographic Resources

As defined by the *NPS Management Policies 2006*, ethnographic resources are the cultural and natural features of the park that are of traditional significance to traditionally associated peoples. These peoples are the contemporary park neighbors and ethnic or occupational communities that have been associated with the park for two or more generations (40 years), and whose interests in the park’s resources began before the park’s establishment. Of the 12 associated Native American tribes or bands that claim traditional association with the park, the Havasupai have identified the proposed project area as an area of concern for the tribe.

Natural Resources

Vegetation

Proposed activities, such as new roads, parking lots, and trail construction would result in new ground disturbance that would affect native vegetation in select areas on the South Rim, near the South Entrance Station, and at Tusayan. The plant communities likely to be impacted are mature piñon/juniper, conifer forest, and ponderosa pine forest. Tree removal would be necessary under all action alternatives. There is also potential for nonnative plant species to be introduced in areas of newly cleared soils.

Wildlife

Because proposed activities would disturb plant communities, wildlife habitat would also likely be affected. Impacts could include direct mortality during construction, species displacement from habitat following vegetation removal, habitat fragmentation (by construction of new parking lots, roads, or trails), change in habitat quality (as it pertains to breeding areas, foraging areas, and movement corridors), lighting changes, noise disturbance from construction and increased traffic, and trail use.

Special Status Species

Federally listed threatened or endangered species, species proposed for listing on the Endangered Species List, and species of particular concern to Grand Canyon National Park and Kaibab National Forest could be affected by proposed actions. A biological assessment is being prepared for this project to facilitate consultation with the U.S. Fish and Wildlife Service and will detail the potential for effects to federally listed species.

Soundscapes

The *NPS Management Policies 2006* require, to the fullest extent practicable, the protection, maintenance, or restoration of the natural soundscape resource in a condition unim-

paired by inappropriate or excessive noise sources. Proposed project actions would generate construction-related noise above existing ambient conditions in the project area and would involve long-term changes in traffic levels, vehicle types, parking areas, transit operations, facilities, and activities in the project area.

Visual / Scenic Resources

The NPS *Management Policies 2006* identify the conservation of scenic resources and the provision of opportunities for their enjoyment as fundamental principles for national park management. Changes to views of Grand Canyon vistas and the scenic character of key visitor areas such as Canyon View Information Plaza, the South Entrance Station, scenic overlooks, and parking areas could be affected by proposed project actions.

Social Resources

Transportation

Actions in the plan would affect visitor transportation to and within Grand Canyon Village. Impacts could include changes in parking for visitors in private vehicles and tour buses, changes in the modes of transportation visitors use to enter and travel within Grand Canyon Village, changes in traffic volumes and resulting traffic flow on roads, and changes in the shuttle bus system serving Grand Canyon Village. Transportation impacts would trigger related impacts to visitor experiences, as well as sound and air quality.

Visitor Access, Use, and Experience

The 1916 Organic Act and the NPS *Management Policies 2006* direct national parks to provide for public enjoyment. The South Rim of Grand Canyon National Park provides access to a variety of park features and sites, recreational activities, educational and interpretive opportunities, and access to other visitor services and amenities (such as restaurants, hotels, and shopping). The primary

objectives of this project encompass many visitor experience components, including enhancing visitor convenience by improving travel time; providing adequate parking to meet current and future demand; reducing delays at the entrance station; improving wayfinding elements to make it easier to locate destinations by all transportation modes; accommodating a wide range of visitor experiences; providing access to visitor amenities and services by several modes; and improving safety for visitors.

Socioeconomic Environment

Proposed alternatives could affect park visitation, length of visitor stay, visitor spending patterns, and numbers of employees, among other factors, both within the park and in local communities surrounding the park, such as Tusayan, Cameron, and Valle. Changes in these factors could result in impacts on these communities that might benefit or adversely impact economic health locally or in the region.

Gateway Communities and Adjacent Land Uses

Proposed alternatives include staging (parking) areas within the community of Tusayan. This community relies heavily on the tourism generated by Grand Canyon National Park. Any changes in visitation patterns, visitation numbers, or ways that visitors enter the park could affect this community. In addition, changes in visitation patterns could also impact other gateway communities such as Cameron, Valle, Williams and Flagstaff. Surrounding land uses could be subject to increased development pressure and traffic. Adjacent land uses taken into consideration in the analysis include national forest system lands.

Park Operations and Management

Park operations and management, including operational efficiency, staffing needs, inter-agency relations for both NPS and USFS law enforcement, maintenance, fee collections,

shuttle bus operations, and concessioner operations could be affected by actions proposed in the alternatives.

IMPACT TOPICS DISMISSED FROM FURTHER ANALYSIS

Resources and resource-related issues may be dismissed from detailed analysis in an environmental document if a resource is not present within the project area or within the area of potential affect or if the resource would not be measurably impacted by proposed actions. Measurable impacts are those that the interdisciplinary team determines to be greater than **minor** by the analysis process described in *Director's Order #12: Conservation Planning, Environmental Impact Analysis, and Decision-making* (NPS 2001b, sec. 2.9, and sec. 4.5(G)(4) to (G)(5)). For example, a minor effect would mean that a relatively small number of individuals or resources would be affected. The change would require considerable scientific effort to measure, be limited to relatively few individuals, be very localized in area, and have barely perceptible consequences (NPS 2001b). Therefore, the following impact topics were dismissed from further consideration and analysis, and the rationale for their dismissal is described below:

Cultural Resources

Museum Collections

As described in *Director's Order #24: NPS Museum Collections Management*, the National Park Service is custodian in perpetuity of irreplaceable and priceless museum collections that include objects, specimens, and archival and manuscript materials representing cultural and natural resources in the United States. Such museum collections are housed at the Grand Canyon; however, there are no structures within the area of potential effect that house museum collections. Therefore, this impact topic was dismissed from further analysis.

Indian Trust Resources

Executive Order 13175, "Consultation and Coordination with Indian Tribal Governments," requires that any anticipated impacts to Indian trust resources from a proposed project or action by Department of the Interior agencies be explicitly addressed in environmental documents. The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights, and it represents a duty to carry out the mandates of federal law with respect to American Indian and Alaska Native tribes. There are no Indian trust resources in Grand Canyon National Park. The lands comprising the park are not held in trust by the Secretary of the Interior for the benefit of Indians due to their status as Indians. Therefore, this impact topic was dismissed from further analysis in this document.

Natural Resources

Water Resources

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. The NPS *Management Policies 2006* provide direction for the preservation, use, and quality of water originating, flowing through, or adjacent to park boundaries. The National Park Service seeks to restore, maintain, and enhance the quality of all surface and ground waters within the parks consistent with the 1972 Federal Water Pollution Control Act, as amended, and other applicable federal, state, and local laws and regulations.

The proposed project area does not contain permanent surface waters, and is mostly dry, except for a few ephemeral streams that carry periodic runoff from snowmelt and storm events. Because ephemeral streams are dry for the vast majority of the year, impacts on water

quality from either construction activities or operations at the Canyon View Information Plaza, the South Entrance Station, or in Tusayan could only occur when water is present in the streams. During construction, sediment traps, erosion checks, and/or filters would be used before or following all culvert drain construction (if such drains were required) and in all other ditches before runoff left the project construction limits. After construction, surface rehabilitation and revegetation of disturbed land would reduce soil erosion and the potential for sediment transport in runoff during storm events. The main source of sedimentation after construction would be snow removal and the placement of sand for winter safety measures. The main source of chemical pollutants is from parked vehicles. Post-construction mitigation measures could include environmental filtration along roadway embankments, mechanical treatments, and sedimentation basins (see “Mitigation Measures” in Chapter 2). Therefore, impacts on surface water quality under any of the action alternatives would be short-term, negligible, and adverse. Under the no-action alternative no new construction would occur; however, cars would continue to park along the roadway and potentially contribute some untreated pollutants to surface runoff, resulting in long-term, negligible to minor, adverse impacts on water quality.

Where social trails have formed and where people have historically parked their vehicles on bare ground within the project area, soils have become compacted. Compacted soils are less likely to absorb stormwater, effectively creating impervious surfaces and allowing for greater runoff that transports sediment into the watershed, where impacts on water quality could occur. Under each of the action alternatives these social trails and informal parking areas would be rehabilitated and revegetated, resulting in reduced runoff rates and better infiltration of stormwater. This would result in long-term, minor, beneficial impacts on water quality. Under the no-action alternative, no rehabilitation efforts would occur related to social trails and informal

parking areas. While runoff from these areas may impact water quality, the overall impacts would be below water quality standards, within historical or desired water quality conditions, and occur only during storm events. As a result, short-term, negligible adverse impacts on water quality would likely occur.

The proposed increase in impervious surface at Canyon View Information Plaza, Tusayan, and other smaller locations would increase the total amount of stormwater runoff generated within the project area. To minimize the impacts from increased flows, the design of the transportation facilities would incorporate appropriate stormwater detention/retention systems and controlled release methods to ensure that the flows within these ephemeral streams would remain at or as near to pre-construction flows as possible. Mitigation measures are described at the end of Chapter 2. Therefore, negligible impacts would occur to flows within ephemeral streams under any of the proposed action alternatives. No increases in developed impervious surfaces would occur under the no-action alternative.

Because implementation of the proposed alternatives with mitigation would result in negligible adverse impacts on both water quality and streamflows, this impact topic was dismissed from further analysis in this document.

Floodplains and Wetlands

Executive Order 11988, “Floodplain Management,” requires all federal agencies to avoid construction within the 100-year floodplain unless no other practicable alternative exists. In accordance with NPS *Management Policies 2006* and *Director’s Order #77-2: Floodplain Management*, the National Park Service strives to preserve floodplain values and minimize hazardous floodplain conditions. No floodplains are located in the project area; therefore, this impact topic was dismissed from further analysis in this document.

Executive Order 11990, “Protection of Wetlands,” requires federal agencies to avoid, where possible, adversely impacting wetlands. NPS *Management Policies 2006* and *Director’s Order #77-1: Wetlands Protection* implement policies that strive to prevent the loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. No wetlands are located in the project area, and wetlands outside the project area would not be indirectly impacted; therefore, this impact topic was dismissed from further analysis in this document.

Geology, Topography, and Soils

According to NPS *Management Policies 2006*, geologic resources and features will be preserved and protected from adverse impacts of human activity, while allowing natural processes to continue. These policies also state that the National Park Service will strive to understand and preserve the soil resources of park units and to prevent, to the extent possible, the unnatural erosion, physical removal, or contamination of the soil, or its contamination of other resources.

Geology and Topography. Under the no-action alternative there would be no modification or alteration of the natural geology or topography within the project area. Under the action alternatives some modification of topography would be needed within the proposed footprint of facilities for parking, visitor services, and other related operations to produce the appropriate grades. However, these modifications would have negligible to minor impacts on topography within the project area since the area is mostly flat at the South Entrance Station, slightly sloped at Canyon View Information Plaza, and moderately sloped at Tusayan. Parking areas at the Tusayan site would be terraced into the slope, and topography would be undisturbed in large islands between parking areas. Excavation required to lay the appropriate base courses for these proposed facilities would be relatively shallow, and impacts on geologic features could be localized and negligible.

Basic mitigation measures described in Chapter 2 would be implemented to offset any adverse impacts. For example, measures would be taken to preserve the magnitude and area/extent of infiltration as much as is practical to preserve local groundwater recharge and karst processes, and drainage infiltration structures would not be placed over limestone subsurface that would cause increased dissolution of limestone. Because the impacts on geology and topography would be negligible to minor, this impact topic was dismissed from further analysis.

Soils. The action alternatives would result in the following ranges of total disturbance, depending on the alternative selected: 15 to 30 acres at Canyon View Information Plaza; 2 to 3 acres at the South Entrance Station; 2 acres at the lot D area; and 10 to 17 acres at Tusayan. When the acres of previously disturbed and restored lands are considered, the area of final disturbance at Canyon View Information Plaza is reduced to between 15 and 24 acres. Some limited disturbance could also occur near Mather Point, and in a few other locations.

Chapter 2 contains mitigation measures that would reduce impacts to soils. Soil impacts would occur on previously disturbed soils where possible, would be localized near already developed areas, and would be limited to a small area when compared to the overall size and remaining undisturbed acreage of Grand Canyon National Park. Stockpiling of materials would occur in previously disturbed areas, such as an asphalt batch plant at the park’s dump site. Mitigation measures such as silt fences, sand bags, and other control methods would also be implemented to offset any adverse impacts during construction and operation of the proposed facilities. After construction, soil contouring and revegetation would minimize potential soil erosion. Stormwater management systems would also be incorporated into the design of proposed facilities to control runoff as outlined above. Best management practices for soil and sediment control would be implemented.

Thus, short-term construction and long-term operation activities would result in minor adverse impacts to soils from new disturbance.

Under the no-action alternative long-term, minor, adverse impacts would result because the existing damage would continue within the project area. However, the area impacted is relatively small and not likely to expand. Long-term, minor, beneficial impacts on park soils would occur in the action alternatives with the reduction or elimination of existing damage from informal roadside parking and social trails as a result of new parking facilities. Because both the adverse and beneficial impacts on soils would be minor or less, this topic has been dismissed from further analysis in this document.

Air Quality

Grand Canyon National Park is classified as a mandatory Class I area under the Clean Air Act (42 USC 7401 et seq.). Under this most stringent air quality classification, it is mandated that the park be protected against degradation of air quality and an increase in air pollution. Furthermore, the Clean Air Act sets the goal of natural visibility conditions, free of human-caused haze. The NPS *Management Policies 2006* provide guidance for the protection of air quality under both the 1916 NPS Organic Act and the Clean Air Act to ensure the best possible air quality in parks and to actively promote and pursue measures to protect air-quality related values. Current air quality in the park is generally good, with pollution levels that fall below those established by the U.S. Environmental Protection Agency to protect human health. However, visibility is usually well below natural levels because of regional haze that originates far outside park boundaries and occasional wildland fires.

Under the no-action alternative air quality in the project area would continue to be influenced by the operation of vehicles, including visitor vehicles, commercial tour buses, and park-operated shuttle buses, particularly at

the South Entrance Station. Projected increases in visitation would likely degrade air quality at the South Entrance Station and at existing parking areas as a result of idling vehicles. The no-action alternative would result in long-term, minor or less, adverse impacts on air quality due to an increase of emissions from idling vehicles in the project area.

Under the action alternatives air quality would be affected by short-term construction-related activities and by long-term changes in vehicle emissions. Construction activities would result in short-term, negligible to minor, adverse impacts on air quality from vehicle emissions and the disturbance of soils. Mitigation measures to minimize these short-term construction-related impacts are discussed in Chapter 2.

An air quality analysis was undertaken to evaluate long-term changes to air quality due to changes in vehicle miles traveled by visitor vehicles, commercial tour buses, and shuttle buses under the action alternatives. Changes to vehicle miles traveled are dependent on changes in the number of park entries by visitor vehicles and commercial tour buses, changes to the length of these vehicle trips, and changes to park shuttle bus operations in the park. The park's air quality specialist calculated emissions for the various alternatives based on the park's 2000 emission inventory, including allowances for future improvements in emission and fuel standards, as used in the state's 2003 *Regional Haze State Implementation Plan* (Arizona Department of Environmental Quality 2003). Emissions of particulate matter (PM₁₀), nitrogen oxides (NO_x), carbon monoxide (CO), and volatile organic compounds (VOC, as represented by hydrocarbons) were calculated for visitor vehicles, tour buses, and park shuttle buses, based on projected vehicle miles traveled. All park shuttles were assumed to be fueled by natural gas, either liquefied natural gas (LNG) or compressed natural gas (CNG).

Based on the analysis, none of the action alternatives would increase the number of vehicles in the park or the vehicle miles traveled to an appreciable extent. The action alternatives would redistribute vehicles and vehicle miles traveled, and related air quality impacts, within the project area. However, localized changes in pollutant concentrations could occur in areas such as Tusayan, the South Entrance Station, Canyon View Information Plaza, or Grand Canyon Village as a result of this redistribution. These effects to air quality would be below or at the lower levels of detection and localized. Thus, pollutant levels would not substantially increase, resulting in long-term, negligible, adverse impacts on air quality in localized areas under all action alternatives (less than 50 tons per year for each pollutant).

Proposed actions such as the construction of new parking areas and shuttle stops and modifications to existing parking areas and shuttle stops would result in negligible to minor and beneficial to adverse impacts due to the introduction or removal of vehicle emissions related to vehicles idling at these locations. Mitigation measures to minimize long-term impacts to air quality are discussed in Chapter 2.

In summary, the no-action alternative would result in long-term, minor, adverse impacts to air quality from increased vehicle emissions in localized areas. The action alternatives would result in short-term, negligible, adverse impacts from pollutants and fugitive emissions related to construction activities and long-term, negligible to minor, beneficial to adverse impacts related to both decreases and increases in vehicle emissions. Therefore, this topic has been dismissed from further analysis in this document.

Night Sky

NPS *Management Policies 2006* indicates that natural lightscapes of parks, which are natural resources and values that exist in the absence of human-caused light, will be preserved to the greatest extent possible (sec. 4.10). To

protect natural darkness and other components of the natural lightscape in parks, the National Park Service is mandated to accomplish the following:

- restrict the use of artificial lighting in parks to those areas where security, basic human safety, and specific cultural resource requirements must be met
- use minimal-impact lighting techniques
- shield the use of artificial lighting where necessary to prevent the disruption of the night sky

At Grand Canyon National Park the relative clarity of the air, the high number of cloud-free nights, and the distance from cities combine to create a visual resource that is of national significance. As a result, the park has become a popular destination for stargazers in recent years. Ranger-led star programs are popular on both the North Rim and South Rim (Yavapai Observation Station). In addition, natural darkness is important to many wildlife species. Artificial light can disrupt predator-prey relationships, alter navigational cues, change mating behavior, disorient migrating birds, and change the timing of biological functions in animals as well as plants (Rich and Longcore 2006). Any potential impacts on wildlife or special status species will be discussed in Chapter 3.

Current conditions in the vicinity of Grand Canyon Village are substantially different than those in the backcountry. Facilities in and around Grand Canyon Village and Tusayan are currently visible from many points along the canyon rim, both north and south sides, but are probably not visible from within the canyon (below the rim). To minimize these existing impacts, Grand Canyon National Park has implemented lighting standards based on those of the Illuminating Engineering Society of North America to comply with safety and security requirements as well as dark sky protection. Based on this, long-term, negligible, adverse impacts on night sky would continue under the no-action alternative.

In the action alternatives the proposed addition of new parking lots at Canyon View Information Plaza and in Tusayan would provide parking for visitors during the day and night. New paths and some new buildings, such as the theater at Canyon View Information Plaza, would also be constructed. These new facilities would have lighting for evening hours. Because safety and security is a park priority, choosing not to light these areas would not be an option. Therefore, the National Park Service modeled the potential impacts that could result from the alternative (alternative D) with the largest number of parking spaces at Canyon View Information Plaza (1,190 spaces). This location has the most sensitivity to reflected light because Yavapai Observation Station is nearby, so it essentially represents the worst-case scenario for potential night sky impacts.

Using the results of this modeling and incorporating the proposed lighting mitigation measures (see Chapter 2) and design features for alternative D would result in long-term, negligible to minor, adverse impacts on the night sky. This means that on the North Rim and South Rim changes in sky brightness in the upper sky would be undetectable to humans but perhaps measurable by instrument. Changes in sky brightness at the horizon in the direction of the project may be apparent to a human observer on the South Rim but may only be detectable to a human observer on the North Rim. Additional point sources of light may be visible from points along the North Rim but would most likely be visible in the project area and at a few points along the South Rim. The Milky Way and other features of a natural night would be equally as visible and contain the same degree of detail.

The other action alternatives would have fewer impacts on the night sky. Alternative C, which would place most of the parking in Tusayan (920 spaces at Tusayan and 400 spaces at Canyon View Information Plaza) would have the least impact on the night sky in the park. The preferred alternative (alternative B), which would place up to 900

parking spaces at Canyon View Information Plaza and up to 400 spaces in Tusayan, would be less than the modeled alternative because of fewer parking spaces in the park.

Impacts are also possible from moving and stationary vehicle headlights on roadways and in parking areas. To minimize these impacts, most of the new parking facilities in the action alternatives would be away from the South Rim. Where parking remains at Mather Point, parking spaces would be oriented to reduce headlight glare in the direction of the North Rim. In alternatives B and D existing parking at Mather Point would be removed and the new South Entrance Road sections would be located away from the rim at a lower elevation than the current road. Parking for persons with disabilities would be located approximately 200–400 feet from the rim, south/southwest of the existing South Entrance Road. A vegetative barrier would be established in between the parking and the rim to minimize the visibility of headlights from the North Rim and other locations along the South Rim. Other mitigation measures that would be employed are listed in Chapter 2. Because of these mitigation measures, adverse impacts from moving vehicles would be long-term negligible to minor.

In summary, the no-action alternative would result in long-term, negligible impacts to night sky due to implementation of existing lighting guidelines. Because design and lighting mitigation measures would be implemented by the National Park Service for new stationary and moving light sources, the action alternatives would result in long-term, negligible to minor, adverse impacts on the night sky. Therefore, this impact topic was dismissed from further analysis in this document.

Prime and Unique Farmlands

The Farmland Protection Policy Act of 1981, as amended, requires federal agencies to consider adverse effects to prime and unique farmlands that would result in conversion of these lands to non-agricultural uses. Prime or unique farmland is specifically defined as soil

that produces general crops as common foods, forage, fiber, and oil seed; unique farmland produces specialty crops such as fruits, vegetables, and nuts. This proposed project's locations and surrounding lands have been evaluated by appropriate park technical area specialists and by specialists from the Natural Resources Conservation Service. Based on their assessment, the project area is not considered prime or unique farmland. Therefore, this topic was dismissed from further analysis in this document.

Wilderness

Most of the park has been recommended for wilderness designation. Until Congress formally acts on this recommendation, NPS policies require that these areas be managed under the provisions of the Wilderness Act. However, the project area does not overlap recommended wilderness and is wholly within the developed area of the South Rim. Proposed actions would therefore not directly affect wilderness character or wilderness values. Indirect effects to wilderness and to visitors accessing recommended wilderness areas below the canyon rim (such as along the South Kaibab trailhead below Mather Point and Yaki Point, or visitors below Yavapai Observation Station) are possible due to the potential for increased noise from tour bus operations at these locations. However, it is anticipated that noise from tour buses near

these areas would not be noticeable to visitors below the rim. The South Kaibab Trail is designated as a corridor trail in the 1995 *General Management Plan* and is a transition from the developed areas to the backcountry. Because wilderness character and wilderness values would not be directly affected by any proposed action and the potential for indirect effects are primarily related to noise and visitor experience (two impact topics being analyzed in detail in Chapter 3), this topic was dismissed from further detailed analysis in this document.

Social Resources

Environmental Justice

Executive Order 12898 requires consideration of impacts on minority and low-income populations to ensure that these populations do not receive a disproportionately high number of adverse or human-health impacts. Each alternative would affect everyone equally and would not disproportionately impact minority or low-income populations because transit would be voluntary and would not affect low income families to a greater extent, improvements in the transportation system would be available to all visitors, and impacts to tribes and all other minority populations would be equivalent to all other visitors. Therefore, this impact topic was dismissed from further analysis in this document.

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