

Wupatki

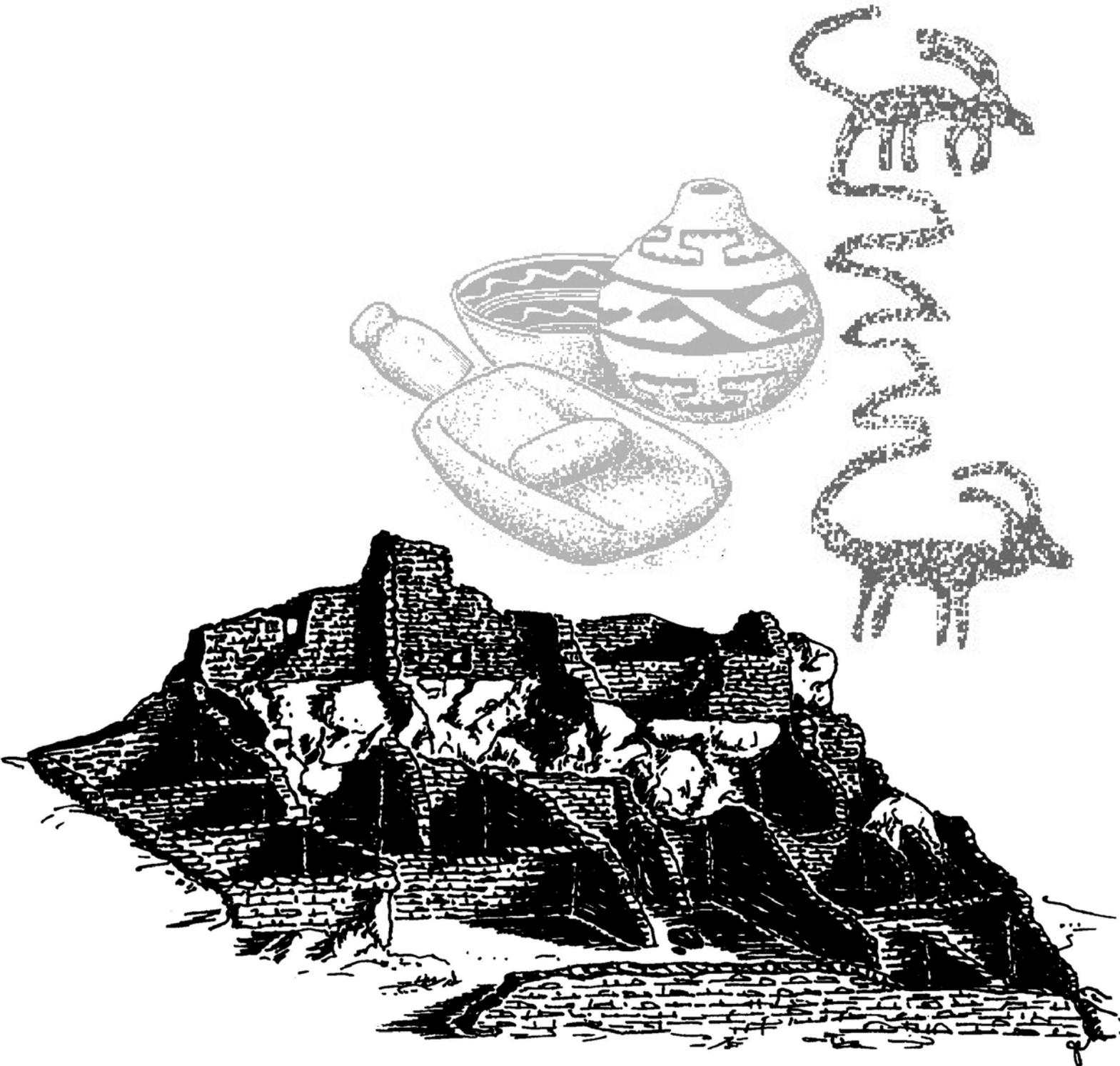
National Monument • Arizona

National Park Service
U.S. Department of the Interior



Final Environmental Impact Statement General Management Plan

November 2002



Final Environmental Impact Statement General Management Plan

WUPATKI

National Monument • Arizona

EXECUTIVE SUMMARY:

This general management plan will guide the management of the Wupatki National Monument for the next 10 to 15 years. Five alternatives were considered: a no-action and four action alternatives, including the National Park Service (NPS) preferred alternative. The preferred alternative would include important resources and landscapes north of the park within park boundaries, retain existing motorized sightseeing, focus on existing major visitor use areas, provide visitor orientation at the existing visitor center and at a new contact station at the north entrance, and diversify visitor experiences via new trails, new interpretive media and activities, and guided hikes to some cultural sites. The environmental impact statement assesses impacts to archeological resources; historic character of built environment; ethnographic resources; natural systems and processes; threatened, endangered, and sensitive species; wetlands, floodplains and riparian habitat; visitor experience of park resources; park neighbors; local, state, and tribal land management plans; land/resource managing agencies; and operational efficiency.

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SUMMARY

The purpose of the general management plan is to provide a comprehensive direction for resource preservation and visitor use and a basic foundation for decision making for the monument for the next 15 to 20 years. The plan prescribes the resource conditions and visitor experiences that are to be achieved and maintained in the park over time. The clarification of what must be achieved according to law and policy is based on review of the park's purpose, significance, and special mandates.

The plan will outline the kinds of resource management activities, visitor activities, and development that would be appropriate in the monument in the future. However, the plan will not propose specific actions or describe how particular programs or projects will be implemented or prioritized. More detailed site-specific analysis of alternatives and specific proposals will be required in subsequent phases of planning before any major federal actions are undertaken. Four action alternatives and a no-action alternative are presented, and the impacts of implementing those alternatives are analyzed. A brief summary of the major actions under the alternatives, as well as the actions that are common to all alternatives and the impacts thereof, are presented below.

The Next Step

This Final Environmental Impact Statement/General Management Plan, which includes agency and organization letters and response to all substantive comments, has been distributed. After distribution of this final plan, there will be a no-action period of at least 30 days. After this no-action period, a final plan will be selected and approved by the

National Park Service and a Record of Decision will be issued to document the approval.

Actions Common to All Alternatives

Within the broad parameters of the park mission and mission goals, various approaches to park resource protection, use and development are possible. Management zones are the tool this plan uses to identify how different areas of the park could be managed to achieve a variety of resources and social conditions to serve recreation and resource protection needs. Each zone specifies a particular combination of physical, biological, social and management conditions. Nine possible zones were described that could be appropriate to various areas in Wupatki National Monument. They are the resource preservation zone, the extended learning zone, the guided adventure zone, the hiking zone, the motorized sightseeing zone, the motorized sightseeing-semi-primitive zone, the natural area recreation zone, the overview zone, and the administrative zone.

Common to all alternatives are short-range planning efforts already underway to meet immediate operational needs that will continue to exist regardless of the alternative selected. These are identified in National Park Service-wide initiatives, in Flagstaff Area National Monuments planning documents, such as the Strategic Plan, Annual Performance Plan, Comprehensive Interpretive Plan, Fire Management Plan, and Resources Management Plan, and in local action plans to resolve safety, accessibility, facility maintenance, and similar issues.

All alternatives presented recognize the opportunity for partnerships, for the protection of cultural and natural resources, with the USFS, the State of Arizona, and private landowners. USFS lands south of Wupatki will continue under USFS management, in accordance with decisions reached in the USFS Flagstaff Lake Mary Ecosystem Analysis (FLEA) planning process. The proposed expansion to the north will involve state and private lands now within the Coconino Plateau Natural Reserve Lands (CPNRL).

Planning and design of new wayside exhibits and museum exhibits is in progress, in accordance with the Flagstaff Areas Comprehensive Interpretive Plan, to improve visitor understanding and appreciation of Wupatki resources.

New wayside exhibits will replace and expand the existing system of interpretive signs along FR545 and at major existing visitor use areas. A new storage building will be constructed at New Heiser specifically to address the hantavirus problem and to centralize maintenance equipment storage at Wupatki. Upon completion of this new facility, hantavirus-prone storage buildings/trailers will be removed.

NPS plans to restore historic conditions at Heiser Spring, through removal of containment and diversion structures, restoration of original contours, and planting of riparian vegetation.

The backcountry of Wupatki National Monument (defined as all areas beyond designated roads, trails, or developed facilities within the monument) is closed to unguided entry. The closure will be made permanent through the formulation and publishing of a special regulation. Although various alternatives may allow guided activities to continue in the park backcountry, there will be no unguided access.

No-Action Alternative: Existing Conditions

This alternative describes the continuation of current management and trends; it serves as a basis for comparing the other alternatives.

Visitors to Wupatki National Monument generally arrive from the south via US89 and FR545, after passing through Sunset Crater Volcano National Monument. Most receive orientation to the monuments at Sunset Crater Volcano visitor center. This road connection between the two monuments facilitates the visitor's ability to connect the cultural and natural history of the two areas.

Visitor use is concentrated at the Wupatki visitor center, four of the park's primary archeological areas (Wupatki Pueblo, Wukoki, Lomaki/Box Canyon, and Citadel/Nalakihi), and the picnic/viewpoint area at Doney Mountain on USFS land. These areas were specifically developed for interpretive use with short trails and interpretive media.

The vast majority of visitors interact with these sites on their own with no on-site NPS presence. Two types of guided activities are offered into the closed areas. Discovery hikes are generally a half-day excursion and follow routes consistent with resource protection concerns. Overnight hikes to Crack-in-Rock Pueblo are offered on eight weekends in April and October.

Under the No-Action alternative, a large number of archeological sites open to the public would continue to experience adverse impacts due to surface disturbance, inadvertent damage, soil compaction, trampling, collecting and vandalism. Impacts from visitation also have adverse impacts on the ethnographic resources. Vegetation and wildlife habitat within the monument will continue to recover from former

ranching activities. Occasional incidental trampling of vegetation likely has minor impacts on plant species. A number of unique habitats exist within the monument, and most of them are in the closed backcountry, which protects them from most impacts. The no-action alternative would likely have negligible to minor impacts on existing wetlands of the Little Colorado River, floodplains, and riparian resources. Restoration of historic conditions at Heiser Spring would have moderate beneficial impacts to wetlands and riparian resources.

Main roads providing access to the park will see a likely increase in visitor and commuter traffic, which may result in additional congestion and accidents. Maintenance needs would increase. Increased use of roads leading to the park would increase the difficulties that already exist in protecting park resources.

Alternative 1: Limit Motorized Sightseeing and Focus On Extended Learning

This alternative would enhance the protection of cultural resources by significantly changing the way people visit and experience the park. With increased emphasis on longer and more intensive educational programs, Wupatki would become a destination for many visitors, rather than a short drive-through experience.

Visitors would enter the park via existing FR545 from Sunset Crater Volcano, proceed only as far as the existing visitor center-Wupatki Pueblo area, and return via the same route. A short spur road to Wukoki Pueblo would be maintained. The north entrance and other entry points would be eliminated. FR545 would be gated west of the visitor center to increase resource protection. Significant resources and landscapes north of the park would be preserved through

partnerships with adjacent landowners or possible park boundary expansion. The proposed boundary expansion to the south would include that portion of the park entrance road that is on National Forest lands, allowing the NPS to manage access to the western half of the park.

Fewer archeological sites would be open to unguided or self-guided use than at present, resulting in less impact on those sites; however, there would be increased guided tours to cultural sites that have not been stabilized or previously developed for visitation.

New interpretive programs would be developed to present a broader range of educational and interpretive opportunities than are available at present. Guided programs, both on foot and by vehicle, would be added for those with more time and interest.

The existing visitor center and associated housing/maintenance area would be retained. A small primitive campground would be developed for use only in conjunction with sponsored park programs.

Closure of the northern portion of FR545 would have a major impact on how visitors see the park, resource protection and park operations. Elimination of the drive-through could have a moderate adverse impact on neighbors, other land and resource managers and residents of the Navajo Nation who use that road for access to the north. For visitors, closing the road would provide a greater opportunity to experience natural soundscapes. More kinds of ecological resources would be open to the public. Eliminating the drive-through would decrease unregulated use and access to the park, affording greater protection of park resources.

Providing special learning opportunities for visitors with more time and interest could have the effect of decreasing the

numbers of visitors to some areas. This would have a beneficial effect on archeological resources because fewer sites would be open to visitation and most visitation would be restricted to guided tours. Other areas would have more concentrated visitor use, leading to greater impacts the sites in those areas. Fewer visitors at sites would have beneficial effects on ethnographic resources by increasing their protection from vandalism. Updated interpretive media and guided tours would increase visitor education.

The proposed road system changes would eliminate most traffic through half the monument, which would have long-term beneficial impacts to most natural resources. Minor impacts could result from realignment of the Wukoki Pueblo access road. Increased extended learning areas around the Heiser Spring and Citadel-Lomaki could have some adverse impacts on pronghorn, grasslands, and several sensitive species. Overall, this alternative would result in long-term negligible to minor impacts on most sensitive species and unique habitats

Alternative 2: Emphasize Motorized Sightseeing and Resource Protection through On-Site Education

This alternative emphasizes improved vehicle access to more of the park for diverse motorized sightseeing experiences and ensures the presence of park personnel at popular use areas for visitor contact and site protection purposes. The long-term integrity of archeological sites and natural resources would be enhanced by on-site personal orientation and education. In this alternative, there is no visitor center. Instead, park staff would interpret park resources where specific features and sites can be seen and/or visited. FR545 would remain open to 24-hour, two-way

traffic. A new contact station and associated wayside exhibits would be built at the north entrance from US89. The access roads and parking lots to sites would be gated at night to deter after-hours visitation. The proposed boundary expansion to the south would include that portion of the park entrance road that is on National Forest lands, which would allow the NPS to manage access to the western half of the park.

Existing roads to the Crack-in-Rock area and northern expansion lands would be gated and maintained in primitive condition. They would be used for escorted four-wheel-drive and/or mountain bike scenic tours to interpret a broader range of park themes. The road to Black Falls Crossing would be opened to park visitors, and existing primitive roads in the north boundary expansion would be used for guided tours along a scenic backcountry loop.

One of the largest impacts of this alternative will be on visitor use. A greater number of archeological sites would be open to visitors. However, there would be fewer opportunities for intimate experiences, because most resources would be experienced by vehicle. More restrictive uses of lands previously under other jurisdictions would decrease the ability of visitors to experience resources related to park significance.

Changing modes of visitation will have a beneficial effect on resources. Fewer archeological resources would be impacted by human use. There would be some benefits to natural systems, as they would continue to recover from historic land uses. Impacts of building new support facilities would be very localized, minor and offset by promotion of appropriate visitor behavior. Some minor adverse impacts would result from increased vehicular traffic, and the associated noise and disturbance.

The elimination of guided hikes and dispersed hiking to Crack-in-Rock would benefit a large area of sensitive plant habitat.

Operational efficiency will be impacted in this alternative by the modified use of the existing visitor center and the dispersal of park staff to day-use locations. There would be increased demands of the park infrastructure, including park roads and facilities.

Alternative 3 (Preferred): Preserve Sensitive Park Resources while Diversifying the Range Of Visitor Experiences

This alternative was developed to ensure the preservation of sensitive park resources while providing a greater diversity of visitor experiences and locations.

FR545 would remain open to 24-hour, two-way traffic. In order to ensure that southbound visitors are properly oriented before encountering park resources, a new contact station and associated wayside exhibits would be built at the north entrance from US89. Motorized sightseeing would remain the same, focusing on existing developed areas. The access roads and parking lots at Wukoki, Lomaki/Box Canyon, and Citadel/Nalakihi archeological areas would be gated at night to deter after-hours visitation.

This alternative would improve upon existing visitor educational opportunities at popular use areas, and provide guided access into undeveloped areas of the park. The existing visitor center would remain open for the purpose of resource interpretation. Opportunities for independence and solitude would be provided by new self-guided trails and interpretive activities. A new trail would

be constructed into the grassland ecosystem on Antelope Prairie. For visitors desiring a longer hike and greater opportunities for solitude, a trail would be constructed from the visitor center to Wukoki.

Guided programs would be offered to a wide variety of cultural sites in the Extended Learning and Guided Adventure Zones, and occasional escorted activities would occur along existing administrative roads, including ranch roads into the partnership/expansion area to the north.

The Wukoki spur road would be realigned to meet FR545 north of the visitor center. The current Wukoki parking area would be pulled back from the site, and the access trail would be lengthened accordingly.

The overall impacts of this alternative to visitor experience of the park resources would be beneficial. The new visitor contact station and access to two new trails would expand opportunities and enhance interpretation, even though many of the parks' resources would be off limits to visitation.

This alternative would provide overall beneficial impacts to both cultural and natural resources. Archeological resources would benefit because visitors would be restricted to stabilized front country sites. There would be some adverse impacts on the historic integrity of prehistoric and Mission 66 landscapes. The natural systems would have some benefits, as the natural systems continue to recover from historic land uses. The construction of a new visitor orientation station at the north entrance would permanently impact a local area of habitat for the Wupatki pocket mouse and pronghorn. Increased human presence in a larger area around the Citadel and Lomaki Pueblos and along the new grassland trail would have

moderate adverse impacts to native grassland integrity and wildlife in the western half of Wupatki.

Changes resulting from implementation of this alternative would have an overall beneficial impact on operational efficiency. Most impacts would be in the form of increased staff to operate the new contact station, perform maintenance on the facilities and trails, and see to increased resource preservation needs.

Alternative 4: Emphasize Integrated Story Between The Parks And Minimize Development

This alternative would restructure the way visitors gain access to and experience both Wupatki and Sunset Crater Volcano National Monuments to provide a more unified interpretive story and greater protection for natural and cultural resources. Visitors would enter only at Sunset Crater Volcano. The portion of FR545 from the current Wupatki visitor center to US89 would be converted to a one-way road; the north entrance at US89 would be converted to exit-only. The visitor function and much of the building would be removed from Wupatki. Expanded facilities, services, and visitor orientation would be concentrated at Sunset Crater Volcano. As visitors travel through Wupatki, they would encounter fewer facilities and more pristine resource conditions. The Black Falls Crossing Road and the portion of FR150 within the park boundary would be closed and reclaimed.

The goals of this alternative are to provide an integrated story for Wupatki and Sunset Crater Volcano while reducing duplicate facilities, minimizing development at Wupatki, and preserving outstanding park values.

This alternative takes advantage of current visitor use patterns to lead

visitors through a sequential learning experience that presents a unified picture. By concentrating visitor use in previously developed areas, minimizing new developments, and removing unnecessary structures, this alternative would preserve and enhance the minimally altered prehistoric cultural landscape, extensive grassland antelope habitat, seeps and springs, spectacular scenic views, and other key values that define Wupatki National Monument.

The proposed boundary expansion to the south would include that portion of the park entrance road that is on National Forest lands, which would allow the NPS to manage access to the western half of the park.

The Wukoki spur road would be realigned to meet FR545 north of the visitor center. The parking area would be pulled back from the site. For visitors wishing a longer hike and greater opportunity for solitude, a new primitive trail would be developed from the current visitor center to Wukoki.

Visitor opportunities at Wupatki would decrease with removal of the visitor center/museum; however, extended learning would still be provided at each of the existing day use sites. Guided overnight hikes to Crack-in-Rock would be discontinued, but guided vehicle tours would be offered in their place, using existing primitive roads.

This alternative has a moderate impact on visitors' ability to experience a full range of resources related to park significance. Elimination of access to Black Falls Crossing Road removes some significant portions of the Wupatki story. However, guided trips to Crack-in-Rock add opportunities to see sites that have not been previously developed for visitation. Changing the access, however, provides a more primitive setting for visitors.

In comparison to existing conditions, Alternative 4 would have a major beneficial effect for most resources, because visitation would be restricted to stabilized front country sites and Crack-in-Rock Pueblo. The creation of a new trail to Wukoki would offset these benefits slightly. There would be some adverse impacts on the historic integrity of prehistoric and Mission 66 landscapes. The natural systems would have some benefits, as the natural systems continue to recover from historic land uses. Abandoning the Black Falls Crossing Road would have beneficial impacts by decreasing impacts to sensitive plant species and road mortality to the Wupatki pocket mouse.

The elimination of guided hikes and dispersed hiking to Crack-in-Rock would benefit a large area of sensitive plant habitat.

Conversion of FR545 to a one-way road would have a major, long-term, adverse impact on the residents living on the CPNRL north of the park, some residents living in Alpine Ranchos, and those living across the Little Colorado River on the Navajo Reservation, because their access from US89 would be restricted and rerouted through Sunset Crater.

Boundary expansion could have a moderate, long-term, adverse impact on access by American Indian tribes. Closure of the Black Falls Crossing Road and increased congestion and contact with others could have a moderate, long-term adverse impact on American Indian tribes seeking traditional cultural uses.

This alternative would dramatically reduce and streamline park operations, but would have a major adverse impact on the effectiveness of park operations. There would be a major long-term benefit resulting from the more restricted access and the conversion of a major portion of the park from a drive-through 24-hour use to day use only. There would be a major adverse effect to operational efficiency with the removal of many of the existing support facilities and the transfer of staff to distant work locations. There would be a greater need for improved communication, and vehicle costs would increase. The long-term beneficial impacts would include a reduction in overall facility and utility costs. Removal of the facilities would positively affect the cultural landscapes and the park's natural resources.

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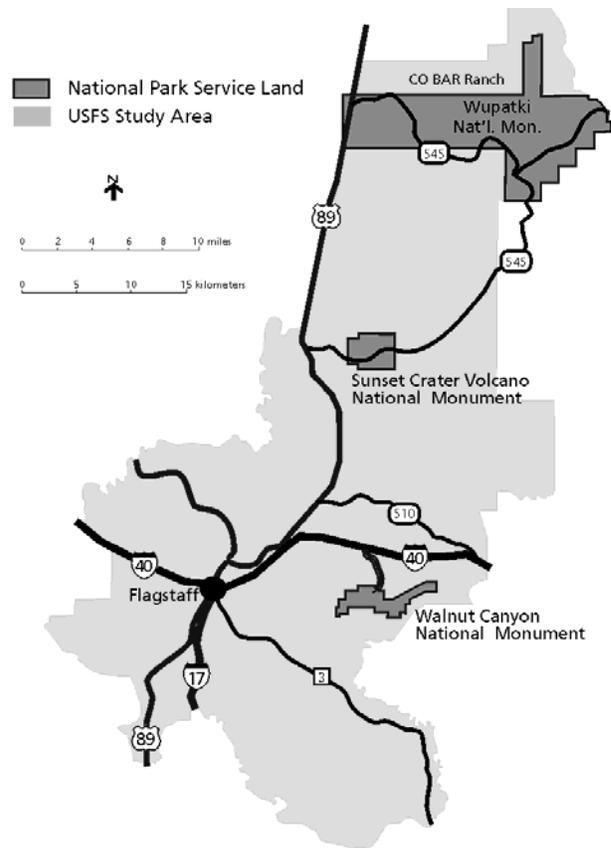
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PURPOSE OF AND NEED FOR THE PLAN

PURPOSE OF THE GMP

The purpose of the general management plan (GMP) is to clearly define a direction for resource preservation and visitor use at Wupatki National Monument (NM). Wupatki is currently operating under a Master Plan approved in June 1982. It is the intent of this planning effort to provide a comprehensive direction for the next 10 to 15 years and to arrive at that direction through public participation. In fact this draft GMP is the result of extensive interaction with interested publics and affected government agencies begun in June 1996 (see Description of Scoping Process and Consultation and Coordination sections).

The approved plan will provide a framework for proactive decision making, including decisions on visitor use, natural and cultural resources management, and park development, which will allow park managers to effectively address future opportunities and problems. The general management plan will prescribe the resource conditions and visitor experiences that are to be achieved and maintained in the park over time. The clarification of what must be achieved according to law and policy is based on review of the park's purpose, significance, special mandates, and the body of laws and policies directing park management. Management decisions to be made where law, policy, or regulations do not provide clear guidance or limits will be based on the purpose of the monument, the range of public expectations and concerns, resource analysis, an evaluation of the natural, cultural, and social impacts of alternative courses of action, and consideration of long-term economic costs.



Combined USDA - USFS Flagstaff/Lake Mary Ecosystems Analysis and DOI - NPS Flagstaff Area National Monuments General Management Plan Study Area

Some of those conditions and experiences are specified already in law and policy, whereas others are open to debate and must be determined through planning. Based on determinations of desired conditions, the plan will outline the kinds of resource management activities, visitor activities, and development that would be appropriate in the monument in the future. However, the plan will not propose specific actions or describe how particular programs or projects will be implemented or prioritized. Those decisions will be deferred to more detailed

PURPOSE AND NEED

implementation planning, which will follow the broad, comprehensive decision making outlined in the general management plan.

NEED FOR THE GMP

There were many issues and concerns that precipitated the need for a GMP. Administratively, the three parks of the Flagstaff Area (Wupatki, Sunset Crater Volcano, and Walnut Canyon National Monuments) were combined under one superintendent in 1990. A boundary expansion of Wupatki (169 acres) was added as part of the 1996 National Park Service (NPS) Omnibus Bill. Visitation has increased demands on park resources, resulting in documented loss of some resources through erosion, vandalism, theft, and irreversible damage to petroglyphs.

Nationwide demographics and traffic patterns (Sunbelt migration, international visitors, aging of America, shorter vacations year-round) have increased peak visitation seasons and extended shoulder seasons. Flagstaff growth and housing development is occurring near park boundaries, impacting the visitor experience and remote character of the monument and increasing incompatible adjacent land uses. Traffic levels are increasing adjacent to and through the park; views are intruded on by mining operations, housing developments, and divided highways; and noise is increasing.

Wupatki National Monument protects thousands of archeological sites-the entire monument is on the National Register of Historic Places. Park lands also provide critical pronghorn habitat. However, park boundaries incorporate only a small portion of the cultural features and natural systems (especially grasslands) that are central to the park's purpose. Numerous traditional cultural

properties have been identified by affiliated tribes, and concerns exist about public use of some sites.

Multiple roads enter Wupatki, and the inability to physically close them at night makes protection of cultural resources difficult and increases monetary and staffing demands (road maintenance, residences, 24-hour emergency response, etc.). The Wupatki visitor center, where most orientation and interpretation occur, is miles from the park entrances. The 1960s exhibits are outdated, inaccurate, and/or obsolete. The visitor center provides limited collections storage space. In some cases, facilities, parking areas, and roads were built almost on top of archeological sites.

In 1998, the staff of the Flagstaff Areas undertook an in-depth review and analysis of staffing needs for the three monuments and for support positions in headquarters. This process identified critical positions in visitor services, protection, resource management, maintenance, and administration that are integral to accomplishing the purposes of the monuments and the National Park Service mission. This review evaluated existing conditions and personnel shortfalls in terms of National Park Service abilities to provide for a safe, educational visitor experience and for adequate protection and preservation of park resources. A number of positions were identified as critical to maintaining operations at acceptable levels, for both current and future needs. These needs were identified prior to the general management planning process and are incorporated into the alternatives developed.

Reaffirm What Must Be Achieved

Each unit in the National Park System is guided by agency-wide and park-specific laws, regulations, and policies.

Understanding this guidance and how it affects each park's mission is fundamental to planning for the park's future. This section highlights the mission (expressed as park purpose, significance, and mission goals) and legal and policy mandates that guide management of the park. These mission and mandate statements define the sideboards within which all management actions must fall. All alternatives to be considered in the general management planning effort must be consistent with and contribute to fulfilling these missions and mandates.

PARK MISSION

Wupatki National Monument was established by Presidential Proclamation No. 1721 on December 9, 1924, as a two-piece area to preserve the Citadel and Wupatki prehistoric pueblos. It was subsequently enlarged by Presidential Proclamation No. 2243 on July 9, 1937, and was reduced by Presidential Proclamation No. 2454 on January 22, 1941. Public Law 87-134 in 1961 enlarged the area again, to preserve additional archeological resources. Public Law 104-33, the Omnibus Parks and Public Lands Management Act of 1996, revised the boundaries yet again. The monument now comprises 35,422.13 acres adjacent to the Coconino National Forest, the Navajo Indian Reservation, and private lands.

The following purpose statement is based on and represents the agency's interpretation of the above-mentioned legislative mandates and National Park Service policies. Purpose statements are the most fundamental criterion against which the appropriateness of all plan recommendations, operational decisions, and actions are tested.

- To preserve, protect, care for, and manage the ancestral Hopi sites, other prehistoric remains, and cultural and natural resources of

historic, ethnographic, and scientific interest located within Wupatki National Monument.

Park significance statements capture the essence of the park's importance to the nation's natural and cultural heritage. Understanding park significance helps managers to make decisions that preserve the resources and values necessary to the park's purposes. The following significance statements have been developed for the park:

- Wupatki is the only known location in the Southwest where physical evidence from at least three archeologically separate ancestral Puebloan cultures is found together in a number of archeological sites. According to Puebloan oral tradition, Wupatki represents one ancestral Puebloan group.
- The natural and cultural resources within the monument are known to be significant to contemporary native tribes, as evidenced by oral history and continuing practices and the archeological record.
- Many prehistoric and historic sites are well preserved and have a high degree of cultural resource integrity.
- Historic material reveals a rich record of human endeavor left by Navajo families over a period of 150 years and continuing through the present day and by ranchers, sheepherders, prospectors, Mormons, the Civilian Conservation Corps, park custodians, and the Museum of Northern Arizona. Their activities, combined with environmental changes, have created complex cultural landscapes within the monument.
- Wupatki protects one of the few native grasslands in the Southwest that is not being domestically grazed, and its integrity is essential to

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perpetuating native species and natural ecosystem processes.

- The setting of Wupatki, undeveloped and largely unpolluted, provides the exceedingly rare opportunity to see more than 60 miles, view the night sky, and encounter quiet-an experience comparable to that experienced by prehistoric peoples. These qualities are a baseline against which change can be monitored, managed, and mitigated.

MISSION GOALS

Mission goals were developed for the three units in the Flagstaff Area National Monuments Strategic Plan (NPS 2000). They state that:

- Natural and cultural resources and associated values within the three Flagstaff Area monuments are protected and maintained in good condition and managed within their broader ecosystem and cultural contexts.
- Flagstaff Area National Monuments actively pursue acquisition of natural and cultural resource data through NPS staff and funding channels and through association with the scientific community. Current and complete scientific findings are available for communication to partners, integration into the interpretive program and use in the management decision process.
- Facilities, services, and recreational opportunities offered are in keeping with site-specific requirements of resource protection and visitor enjoyment. Safety measures are an integral part of the visitor experience.
- Through on-site and off-site education, the Flagstaff Area National Monuments promote visitor understanding of park purpose and significance, enhance appreciation

and enjoyment, and promote an attitude of personal responsibility.

- Flagstaff Area National Monuments use current management practices, systems, and technologies to accomplish their missions.
- The Flagstaff Area National Monuments increase their capabilities through initiatives and support from other agencies, organizations, and individuals.

SPECIAL MANDATES AND ADMINISTRATIVE COMMITMENTS

The monument has numerous special use agreements with other agencies:

Law Enforcement Agreements between USFS and NPS: National, regional, and local agreements exist that allow law enforcement operations on each other's lands.

Memorandum of Understanding with Coconino County Sheriff's Department: Outlines areas of responsibility within the national monument and provides for the deputization of NPS protection park rangers through the Coconino County Sheriff's department.

Interpretive Partnership: This partnership, which has been in operation for seven years, coordinates interpretive activities on NPS and USFS lands and encourages consistent messages through shared staffing.

Cooperative Agreement with Department of Anthropology, Northern Arizona University: Provides assistance to NPS for various cultural resource management activities, using NAU students and faculty to complete projects.

Memorandum of Understanding with Museum of Northern Arizona: Allows the museum to store and care for various

artifacts from the three Flagstaff Area monuments, while retaining NPS ownership of the collection.

Cooperative Agreement with Western National Parks Association (WNPA): Allows WNPA to operate a bookstore in each of the Flagstaff Area monuments and headquarters, with support provided to NPS from those sales.

Memorandum of Understanding between USFS and NPS: Outlines the responsibilities and uses of the administrative area at Sunset Crater Volcano National Monument, where there are NPS facilities on USFS lands, as well as the maintenance and jurisdiction on FR545.

Letter of Authorization for Stella Peshlakai Smith: Provides permission for Stella Peshlakai Smith to reside and graze sheep on Wupatki National Monument for her lifetime. She currently resides in the southeast portion of the monument and actively grazes sheep in that area.

SERVICEWIDE LAWS AND POLICIES

As with all units of the National Park System, management of Wupatki National Monument is guided by the 1916 act creating the National Park Service, the General Authorities Act of 1970, the act of March 27, 1978, relating to the management of the National Park System, and other applicable federal laws and regulations, such as the Endangered Species Act and the National Historic Preservation Act.

Many resource conditions and some aspects of visitor experience are prescribed by these legal mandates and NPS policies. Although the attainment of some of these conditions has been deferred in the monument because of funding or staffing limitations, NPS will continue to strive to implement these policies at the monument with or without a new GMP. The GMP is not

needed to decide, for instance, whether or not it is appropriate to protect endangered species, control exotic species, improve water quality, protect archeological sites, provide access for visitors with disabilities, or conserve artifacts.

The conditions prescribed by laws, regulations, and policies most pertinent to the planning and management of the monument are summarized in this section.

Impairment

Current laws and policies require the analysis of potential effects to determine whether or not actions would impair park resources.

Desired Condition	Source
<p>While Congress has given the Service the management discretion to allow certain impacts within parks, that discretion is limited by the statutory requirement (enforceable by the federal courts) that the Park Service must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise.</p> <p>The impairment that is prohibited by the Organic Act and the General Authorities Act is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those</p>	<p>Management Policies</p>

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Desired Condition	Source
resources or values. Whether an impact meets this definition depends on the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts.	

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. NPS managers must always seek ways to avoid, or to minimize to the greatest degree practicable, adverse impacts on park resources and values. However, the laws do give the National Park Service the 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 the National Park Service the management discretion to allow certain impacts within parks, that discretion is limited by the 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 the opportunities that otherwise would be present for the enjoyment of those resources or values. An impact to any park resource or value

may constitute an impairment. An impact would be more likely to constitute an impairment to the extent it affects a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- Key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- Identified as a goal in the park's general management plan or other relevant NPS 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. A determination of impairment is made in the Environmental Consequences section for each impact topic.

Cultural Resource Management Requirements

Archeological Resources

Current laws and policies require that the following conditions be achieved for archeological resources in the park:

Desired Condition	Source
Archeological sites are identified and inventoried, and their significance is determined and documented.	National Historic Preservation Act; Executive Order 11593; Archeological and Historic Preservation Act; Archeological Resources Protection Act; the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation; Programmatic Memorandum of

Desired Condition	Source
<p>Archeological sites are protected in an undisturbed condition unless it is determined through formal processes that disturbance or natural deterioration is unavoidable. In those cases where disturbance or deterioration is unavoidable, the site is professionally documented and salvaged.</p>	<p>Agreement among the NPS, Advisory Council on Historic Preservation, and the National Council of State Historic Preservation Officers (1995); NPS Management Policies</p>

Portions of the park have not been systematically surveyed or inventoried. Precise information about the location, characteristics, significance, and condition of the majority of archeological resources in the park is lacking, and impacts are difficult to measure. The National Park Service will take the following kinds of actions to meet legal and policy requirements related to archeological sites:

- Survey and inventory archeological resources and document their significance.
- Treat all archeological resources as eligible for listing on the National Register of Historic Places (NRHP), pending a formal determination by the National Park Service and the Arizona State Historic Preservation Officer (SHPO) as to their significance.

- Protect all archeological resources determined eligible for listing on, or listed on, the NRHP; if disturbance to such resources is unavoidable, conduct formal consultation with ACHP, SHPO, and affiliated American Indian tribes in accordance with the National Historic Preservation Act.

Historic Properties

Current laws and policies require that the following conditions be achieved in the park for historic properties (e.g., buildings, structures, roads, trails, cultural landscapes):

Desired Condition	Source
<p>Historic properties are inventoried and their significance and integrity are evaluated under National Register criteria. The qualities that contribute to the eligibility for listing or listing of historic properties on the NRHP are protected in accordance with the Secretary of the Interior's Standards (unless it is determined through a formal process that disturbance or natural deterioration is unavoidable).</p>	<p>National Historic Preservation Act; Executive Order 11593; Archeological and Historic Preservation Act; the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation; Programmatic Memorandum of Agreement among the NPS, Advisory Council on Historic Preservation, and the National Council of State Historic Preservation Officers (1995); NPS Management Policies</p>

Many of the historic properties in the park exhibit various stages of deterioration owing to a lack of systematic preservation maintenance. A study of planning and architecture of the NPS Mission 66 program is under way. The study will provide the park with baseline data necessary for the long-term preservation of these resources.

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The National Park Service will take the following kinds of actions to meet legal and policy requirements related to historic properties:

- Complete a survey, inventory, and evaluation of historic properties under National Register criteria.
- Complete a survey, inventory, and evaluation of cultural landscapes.
- Submit inventory/evaluation results to SHPO with recommendations for eligibility to the National Register.
- Determine the appropriate level of preservation for each historic property formally determined to be eligible for listing, or listed on, the National Register (subject to the Secretary of the Interior's Standards).
- Implement and maintain the appropriate level of preservation for such properties.
- Analyze the design elements (e.g., materials, colors, shape, massing, scale, architectural details, site details) of historic structures and cultural landscapes in the monument (e.g., buildings, bridges, trails, roads and intersections, curbing, signs, picnic tables) to guide rehabilitation and maintenance of sites and structures.

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 Alaska Native tribes.

Desired Condition	Source
Anticipated impacts to Indian trust resources are addressed in environmental documents.	Secretarial Order 3175; NPS Management Policies

Although there are no Indian trust resources in Wupatki, resources important to Indian tribes were identified during the scoping process by the tribes themselves, and that information was carefully incorporated into the design of alternatives so that these resources would be protected under any alternative considered.

Ethnographic Resources

Certain contemporary American Indian and other communities are permitted by law, regulation, or policy to pursue customary religious, subsistence, and other cultural uses of park resources with which they are traditionally associated. The National Park Service plans and executes programs in ways that safeguard cultural and natural resources while reflecting informed concern for the contemporary peoples and cultures traditionally associated with those resources.



Desired Condition	Source
<p>Ethnographic information will be collected through collaborative research that recognizes the sensitive nature of such information.</p> <p>All agencies shall accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and avoid adversely affecting the physical integrity of these sacred sites.</p> <p>The National Park Service acknowledges that American Indian tribes, including Native Alaskans, treat specific places containing certain natural and cultural resources as sacred places having established religious meaning and as locales of private ceremonial activities. Consistent with E.O. 13007, the Service will, to the extent practicable, accommodate access to and ceremonial use of Indian sacred sites by religious practitioners from recognized American Indian and Alaska Native tribes, and avoid adversely affecting the physical integrity of such sacred sites.</p> <p>Other federal agencies, state and local governments, potentially affected American Indian and other communities, interest groups, State Historic Preservation Officer, and the Advisory Council on Historic Preservation will be given opportunities to become informed about and comment on anticipated NPS actions at the earliest practicable time.</p>	<p>NPS Management Policies</p> <p>Executive Order 13007 on American Indian Sacred Sites</p> <p>NPS Management Policies, E.O. 13007 on American Indian Sacred Sites</p> <p>National Historic Preservation Act; Programmatic Memorandum of Agreement among the NPS, Advisory Council on Historic Preservation, and the National Council of State Historic Preservation Officers (1995); Executive Order 11593; American Indian Religious Freedom Act, American Indian Graves Protection and Repatriation Act, Executive Order 13007 on American Indian Sacred Sites; Presidential Memorandum of April 29, 1994, on Government-to-Government Relations with Tribal Governments; NPS Management Policies American Indian Religious Freedom Act; Presidential Memorandum of April 29, 1994, on Government-to-Government Relations with Tribal Governments; NPS Management Policies</p>
<p>All agencies shall consult with tribal governments prior to taking actions that affect federally recognized tribal governments. These consultations are to be open and candid so that all interested parties may evaluate for themselves the potential impact of relevant proposals. Parks will regularly consult with traditionally associated American Indians regarding planning, management, and operational decisions that affect subsistence activities, sacred materials or places, or other ethnographic resources with which they are historically associated.</p>	
<p>Certain research data may be withheld from public disclosure to protect sensitive or confidential information about archeological, historic, or other NPS resources when doing so would be consistent with FOIA. In many circumstances, this will allow the NPS to withhold information about ethnographic resources. American Indians and other individuals and groups linked by ties of kinship or culture to ethnically identifiable human remains will be consulted when remains may be disturbed or are encountered on park lands.</p>	<p>NPS Management Policies</p> <p>NPS Management Policies; American Indian Grave Protection and Repatriation Act</p>

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To accomplish these goals, NPS will do the following:

- Survey and inventory ethnographic resources and document their significance.
- Treat all ethnographic resources as eligible for listing on the National Register of Historic Places, pending a formal determination by NPS and Arizona SHPO as to their significance.
- Protect all ethnographic resources determined eligible for listing or listed on the NRHP; if disturbance to such resources is unavoidable, conduct formal consultation with ACHP and SHPO in accordance with the National Historic Preservation Act.
- Conduct regular consultations with affiliated tribes to continue to improve communications and resolve any problems or misunderstandings that occur.
- Continue to encourage the employment of American Indians on the park staff to improve communications and working relationships and encourage cultural diversity in the workplace.
- Provide for access to and use of natural and cultural resources in parks and collections by American Indians that is consistent with park purposes, does not unreasonably interfere with American Indian use of traditional areas or sacred resources, and does not result in degradation of park resources. Through consultation, an agreement with tribes on access issues will be developed.

In addition, consultation with affiliated Indian tribes was conducted throughout the course of the planning process. Tribes were funded to identify ethnographic resources within the three Flagstaff Area monuments, and this information was considered in developing alternatives.

Collections

Current laws and policies require that the following conditions be achieved in the park for museum collections:

Desired Condition	Source
All museum objects and manuscripts are identified and inventoried, and their significance is determined and documented.	National Historic Preservation Act; American Indian Religious Freedom Act; Archeological and Historic Preservation Act; Archeological Resources Protection Act; American Indian Graves Protection and Repatriation Act; NPS Management Policies
The qualities that contribute to the significance of collections are protected in accordance with established standards.	

The Flagstaff Area curatorial/museum collections are at risk. Improper storage and lack of adequate security and fire protection systems at facilities that house the collections threaten their safety and integrity. Significant portions of the archeological and historical collections remain uncataloged, and the collections continue to be scattered throughout various facilities.

The National Park Service will take the following kinds of actions to meet legal and policy requirements related to collections:

- Construct and staff an approved curatorial facility to house the Flagstaff Area collections.

- Ensure objects are housed in proper storage. Ensure that museum collections not housed in NPS repositories are preserved, protected, and documented, according to National Park Service standards.
- Acquire and catalog all park museum collections in accordance with standards in the NPS Museum Handbook. All cataloging information will be made accessible in the Automated National Catalog System.
- Develop a collection management program according to NPS standards to guide protection, conservation, and use of museum objects.
- Implement the collection management program.

Natural Resource Management Requirements

Air Quality

Wupatki is a class II air quality area. Current laws and policies require that the following conditions be achieved in the monument for air quality:

Desired Condition	Source
Air quality in the monuments meets national ambient air quality standards (NAAQS) for specified pollutants.	Clean Air Act; NPS Management Policies
Park activities do not contribute to deterioration in air quality.	Clean Air Act; NPS Management Policies

Overall, the regional air quality is good. Air flows generally down and away from the adjacent San Francisco Peaks and does not allow concentrations of most pollutants to accumulate within the monument. However, rapid growth and development in the Flagstaff area could begin to affect air quality in the parks. Some regional haze issues already exist in the Wupatki area, which is in the same

airshed as Grand Canyon National Park. Current passive ozone monitoring at the monument indicates some elevation of ozone levels (ca 60 ppb) during the summer months prior to the onset of the monsoon season in July. Although the National Park Service has very little direct control over air quality within the airshed encompassing the monument, the Flagstaff Areas cooperate with the Arizona Department of Environmental Quality (ADEQ) and the Environmental Protection Agency to monitor air quality and ensure that air quality is not impaired.

The National Park Service will take the following kinds of actions to meet legal and policy requirements related to air quality:

- Enhance monitoring of localized air quality by establishing long-term monitoring stations for visibility impairment in the Wupatki area and continue monitoring ozone at the monument. (Air quality monitoring will be conducted in conjunction with regional air quality agencies.)
- Participate in regional air pollution control plans and regulations and review of permit applications for major new air pollution sources.
- Conduct park operations in compliance with federal, state, and local air quality regulations.

Water Resources

Current laws and policies require that the following conditions be achieved in the monument for water resources:

Desired Condition	Source
The Service will perpetuate surface waters and groundwaters as integral components of park aquatic and terrestrial ecosystems.	Clean Water Act; Executive order 11514; NPS Management Policies

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Desired Condition	Source
The Service will determine the quality of park surface and groundwater resources and avoid, whenever possible, the pollution of park waters by human activities occurring within and outside of parks.	Clean Water Act; Executive Order 12088; NPS Management Policies
Natural floodplain values are preserved or restored.	Executive Order 11988; Rivers and Harbors Act; Clean Water Act; NPS Management Policies
The natural and beneficial values of wetlands are preserved and enhanced.	Executive Order 11990; Rivers and Harbors Act; Clean Water Act; NPS Management Policies

The National Park Service and Department of Justice are currently negotiating a water rights agreement to resolve water rights issues at Wupatki National Monument. A number of entities are involved, including the City of Flagstaff, U.S. Forest Service, and Navajo and Hopi Tribes. It is expected that settlement will be reached in the near future.

The National Park Service will take the following kinds of actions to meet legal and policy requirements related to water resources:

- Apply best management practices (BMP) to all pollution-generating activities and facilities in the parks, such as NPS maintenance and storage facilities and parking areas; minimize use of pesticides, fertilizers, and other chemicals and manage them in keeping with NPS policy and federal regulations.
- Remove modern developments from perennial springs at Wupatki; restore

native vegetation and wildlife habitat at these and selected reaches of the Little Colorado River banks.

- Promote greater public understanding of water resource issues in the parks.

Geologic Resources

Current laws and policies require that the following condition be achieved in the park for geologic resources:

Desired Condition	Source
Natural soil resources and geologic processes function in as natural condition as possible, except where special management considerations are allowable under policy (areas of special management considerations will be determined through management zoning decisions in the GMP).	Monuments' enabling legislation; NPS Management Policies

The natural weathering of exposed geologic outcrops in the monument under the prevailing arid climate has led to the formation of thin, sparsely vegetated soils. A large area within the monument harbors fragile soils that are sensitive to trampling and visitor use development. Historic livestock grazing and heavy visitor use in local areas has resulted in soil compaction, vegetation loss, accelerated wind and storm erosion, and altered sediment deposition patterns in adjacent drainages. This is particularly evident near historic ranch facilities, around existing popular visitor-use areas, and along poorly designed and maintained trails.

Unique local subterranean features, described as "karst" or "earthcracks" are found at Wupatki. These features provide local conduits for groundwater

recharge and may provide unique habitats for wildlife species.

The National Park Service will take the following kinds of actions to comply with legal and policy requirements related to soils:

- Identify areas of Wupatki where current human activities and modern developments are accelerating soil loss and causing erosion problems; take actions appropriate to the management zone to deter resource degradation and restore soil formation processes.
- Inventory abandoned roads, gravel and cinder borrow sites, trails, and other disturbed lands; address public safety threats and restore natural contours, drainage patterns, soils, vegetation, and wildlife habitat where impacts are severe or unacceptable.
- Survey, map, and study soils that are sensitive to disturbance; use this information during facility and visitor-use planning to protect fragile resources.

Species of Special Concern

Current laws and policies require that the following conditions be achieved for species of special concern in the park:

Desired Condition	Source
Federal- and state-listed threatened and endangered species and their habitats are sustained.	Endangered Species Act; NPS Management Policies
Populations of native plant and animal species function in as natural a condition as possible except where special management considerations are warranted. (Areas with special management considerations will be	Monuments' enabling legislation; NPS Management Policies

Desired Condition	Source
determined through management zoning decisions in the GMP.)	
The Service will strive to restore extirpated native plant and animal species to parks when specific criteria are met.	Monuments' enabling legislation; NPS Management Policies
Management of populations of exotic plant and animal species, up to and including eradication, will be undertaken wherever such species threaten park resources or public health and when control is prudent and feasible.	NPS Management Policies; Executive Order 13112, Invasive Species

Many natural areas support populations of species that are sensitive to human disturbance and development. If these species are in serious decline, they are protected by law. Preserving the prehistoric landscape of Wupatki may also provide a unique refuge for certain species that are sensitive to other land uses. Because Wupatki has one of the larger ungrazed grassland areas within northern Arizona, an assemblage of plant and animal species exists there that is reminiscent of native grasslands prior to historic ranching and range fire suppression within the region. Local subterranean karst and earthcrack features provide habitat for rare bat species and may harbor other unique wildlife. In addition, a few perennial springs, the Little Colorado River, and numerous intermittent drainage channels provide significant water sources and riparian habitat for wildlife.

Several species of nonnative, invasive plants have become established throughout Wupatki and represent a threat to native species. Given time, aggressive "exotic" plant populations can greatly expand, altering natural

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vegetation, displacing rarer native plants and animals, and changing the original scenic character. These effects are already apparent in some areas of the monument and are expected to substantially worsen if left unmanaged. A sustained effort is needed to control these threats to native vegetation and wildlife habitats.

Development for visitor access, visitor use, and administrative activities within Wupatki influences plant and animal species distribution. Roads divide the natural areas of the monument and act as barriers or create crossing hazards for wildlife. Although not officially listed as threatened or endangered, pronghorn antelope are declining in the Wupatki area. Seasonal pronghorn antelope movements are completely thwarted in areas where fenced roadsides form continuous barriers. Roads, trails, and disturbed areas also function as corridors for invasive species to move into the monument.

Certain rare species may be subject to collection for cultural reasons, and better information on them is needed to ensure that populations remain stable.

The National Park Service will take the following kinds of actions to comply with legal and policy requirements related to native species and to manage the park "in as natural a condition as possible":

- Inventory and catalog the plants and animals occurring in the monument.
- Regularly monitor the distribution and status of selected species that are (1) indicators of healthy ecosystem function and inherent biodiversity, (2) rare or protected, (3) nonnative, and (4) native species capable of creating resource problems (e.g., overpopulation may result in undue competition or alter available habitat for other species).
- Nurture research that contributes relevant knowledge for conserving

native species and ecosystem processes.

- Restore species populations and their habitats where feasible; in particular, protect and restore grasslands and riparian habitat in Wupatki.
- Manage native species in management zones designated for historic scene, active recreation, operations, or other prescribed uses; plantings of nonnative species in such zones would follow NPS policies (e.g., limited use of noninvasive plants only where justified by historic scene or operational needs).
- Control or eliminate nonnative invasive plants and animals where there is a reasonable expectation of success and sustainability; control efforts would be prioritized in order of:
 - threat to legally protected or uncommon native species and habitats
 - threat to visitor health or safety
 - threat to scenic and aesthetic quality
 - threat to common native species and habitats
- Manage diseases and pests in similar priority order to those listed above for nonnative species.
- Educate visitors and neighbors on threats to native species and ways to conserve these species.
- Cooperate with Arizona Game and Fish, the U.S. Forest Service, Arizona Department of Transportation (ADOT), and local landowners to sustain the regional pronghorn antelope herd.

Wildland Fire

Current laws and policies require that the following conditions be achieved regarding wildland fire in the park:

Desired Condition	Source
Park fire management programs are designed to meet park resource management objectives while ensuring that firefighter and public safety are not compromised. All wildland fires are effectively managed through application of the appropriate strategic and tactical management options.	NPS Management Policies, National Fire Management Plan

A fire management plan and environmental assessment will be prepared for Wupatki National Monument. The plan will identify the appropriate tactics for suppressing wildfires and the objectives for using management-ignited fire. Aggressive suppression tactics are only proposed when human life, property, and adjacent ranch lands are threatened. Wupatki has agreements with neighboring fire protection agencies to efficiently share local personnel, equipment, and funds for fire emergency response. In the event a large, regional fire should occur, the monument would participate in an appropriate response as coordinated by the National Interagency Fire Center.

Approximately one-half of Wupatki's 35,000 acres is dominated by native grassland and juniper savanna. Repeat photography and other studies show that junipers are growing over the grassland. The area likely burned more frequently in the past, which promoted native herbaceous cover and biodiversity, thinned junipers, and prevented deadwood accumulation and intensely hot fires. However, scientific studies of local juniper-grassland change and fire history are needed to understand the role of fire at Wupatki. Monitoring programs are also needed to assess

potential impacts to cultural resources. Until these issues have been addressed, only limited management-ignited fires may be proposed, mainly to support restoration research.

The Park Service will take the following kinds of actions to comply with legal and policy requirements related to fire management:

- Suppress all unwanted wildfires as quickly as possible.
- Initiate research to understand presettlement fire history and recent dynamics of grassland and juniper woodland at Wupatki; use the results to identify desired vegetation condition and management-ignited fire objectives; revise the Fire Management Plan accordingly.
- Ensure management-ignited fires comply with Arizona Department of Environmental Quality air quality regulations.

Night Sky/Lightscape Management

The monument's night skies are features that contribute to the visitor experience.

Desired Condition	Source
The Service will preserve, to the greatest extent possible, the natural lightscapes of parks, which are natural resources and values that exist in the absence of human-caused light. Recognizing the roles that light and dark periods play in natural resource processes and the evolution of species, the Service will protect natural darkness and other components of the natural lightscape in parks. To prevent the loss of dark conditions and of natural night skies, the Service will seek the	NPS Management Policies

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Desired Condition	Source
cooperation of park visitors, neighbors, and local government agencies to prevent or minimize the intrusion of artificial light into the night scene of the ecosystems of parks.	

The National Park Service will take the following kinds of actions to comply with this policy:

- Monument staff will work with local communities and other agencies to encourage protection of the night skies.
- Monument staff will evaluate impacts on the night skies caused by facilities within the monument. If light sources within the monument are determined to be affecting night skies, monument staff will study alternatives, such as shielding lights, changing lamp types, or eliminating unnecessary sources.

Natural Soundscapes

An important part of the NPS mission is to preserve or restore the natural soundscapes associated with national parks. The sounds of nature are among the intrinsic elements that combine to form the environment of our national parks. The natural ambient soundscape is the aggregate of all the natural sounds that occur in parks, 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. Natural sounds are slowly and inexorably disappearing from most NPS units.

Desired Condition	Source
<p>The National Park Service will preserve, to the greatest extent possible, the natural soundscapes of parks. The Service will restore degraded soundscapes to the natural condition wherever possible and will protect natural soundscapes from degradation due to noise (undesirable human-caused sound).</p> <p>Using appropriate management planning, superintendents will identify what levels of human-caused sound can be accepted within the management purposes of parks. The frequencies, magnitudes, and durations of human-caused sound considered acceptable will vary throughout the park, being generally greater in developed areas and generally lesser in undeveloped areas. In and adjacent to parks, the Service will monitor human activities that generate noise that adversely affects park soundscapes, including noise caused by mechanical or electronic devices. The Service will take action to prevent or minimize all noise that, through frequency, magnitude, or duration, adversely affects the natural soundscape or other park resources or values, or that exceeds levels that have been identified as being acceptable to, or appropriate for, visitor uses at the sites being monitored.</p>	NPS Management Policies

The Park Service will take the following kinds of actions to comply with this policy:

- Activities causing excessive or unnecessary unnatural sounds in and adjacent to parks, including low-elevation aircraft overflights, will be monitored, and action will be taken to prevent or minimize unnatural sounds that adversely affect park resources or values or visitors' enjoyment of them.
- NPS will work with the Federal Aviation Administration (FAA), tour operators, commercial businesses, and general aviation interests to encourage aircraft to fly outside of the monument, especially for those flights where the presence of the monument is incidental to the purpose of the flight (i.e., transit between two points). Actions that might be considered to encourage pilots to fly outside the monument include identifying the monument on route maps as a noise-sensitive area, educating pilots about the reasons for keeping a distance from the park, and encouraging pilots to fly in compliance with FAA regulations and advisory guidance, in a manner that minimizes noise and other impacts.
- Monument staff will continue to require tour bus companies to comply with regulations that reduce noise levels (e.g., turning off engines when buses are parked).
- Noise generated by NPS management activities will be minimized by strictly regulating administrative functions such as aircraft use and use of motorized equipment. Noise will be a consideration in the procurement and use of equipment by park staff.

Visitor Experience and Park Use Requirements

Current laws and policies require that the following conditions be achieved in the parks regarding visitor experience and park use:

Desired Condition	Source
Visitor and employee safety and health are protected.	NPS Management Policies
Visitors understand and appreciate park values and resources and have the information necessary to adapt to park environments; visitors have opportunities to enjoy the parks in ways that leave park resources unimpaired for future generations.	NPS Organic Act; Monuments' enabling legislation; NPS Management Policies
Park recreational uses are promoted and regulated, and basic visitor needs are met in keeping with park purposes.	NPS Organic Act; Monuments' enabling legislation; Title 36 of the Code of Federal Regulations; NPS Management Policies Americans with Disabilities Act; Architectural Barriers Act; Rehabilitation Act; NPS Management Policies
All reasonable efforts will be made to make NPS facilities, programs, and services accessible to and usable by all people, including those with disabilities.	
Visitors who use federal facilities and services for outdoor recreation may be required to pay a greater share of the cost of providing those opportunities than the population as a whole.	NPS Management Policies; 1998 Executive Summary to Congress, Recreational Fee Demonstration Program, Progress Report to Congress, Volume I-- Overview and

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Desired Condition	Source
The park has identified implementation commitments for visitor carrying capacities for all areas of the unit.	Summary (U.S. Department of the Interior, National Park Service, U.S. Fish and Wildlife Service, Bureau of Land Management; U.S. Department of Agriculture, Forest Service) 1978 National Parks and Recreation Act (P.L. 95-625); NPS Management Policies

These laws, regulations, and policies leave considerable room for judgment regarding the best mix of types and levels of visitor-use activities, programs, and facilities. For this reason, most decisions related to visitor experience and use are addressed in the Decide What Might Be Achieved section and in the alternatives. However, the authority to charge fees is dictated by law and is therefore the same for all alternatives.

The Land and Water Conservation Fund Act (16 USC 460l et seq.) allows NPS to collect recreation fees of the appropriate type for its parks, facilities, and programs. Fees are to be reasonable and are determined in accordance with the criteria and procedures contained in the Land and Water Conservation Fund Act and regulations in 36 CFR 71. Fees collected under this authority are returned to the U.S. Treasury. Fees are also being collected for special park uses under 16 U.S.C. 3(a) and 31 U.S.C. 3701, in accordance with OMB Circular A-25. Under this authority, NPS recovers the costs incurred for providing special park uses, but returns to the U.S. Treasury any revenues in excess of costs.

Congress authorized the recreational fee demonstration program to begin on October 1, 1995, and to end on September 30, 2002. The program authorizes NPS and other agencies to implement and test new fees. The program allows the participating agencies to retain all of the demonstration project revenues and to retain at least 80 percent of the revenues at the sites where they are collected. These revenues yield substantial benefits because they provide on-the-ground improvements at local recreation sites. For NPS, the majority of new recreation fee revenues are dedicated to reducing identified backlogged maintenance, infrastructure, and resource management needs. Some of the demonstration fee revenues are reinvested into infrastructure and new collection methodologies to prepare additional areas to collect fees and provide for overall collection efficiency across NPS.

Regulations governing visitor use and behavior in units of the National Park System are contained in Title 36 of the Code of Federal Regulations and Superintendent's Compendium. These regulations have force of law and address a number of use limitations, such as limits on commercial activities.

Under the 1978 National Parks and Recreation Act (P.L. 95-625), NPS is required to address the issue of carrying capacity in its general management plans. The concept of carrying capacity is intended to safeguard the quality of park resources and visitor experiences. Identifying desired resource conditions and visitor experience by zone is part of general management planning. At this level of decision making, the desired resource conditions and experiences describe carrying capacity in qualitative terms. These qualitative terms are then translated into quantitative standards

over time during implementation planning.

The National Park Service will take the following kinds of actions to meet legal and policy requirements related to visitor experience and park use:

- Provide opportunities for visitors to understand, appreciate, and enjoy the park (management directions are explored in the alternatives within this broad policy).
- Continue to enforce the regulations in 36 CFR.
- Ensure that all park programs and facilities are accessible to the extent feasible.
- Complete a carrying capacity implementation plan, which will succeed this GMP. This plan will identify indicators and standards, develop a monitoring strategy, and identify management actions needed to address conditions when standards are reached or exceeded.
- Implement a carrying capacity monitoring program.
- Take management action as necessary to keep resource and visitor experience conditions within established standards.

Relations with Park Neighbors and Other Agencies

Wupatki NM is managed as part of a greater ecological, social, economic, and cultural system. Current policy requires the following:

Desired Condition	Source
Public participation in planning and decision making will ensure that the Park Service fully understands and considers the public's interests in the parks, which are part of their national heritage, cultural traditions, and	NPS Management Policies

Desired Condition	Source
community surroundings. The Service will actively seek out and consult with existing and potential visitors, neighbors, people with traditional cultural ties to park lands, scientists and scholars, concessioners, cooperating associations, gateway communities, other partners, and government agencies. The Service will work cooperatively with others to improve the condition of parks; to enhance public service; and to integrate parks into sustainable ecological, cultural, and socioeconomic systems. In the spirit of partnership, the Service will also seek opportunities for cooperative management agreements with state or local agencies that will allow for more effective and efficient management of the parks, as authorized by section 802 of the National Parks Omnibus Management Act of 1998 (16 USC 1a-2l).	

The National Park Service will take the following kinds of actions to meet legal and policy requirements related to park neighbors:

- Continue to establish and foster partnerships with public and private organizations to achieve the purposes and mission of the monument. Partnerships will be sought for resource protection, research, education, and visitor enjoyment purposes.
- Park staff will keep landowners, land managers, local governments, and the general public informed about park

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management activities. Periodic consultations will occur with landowners and communities affected by park visitors and management actions. The Park Service will work closely with local, state, and federal agencies and tribal governments whose programs affect, or are affected by, activities in the monument. Monument staff will continue their regular consultations with the Arizona State Historic Preservation Office, the Arizona State Game and Fish Department, and Indian tribes. In particular, NPS will maintain a close working relationship with the U.S. Forest Service to meet mutual management needs with staff from the Peaks and Mormon Lake Ranger Districts on the Coconino National Forest. Park staff will continue to meet as needed with staff from Northern Arizona University (NAU) Departments of Anthropology, Geography, Geology, and School of Forestry; the Museum of Northern Arizona; the U.S. Geological Survey (USGS); U.S.G.S. National Resources Division, Colorado Plateau Field Station at NAU; Coconino Plateau Natural Reserve Lands; City of Flagstaff; Arizona State Lands Department; Coconino County; Natural Resources Conservation Services; and the U.S. Fish and Wildlife Service. Organizations that the monument staff periodically keep informed—depending on the issue—include Grand Canyon Trust, National Parks and Conservation Association, Nature Conservancy, Sierra Club, Friends of Walnut Canyon, and neighboring national parks.

- Monument staff will continue to participate in cooperative regional planning to ensure that the monuments are treated as issues of regional concern.

Sustainable Design/Development

Sustainability can be described as the result achieved by doing things in ways that do not compromise the environment or its capacity to provide for present and future generations. Sustainable practices minimize the short- and long-term environmental impacts of development and other activities through resource conservation, recycling, waste minimization, and the use of energy efficient and ecologically responsible materials and techniques.

Desired Condition	Source
<p>Facilities are integrated into the park landscape and environs with sustainable designs and systems to minimize environmental impact. Development does not compete with or dominate park features, or interfere with natural processes, such as the seasonal migration of wildlife or hydrologic activity associated with wetlands.</p> <p>Any facility development, whether it be a new building, a renovation, or an adaptive reuse of an existing facility, includes improvements in energy efficiency and reduction in "greenhouse gas" emissions for both the building envelope and the mechanical systems that support the facility. Maximum energy efficiency is achieved using solar thermal and photovoltaic applications, appropriate insulation and glazing strategies, energy-efficient lighting and appliances, and renewable energy technologies. Energy-efficient construction projects are used as an</p>	<p>NPS Management Policies</p>

educational opportunity for the visiting public.	
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The NPS Guiding Principles of Sustainable Design (1993) directs NPS management philosophy. It provides a basis for achieving sustainability in facility planning and design, emphasizes the importance of biodiversity, and encourages responsible decisions. The guidebook articulates principles to be used in the design and management of tourist facilities that emphasize environmental sensitivity in construction, use of nontoxic materials, resource conservation, recycling, and integration of visitors with natural and cultural settings. Sustainability principles have been developed and are followed for interpretation, natural resources, cultural resources, site design, building design, energy management, water supply, waste prevention, and facility maintenance and operations. The Park Service also reduces energy costs, eliminates waste, and conserves energy resources by using energy-efficient and cost-effective technology. Energy efficiency is incorporated into the decision-making process during the design and acquisition of buildings, facilities, and transportation systems that emphasize the use of renewable energy sources.

In addition to abiding with these principles, the following will also be accomplished:

- Park staff will work with appropriate experts to make the monument's facilities and programs sustainable. Value analysis and value engineering, including life cycle cost analysis, will be performed to examine the energy, environmental, and economic implications of proposed park developments.
- The park staff will support and encourage suppliers, permittees, and

contractors to follow sustainable practices.

- Park interpretive programs will address sustainable park and nonpark practices.

Special Use Management Requirements

Land Protection

Current laws and policies require that the following conditions be achieved in the parks regarding land protection:

Desired Condition	Source
Land protection plans are developed and periodically reviewed and updated for each park containing nonfederal lands or interests that may be subject to acquisition. Land acquisition is guided by a park's land protection plan. The plans identify the alternative methods that will provide for the protection of resources, for visitor use, and for development; identify the minimum interests necessary for those purposes; and establish priorities for acquisition of land or interests in land.	NPS Management Policies; NPS Land Acquisition Policy Implementation Guideline (NPS-25); the Department of the Interior's "Policy for the Federal Portion of the Land and Water Conservation Fund" (FR 47:19784); the NPS "Land Protection Plan Instructions" (FR 48:21121); the Uniform Relocation Assistance and Real Property Acquisition Policies Act (42 USC 4601 et seq.); and Executive Order 12630, "Governmental Actions and Interference with Constitutionally Protected Property Rights"

The National Park Service will take the following kinds of actions to meet legal and policy requirements related to land protection:

- A Land protection plan will be prepared to determine what land

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within the existing legislative boundaries of the monument will need to be brought into federal ownership to carry out park purposes.

- There are currently mineral rights on approximately 7,500 acres of land within the monument that are owned by the State of Arizona. The State of Arizona will be compensated for these minerals either through exchange of equal value minerals outside the monument or some other equitable means.

Rights-of-Way and Telecommunication Infrastructure

Current laws and policies require that the following conditions be achieved in the park:

Desired Condition	Source
Park resources or public enjoyment of the parks are not denigrated by nonconforming uses. Telecommunication structures are permitted in the parks to the extent that they do not jeopardize the park’s mission and resources. No new rights-of-way will be permitted through the parks without specific statutory authority and approval by NPS management and only if there is no practicable alternative to such use of NPS lands.	Telecommunications Act; 16 USC 5; 16 USC 79; 23 USC 317; 36 CFR 14; NPS Management Policies; Director’s Order 53A, Wireless Telecommunications

The Telecommunications Act of 1996 directs all federal agencies to assist in the national goal of achieving a seamless telecommunications system throughout

the United States by accommodating requests by telecommunication companies for the use of property, rights-of-way, and easements to the extent allowable under each agency’s mission. Unlike with other nonconforming uses, the National Park Service is legally obligated to permit telecommunication infrastructure within the parks if such facilities can be structured to avoid interference with park purposes.

The National Park Service will take the following kinds of actions to meet legal and policy requirements related to special uses of park lands:

- Determine appropriate locations and stipulations before permitting telecommunication infrastructure on NPS lands in order to ensure the protection of park resources and quality visitor experiences while endeavoring to respond positively. Applications, sites, and stipulations will be based on the management zoning scheme determined by the GMP.

Description Of Scoping Process

NOTICES, NEWSLETTERS, AND MEETINGS

The notice of intent (NOI) to prepare an environmental impact statement was published in the Federal Register May 19, 1997 (62 FR 27272). The NOI indicated availability of the first newsletter, from which comments were accepted until June 30, 1997. The first newsletter (April 1997) described purpose and significance statements for all three Flagstaff Area parks and identified preliminary issues. A mail-back comment form was included, asking the public if they agreed with the material in the newsletter, if they had recommendations on improvement, and if there were issues or problems that had been missed. Comments from the

newsletter were collated and presented at an open house August 20, 1997, in Flagstaff. Twenty-nine comment forms were returned by mail. Additional comments were taken at the open house. Primary issues added by the public included funding, access, and the planning process.

The second newsletter, released in February 1998, detailed public response to the first newsletter, described the final purpose and significance statements, and explained the preliminary range of management zones. Another mail-back comment form was included, which asked the public if the management zones included the experiences they felt were important and if they recommended any changes. Nine responses were received.

A third newsletter, issued in November 1998, combined and organized comments received from newsletters #1 and #2 into decision points and related problems to be solved by alternatives in the draft environmental impact statement. This newsletter also introduced draft alternatives for the three parks and two alternatives proposing a combination of Sunset Crater and Wupatki. Again, a mail-back form was included. This newsletter was followed by another public open house, held in Flagstaff, December 3, 1998, and attended by about 60 people.

The third newsletter and the open house that followed elicited a large response compared with the previous newsletters. One hundred and twenty-eight individual responses were received, along with a petition that had 1,200 signatures and 541 copies of a form letter. The issue generating the petition and form letter was the proposal to expand the boundaries at Sunset Crater and Wupatki and eliminate the use of off-highway vehicles. Other actions proposed in the alternatives (increased access, road

closures, and road expansion) received small numbers of responses, relatively equal for and against.

The fourth newsletter, issued in May 1999, described the decision to prepare a plan concurrently with the Forest Service.

All newsletters were posted on the Internet on the National Park Service planning web page. All comments that were received through June 1999 were considered in this EIS.

A number of meetings were held with staff from the Forest Service and Arizona Game and Fish Department to discuss impacts that the alternatives might have on adjacent recreational activities and impacts to wildlife and their movement corridors and to try to ensure that NPS planning would be in support/harmony with other agencies' planning efforts. Many of the conversations focused on joint or comanagement of resources and visitor uses. A number of meetings were held with the affiliated tribes, including Havasupai Tribe, Hopi Tribe, Hualupai Tribe, Navajo Nation, San Juan Paiute Tribe, Tonto Apache Tribe, White Mountain Apache Tribe, Yavapai Apache Nation, Yavapai-Prescott Tribe, and Zuni Tribe. Meetings with the tribes were held to determine traditional uses, desired continuing uses, ethnography information, sacred sites data, consultation protocol, and issues related to repatriation of human remains and artifacts.

TRIP FACT SHEETS

To determine if existing park visitors' needs were being met, trip fact sheets were set out in each of the three visitor centers. Visitors filled out the sheets voluntarily. The trip fact sheets were a one-page check-off that asked visitors where they were from, why they came to the park, how they preferred to learn about the park, and what they would take advantage of, if it were available. A

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total of 4,091 trip sheets, spanning a 15-month time frame, were collected and collated.

Responses were fairly consistent for the three monuments. The following five items were considered highly desirable by visitors to the three monuments:

- Want short and longer hiking trails.
- Want to be able to step off the trail for picture taking.
- Want self-guided activities.
- Want to learn by ranger programs.
- Want to learn by museum exhibits.

VISITOR USE STUDY

As a complement to the public meetings, newsletters, and trip fact sheets, a visitor use study was conducted to gather more in-depth information on visitors, their experience, behavior, and how behavior affects resources.

Approximately 1,200 mail-back questionnaires were distributed in conjunction with an on-site interview. A total of 885 questionnaires were returned--287 for Sunset Crater Volcano, 304 for Walnut Canyon, and 294 for Wupatki. The on-site survey repeated the questions asked in the trip fact sheets, whereas the mail-back questionnaire provided more detailed information. The following information was asked:

- What sites did visitors visit, and how long did they stay at each site?
- In which activities did visitors participate?
- What problems did visitors encounter?
- What were visitors' feelings about seeing other visitors?
- What added to or detracted from their park experience?

Visitors to Wupatki reported that they came to the monument to see

archeological ruins and to look at the scenery. Things that most bothered visitors include the heat, smelly rest rooms, disturbance of the sites, people disobeying rules, and the fact that visitor center displays need modification. A few visitors commented on a lack of signs near the pueblos, unsupervised children, and an overall lack of ranger presence. When asked about what they would like to see changed, most visitors responded, "nothing." Among the changes that some visitors did want were more ranger talks and guided walks and better and more information, including updated exhibits, a video or movie on how the early native people lived, a reconstructed dwelling, more detailed maps, living history, and self-guided tours to the backcountry. (Lee and Treadwell 1999)

Decide What Might Be Achieved

ISSUE ANALYSIS AND CONCERNS

Many issues and concerns were identified by the park staff, other agencies, and the general public as part of the scoping for this general management plan. These issues and concerns were then categorized according to how they could be resolved. The list of things to be addressed in the general management plan will include major planning issues (decision points), the resources and values that could be at stake in choosing one course of action over another (impact topics), and the range of management prescriptions (management zones). These elements are described below. The impact topics are also addressed in the evaluation of alternatives in the Environmental Consequences section of this plan.

DECISION POINTS

Based on public comments and NPS concerns, there are four major points about which decisions must be made in

this GMP. The considerations following each statement were actual scoping comments received.

1. We need to decide to what extent we can provide visitor access to cultural and natural resources without unacceptable impacts to those resources.

Considerations:

- Monitoring and protection of resources is difficult.
- Popular resources are trampled by visitors.
- Additional research is needed to understand the relationships between numbers of visitors and resource impacts.
- There is a need to understand tribal requirements for access to and use of resources without disruption by visitor use.
- Trail use often exceeds design capacity, causing safety and resource protection concerns (trails are subject to erosion and rockfalls).

2. Important park goals are to ensure adequate visitor orientation and education and to minimize use impacts. We need to decide whether to accomplish this by increasing facilities and services or by limiting entrance points and visitor circulation.

Considerations:

- Existing buildings do not meet current visitor or employee needs; visitation often exceeds visitor center and parking lot capacities.
- Visitors do not receive necessary information before they encounter sensitive resources.
- Resources are being lost because of vandalism and theft.

- Visitor centers and exhibits do not reflect current scientific thinking or relationships between sites and people.
- Some facilities are located in prime resource areas and may be causing undue impacts on those resources; other facilities are not sustainable or designed for the landscape.
- Existing staffing and budget levels limit visitor services.

3. We need to decide the extent to which park operations, visitor experiences, and resource protection can be integrated across the three Flagstaff Area parks or whether they need to be treated separately.

Considerations:

- There is redundancy and inefficiency in park facilities and infrastructure; much of the infrastructure is antiquated and inadequate.
- Park units and park operations are not consistently integrated and structured to address prioritized needs.
- Systems and programs do not ensure clear and effective communication among the staff or with visitors.
- Static funding and staffing levels require maximum use and efficiency of park facilities, infrastructure, and programs.

4. We need to determine to what extent we can protect park values through agreements and/or partnerships with park neighbors and inholders and/or boundary adjustments and land acquisition.

Considerations:

- Rapid regional growth and development adjacent to parks increase the potential for damage to resources, viewsheds, and visitor experience.

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- Confusion sometimes arises from the presence of multiple agencies with common boundaries and/or resources but different management policies and visitor use regulations.
- There are land management, land trades, and "friendly condemnation" issues near park boundaries involving the state and the U.S. Forest Service.
- Strategies are needed for dealing with private land in the parks while preserving private property rights.

RESOURCES/VALUES AT STAKE IN THE PLANNING PROCESS

During scoping, the resources and values that could potentially be at stake in selecting various future directions for the parks were identified. Public and park staff input was considered. The following impact topics were derived from this scoping input for Wupatki:

- Long-term integrity of archeological resources
 - Scientific integrity of cultural resources*
- Historic character of built environment
 - Historic resources*
 - Cultural landscapes*
- Ethnographic Resources
 - Long-term scientific and traditional integrity of culturally sensitive areas (shrines, gathering sites, landforms, resource collection areas, etc.)*
- Natural Systems
 - Preserving unfragmented natural systems*
 - Preserving microhabitats*
 - Maintaining the pristine character/condition of grasslands*
 - Movement of herd species, wildlife, and migratory birds*
 - Integrity of natural systems for ecological research*
 - Excluding exotic species*

- Threatened, Endangered, and Sensitive Species
 - Protecting federally listed threatened and endangered species, "species of concern," and critical habitats*
 - Conserving other sensitive plants, animals, and unique habitats identified during the scoping process*
- Wetlands, Floodplains, and Riparian Resources
 - Preserving and restoring perennial springs and the Little Colorado River*
 - Facility development and recreational impacts to intermittent drainages (dry washes and/or arroyos)*
 - Facility development and recreational activities in potential flashflood areas*
- Ability to experience park resources
 - Access to park resources by the general public*
 - Access to a full spectrum of park resources for visitors with disabilities*
 - Uncrowded visitor experiences*
 - Personal freedom (inside and outside park boundaries)*
 - Traditional employee/visitor experiences (interpretation through personal services, access to favorite sites)*
 - Traditional recreational activities (biking, climbing, etc.)*
 - Access to information provided by collections (ability to see the "real thing")*
 - Minimally altered environment*
 - Ability to experience scenic, recreational, and educational pursuits*
 - Visibility of night skies*
 - Natural soundscapes, ability to hear natural sounds*

Ability of public to understand park resources

Visitor understanding of regional context

- Effects on park neighbors; local, state, and tribal land management plans; and land/resource managing agencies

Effects on neighbors' access and emergency response

Economic contribution of park to local economies

Access to culturally sensitive areas by traditional users

Traditional land uses external to boundary

Possible conflicts between the proposed action and local, state, or Indian tribal land use plans, policies, or controls for the area concerned

- Operational efficiency

Employee and visitor health and safety

Ability to enforce park regulations and protect park values

Staff

Facilities

Distance to work

Management of collections and other resources

Ease of communication

Utilities

Employee housing

TOPICS DISMISSED FROM FURTHER ANALYSIS

Socially or Economically Disadvantaged Populations

Executive Order 12898 "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs

and policies on minorities and low-income populations and communities. None of the alternatives considered would result in any identifiable adverse human health effects. Therefore, there would be no direct or indirect adverse effects on any minority or low-income population or community. The impacts on the natural and physical environment that occur from any of the alternatives would not significantly and adversely affect any minority or low-income population or community. Although there are several Indian tribes nearby, a series of consultation meetings has resulted in alternatives carefully crafted to incorporate and resolve the tribal concerns identified. Therefore environmental justice was dismissed as an impact topic.

Prime and Unique Agricultural Lands

In August 1980, the Council on Environmental Quality directed that federal agencies must assess the effects of their actions on farmland soils classified by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) as prime or unique. Prime or unique farmland is defined as a soil that particularly produces general crops such as common foods, forage, fiber, and oil seed; unique farmland produces specialty crops such as fruits, vegetables, and nuts. According to NRCS, none of the soils in the project area are classified as prime or unique farmlands. Therefore, the topic of prime and unique farmlands was dismissed as an impact topic in this document.

Air Quality

The President's Council on Environmental Quality guidelines for preparing environmental impact statements require the lead agency to analyze the impacts of the proposed action and alternatives on air quality. Under each of the proposed

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management alternatives for Wupatki National Monument, visitor use and administrative operations would generate similar levels of air pollutant emissions from motor vehicles and motorized equipment, water and sewage treatment operations, propane and natural gas-fueled appliances, and wood-burning stoves used to heat employee residences. Some dust and fumes would be generated during the maintenance, improvement, construction, or removal of roads, trails, and other facilities. The NPS would follow established policy requiring the use of energy-efficient and environmentally friendly products and processes whenever possible. Although public visitation and motor vehicle use are expected to increase during the next 20 years, levels of vehicle exhaust are not expected to dramatically increase or significantly contribute to regional air pollutant loads.

None of the identified air pollutant sources would generate enough quantities to require a discharge permit under U.S. Environmental Protection Agency and Arizona Department of Environmental Quality regulations. The impacts of these emissions are deemed to be negligible on the local environment and regional air quality for the proposed action and all alternatives. Therefore, they are excluded from further environmental analysis.

Water quality

The President's Council on Environmental Quality guidelines for preparing environmental impact statements require the lead agency to analyze the impacts of the proposed action and alternatives on water quality. Impacts to intermittent drainage systems, wetlands/floodplains, and riparian environments are assessed separately in the Environmental Consequences section. Under each of the proposed management alternatives for Wupatki National Monument, visitor use

and administrative operations would require similar amounts of drinking water and generate similar levels of water pollutants from road run-off, facility maintenance operations, and water and sewage treatment operations. All wastewater and sewage from the visitor center, employee housing, and toilets is treated and discharged to lined evaporative lagoons. None of the existing or proposed facilities would be located in the vicinity of regulated surface waters or aquifer recharge areas. The nearest reliable aquifer beneath these facilities is at least 700 feet deep and hydraulically isolated from the surface by horizontal rock formations of interbedded shale and sandstone. The NPS would follow established policy requiring the use of water-conserving technology and environmentally friendly products. Although public visitation and motor vehicle use are expected to increase during the next 20 years, the level of incidental hydrocarbon run-off from roads is not expected to dramatically increase or contaminate local waterways. For these reasons, the proposed action and all alternatives are deemed to have a negligible impact on the environment and water quality and this topic is excluded from further environmental analysis.

Geologic Resources

The President's Council on Environmental Quality guidelines for preparing environmental impact statements require the lead agency to analyze the impacts of the proposed action and alternatives on geologic resources. Impacts to soils, intermittent drainage systems, and hydrogeology are assessed separately in the Environmental Consequences section. NPS national policy prohibits the surface mining of soil, gravel, cinder, or rock materials for any park operations purposes, including the construction of roads or facilities. Under any of the

proposed management alternatives for Wupatki National Monument, most modifications to access roads and facilities would be limited to existing disturbed areas and would not likely require blasting or other modification of bedrock geology. Under all of the proposed alternatives, the NPS would restore certain abandoned roads and materials borrow quarries. The potential impacts of these actions are assessed separately in the Actions Common to All Alternatives section. There are likely limited paleontological resources, but their extent and significance has not been determined. There are currently no documented incidents of illegal removal of paleontological specimens, and they are believed to either receive adequate protection by the NPS or to have little market value. There are also subsurface karst features within the western half of the monument, including sinkholes and earthcracks. These features may provide unique wildlife habitat, and potential impacts are analyzed under the section on threatened, endangered, and sensitive species. The Doney Mountain Anticline is well exposed in cross section within the monument. The anticline and other geologic features serve as useful examples for education purposes, particularly with university-level geology programs. Typical field-mapping exercises are permitted as a special use within the closed backcountry area. This activity is considered part of overall backcountry visitor use, and potential impacts are analyzed elsewhere in this document. The potential impacts to surface geologic outcrops from road or facility construction, visitor activities, or NPS operations would be negligible. For these reasons, the proposed action and all alternatives are deemed to have a negligible impact upon the geologic resources of the regional environment and are excluded from further environmental analysis.

OUTSTANDING PARK VALUES AND RESOURCE CONCERNS

Wupatki National Monument and the area surrounding the monument contain thousands of archeological sites, dating mostly to the period after the eruption of the Sunset Crater Volcano (1064 until about 1275). The monument contains an exceptionally well-preserved archeological landscape, including large residential sites, isolated field structures, ceremonial ballcourts, lithic quarries, agricultural fields, shrines, rock art, and other features created primarily during the 12th and 13th centuries. The density of sites in this area is astounding (typically there are more than 40 sites per square mile, and in some cases, there are more than 100 sites per square mile). Few places in the world have such a well-preserved and densely populated landscape with as much potential to provide an understanding of prehistoric lifeways. In the American Southwest, Mesa Verde National Park is one of the few places that rivals the density and preservation of Wupatki's archeological resources.

The dense concentration of prehistoric remains, their exceptional state of preservation, and the relatively large number of sizable remains with intact standing architecture were key factors influencing the creation of Wupatki National Monument. These original values persist to the present day. The archeological sites in the monument retain a high degree of integrity and relatively few of the sites have been excavated. Most retain their original masonry architecture and a more or less complete assemblage of artifacts. Approximately 50 of the more than 2,100 architectural sites in the monument have been stabilized to some degree, but only a dozen sites were substantially altered by extensive stabilization work.

PURPOSE AND NEED

Traditionally, Wupatki has been represented as a cultural frontier—a place where multiple prehistoric cultural groups lived and interacted. The three main cultural groups identified by archeologists at Wupatki are the Ancestral Puebloans (Anasazi), Cohonina, and Sinagua. The Hopi and Zuni consider all three prehistoric groups to be their ancestors. Although the interpretation of Wupatki as a cultural frontier still holds true in a general sense, an intensive archeological inventory of the monument in the 1980s, plus more recent work in the general vicinity, confirms that Wupatki is primarily a place inhabited by people of the Ancestral Puebloan cultural tradition. The area south of the monument and north of the Coconino Divide contains abundant sites affiliated with the Cohonina tradition, and south of the divide, in the vicinity of Sunset Crater, sites are predominantly affiliated with the Sinagua tradition. Although partly contemporaneous with the main occupation of Wupatki, the Cohonina and Sinagua sites south of the monument boundary have a strikingly different appearance and feel, dominated by pithouse villages with basalt masonry architecture and plainware pottery. Although outside the established boundaries of Wupatki National Monument, the vast majority of the more than 5,000 sites in the area between the south boundary of Wupatki and the north boundary of Sunset Crater National Monuments are direct extensions of the larger Wupatki settlement system.

The archeological sites that Wupatki National Monument was created to protect are considered to be the ancestral homes of modern-day Hopi, Zuni, and other Puebloan people. Certain Navajo clans also claim affiliation to the prehistoric pueblo remains, as well as to the historic Navajo residential sites in the monument. These sites preserve a tangible record of the clan migrations

recorded by tribal oral traditions. Hopi shrines situated within and outside the current Wupatki boundaries are part of a sacred landscape linking the Hopi Mesas with the San Francisco Peaks. There are several shrines along a prehistoric trail that crosses the Little Colorado River near Black Falls then passes through the Wupatki area and the Cinder Hills to the south, en route to Sunset Crater. In addition to the archeological sites and shrines, other Wupatki resources are of traditional importance to the American Indian tribes in the area. Numerous plant species were traditionally used by Navajos and Hopis, and many of these plants continue to have importance for medicinal and ceremonial purposes. Today, owing to the fact that grazing is no longer permitted in the monument, several culturally important plant species are found in much greater abundance within the monument than outside it.

The Wupatki grassland remains in relatively pristine condition compared with most grasslands on the Colorado Plateau, the majority of which have experienced invasion by a number of nonnative species, including brome grasses. For the most part, the Wupatki grassland is still dominated by native perennial bunchgrasses, and it continues to be the focus of a number of research projects because of its important scientific value as relatively pristine native grassland.

Today, the open Wupatki grasslands provide important habitat for antelope. Habitat for antelope has diminished throughout Arizona in recent years because of expansion of housing developments, highway construction, and cross-fencing of formerly open range land. As habitat has been lost elsewhere, the relative importance of the Wupatki grassland as antelope habitat has increased.

Springs and seeps are extremely rare in the region. Historically, these water sources were extremely important to wildlife as well as to the human inhabitants of Wupatki. Today, most of the major seeps or springs at Wupatki are developed for park use and are therefore unavailable for use by wildlife.

Restoration of these water sources is an important long-term objective, both for enhancing wildlife habitat and for resurrecting key natural features that helped shape the prehistoric cultural landscape.

The largely undeveloped terrain, unpolluted air, and extensive scenic vistas of Wupatki NM preserve a setting similar to that experienced by the prehistoric

occupants of Wupatki. As the population of the Western United States continues to grow, opportunities to see for more than 60 miles, to view a natural landscape unmarred by modern intrusions, to enjoy a night sky unpolluted by urban light sources, and to encounter natural quiet are becoming increasingly rare. As these opportunities have decreased elsewhere, the value of Wupatki's natural vistas and soundscapes has increased in importance. This natural landscape and its associated visual and auditory values provide a rare baseline against which to measure and monitor regional environmental trends.



ALTERNATIVES

DEVELOPMENT OF ALTERNATIVES

Resource Analysis

As the first step in the alternatives development process, landscape units were plotted, sensitive resource areas were mapped, and existing visitor experiences (driving, hiking, viewing archeological sites) were identified. Natural and cultural resource inventories were evaluated. Visitor use statistics were gathered and studied. The planning team also discussed areas where visitors or park staff have noted problems in the past and sought the underlying reasons for those problems.

Landscape units plotted for Wupatki included: rolling grassland, flat grassland, juniper woodland, basalt mesas, shallow valley, canyons, cinder cone, Doney Cliffs, tilted benches, Painted Desert, Little Colorado River floodplain, washes, Wupatki Basin, lava flows, and cinder dunes. The appropriateness of these landscape units for use and development was considered.

Information on the following issues/existing conditions and resources was overlaid to create maps highlighting areas that were particularly sensitive to human use: boundary/adjacent uses, visitor use, roads/trails/development, boundaries/fences, impact areas, ethnographic/sacred sites, threatened/endangered/endemic species/habitat, wetlands, soils/geologic features, sensitive cultural areas, pristine areas, and safety concerns. In meetings with the Forest Service, maps showing cultural resource information (traditional cultural properties, National Register of Historic Places properties, collecting

areas, inventoried archeological site densities, and historic uses), sensitive species, current rules and regulations, stakeholders, and experiences were prepared.

This analysis aided in the development and placement of management zones and facilities in different alternatives. Desirable resource conditions and visitor experiences for each zone were identified. This analysis and the sensitive areas maps were consulted when decisions were made about how to place zones and facilities in different alternatives. Other measures taken to check feasibility and determine potential impacts included field-checking alternative ideas and proposals and consulting with resource experts and other agencies. Input from newsletters and scoping was also used to draft alternatives. Input from visitor surveys provided a better understanding of what visitors value, what their expectations are, and what problems they experience.

The goal was to ensure that the draft alternatives did not include actions with unacceptable effects on park resources or visitors or actions having no public support. For example, sensitive eagle areas were mapped, and those areas were considered off limits for visitor use in order to protect the eagles. An alternative considered early in the process would have closed the loop road connecting Wupatki and Sunset Crater Volcano; this alternative was rejected because of the lack of public support.

Management Zones

Within the broad parameters of the park mission and mission goals, various approaches to park resource protection, use, and development are possible.

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Different approaches can be used to address the decision points previously identified in the planning process (Purpose and Need, Decide What Might Be Achieved section). For all three Flagstaff Area monuments, potential management zones were identified and then applied for each monument to meet the different alternative concepts developed.

Management zones identify how different areas of the park could be managed to achieve a variety of resources and social conditions and to serve recreational needs. Each zone specifies a particular combination of physical, biological, social, and management conditions. Different actions would be taken by the Park Service in different zones with regard to the types and levels of uses and facilities.

Ten possible zones were described that could be appropriate to various areas in the three Flagstaff Area monuments. Ideas for the range of zones came from responses to the newsletters and from park staff. In formulating alternatives for future park conditions and management, preparers placed these zones in different locations or configurations on the ground, based on different alternative concepts. The nine zones applicable to Wupatki National Monument are described below.

RESOURCE PRESERVATION ZONE

Resource Condition or Character

Resources in this area are fragile and may be in a range of conditions from pristine to endangered. Management actions for resource protection would be high, and tolerance for resource degradation would be very low.

Visitor Experience

Access to these areas would be restricted and permitted only for the purposes of research, traditional cultural activities, or

other well-justified special uses. The areas would provide maximum preservation of fragile and/or unique resources, endangered species, sacred sites, and so on. Although access would be restricted, visitors could benefit from the experience of learning that particularly sensitive resources are preserved for future generations.

Appropriate Kinds of Activities or Facilities

There would be no facilities or developments for visitors, but off-site interpretation would be extensive, to promote visitor education about the value of resource protection. As noted, access would be by permit only for approved activities. Telecommunication infrastructure would not be permitted in this zone.

EXTENDED LEARNING ZONE

Resource Condition or Character

Visitors, sites, and trails would be intensively managed to ensure resource protection and public safety. Areas would be predominately natural, but the sights and sounds of people would be evident. Resources could be modified for essential visitor needs (such as trails and interpretive media) and park operation needs (such as hardening of archeological sites), but they would be changed in a way that harmonizes with the natural and cultural environment. Except for essential changes, the Park Service's tolerance for resource degradation would be low.

Visitor Experience

The emphasis in this experience would be on visiting and learning about significant park resources. These experiences could be either self-guided or ranger-led. Intimate interaction with resources would be offered where possible without undue resource impacts. Structure and

direction would be provided, (e.g., trails, interpretive media, signs), but some opportunities for discovery would also be available. Visitors would need to exert some physical effort and make at least a moderate time commitment. At certain times of the day or season there could be opportunities for solitude, but in general there would be a moderate probability of encountering other visitors. The probability of encountering park staff and other evidence of NPS management would be high.

Appropriate Kinds of Activities or Facilities

Trails (which could be surfaced and up to 5 feet wide), overlooks, and wayside exhibits and other interpretive media would be appropriate in these areas. Support facilities, such as rest rooms and small picnic areas, could also be present. Predominant activities would include hiking, viewing resources, and attending interpretive walks and talks. Telecommunication infrastructure would not be permitted in this zone.

GUIDED ADVENTURE ZONE

Resource Condition or Character

Resources in these areas would appear pristine. Low levels of management for resource protection and visitor safety would be appropriate in these areas, but any resource modifications would be minimal and would harmonize with the natural environment. Tolerance for resource degradation in these areas would be low.

Visitor Experience

Visitors would explore park resources as part of a guided group. Areas where this experience would be offered would usually be untrailed and free from developments. Intimacy with resources, learning, social interaction among the group, and the security of a guided

experience would be key elements of this experience. The probability of encountering other groups would be low, and there would be some opportunities for individual solitude. The environment would offer a moderate level of challenge, but the need for individual outdoor skills would be low.

Appropriate Kinds of Activities or Facilities

No permanent facilities would be appropriate in these areas except for primitive trails if deemed necessary for resource protection. Hiking and camping with a guide would be the predominant activity in these areas. Telecommunication infrastructure would not be permitted in this zone.

HIKING ZONE

Resource Condition or Character

Resources would appear pristine. On-site controls and restrictions would be used if needed for resource protection. The tolerance for resource modifications and degradation would be low.

Visitor Experience

Visitors would explore the park using unpaved trails. Trails would be semi-primitive (unsurfaced and no wider than 4 feet), and few other facilities would be present. Visitors would need to make a moderate time commitment. There would be a low probability of encountering NPS staff and a moderate probability of encountering other visitors or evidence of visitor impacts. Off-site management of visitors could include eligibility requirements before entering such an area, and limits on numbers of visitors and length of stay could be in place.

Appropriate Kinds of Activities or Facilities

Few facilities except for trails, trailheads, occasional pit toilets, and minimal interpretation would be appropriate in these areas. Hiking would be the predominant activity. Telecommunication infrastructure would not be permitted in this zone.

MOTORIZED SIGHTSEEING ZONE

Resource Condition or Character

Intensive management would be provided in this area to ensure resource protection and public safety (e.g., fences, intensive law enforcement, and restrictions on visitor activities). Resources might be modified (e.g., paving or felling hazard trees) for essential visitor and park operational needs.

Visitor Experience

The paved roadways and associated developments in this area would be used for touring the park, enjoying scenic overlooks and interpretive media, and gaining access to other park areas. Visitor attractions would be convenient and easily accessible. The visitor experience would be generally dependent on a vehicle or bicycle, would involve driving along a well-maintained, paved road, and would be perceived as linear/sequential in nature. Observing the natural environment would be important, and there would be a sense of adventure, but there would be little need for visitors to exert themselves, apply outdoor skills, or spend a long time in the area. The probability of encountering other visitors would be high, and there would be a moderate probability of encountering NPS staff.

Appropriate Kinds of Activities or Facilities

The motorized sightseeing experience would occur in a substantially developed

area. The paved roads, pullouts, overlooks, and associated short trails and picnic areas, parking areas, and other facilities that support visitor touring would be included in these areas. Most facilities and some trails would be accessible in this area.

Telecommunication infrastructure would not be permitted in this zone.

MOTORIZED SIGHTSEEING-SEMI-PRIMITIVE ZONE

Resource Condition or Character

Only moderate levels of management would be provided in this area to ensure resource protection and public safety. The tolerance for resource modifications and degradation would be low.

Visitor Experience

In this zone, unpaved, four-wheel-drive roads would be used for touring some areas of the park. The visitor experience would be dependent on a vehicle or bicycle and would involve driving or riding along unpaved roads with high-clearance vehicles or mountain bikes. Visitors would travel at their own risk, with only minimal interpretation provided. Observing the natural environment would be important, and there would be a sense of adventure, requiring a moderate time commitment. The probability of encountering other visitors would be low, and there would be a very low probability of encountering NPS staff.

Appropriate Kinds of Activities or Facilities

No development other than the roadway and primitive camping areas would be provided. Use could be seasonal to prevent surface damage during wet weather and to avoid the need to plow snow. Telecommunication infrastructure would not be permitted in this zone.

NATURAL AREA RECREATION ZONE

Resource Condition or Character

Designated trails could be paved and trailside resources manipulated to provide for safety or to prevent impacts off of the trail (e.g., erosion). However, such management actions would be aimed primarily at prevention of secondary impacts and not at trail improvements. There would be a low tolerance for resource degradation in these areas.

Visitor Experience

Emphasis in these areas would be on recreating in a natural setting, therefore, trails would be made of natural or natural-appearing materials. Visitors would be directed to use and stay on designated trails. There would be a moderate probability of encountering other visitors. A moderate amount of off-site interpretive media would be available, but there would not be any on-site interpretation in these areas.

Appropriate Kinds of Activities or Facilities

Facilities, including trails, would be primitive and lie lightly on the land. Improvements would only be made to prevent secondary impacts and provide the minimum safety required for natural setting recreation. Trails would be designed to accommodate a variety of exercise pursuits that can vary from activities on foot to bicycles and horseback; the area would not include motorized conveniences. Telecommunication infrastructure would not be permitted in this zone.

OVERVIEW ZONE

Resource Condition or Character

Resources would appear natural, but paving or other management actions would be taken as necessary to protect

resources. Visitors would interact with resources only to the extent possible without undue impact to those resources. Because of the need for visitors to understand park significance, some primary resources must be available for visitors to view in these areas.

Visitor Experience

Visitors would get an overview of park resources and significance in a short time frame and with a minimum of physical exertion. Park orientation and interpretation of primary park themes would be important elements of this experience. Interaction and encounters with other visitors and park staff would be common, but overcrowding would be avoided. Although structured intimacy with some park resources could be possible, viewing resources from a distance or from trail or overlook facilities would be more common.

Appropriate Kinds of Activities or Facilities

Sightseeing, learning about the park, short walks, and attending interpretive programs would be common activities in these areas. Orientation and interpretation facilities, such as visitor centers, kiosks, wayside exhibits, and other interpretive media would be appropriate. Support facilities such as rest rooms and picnic facilities could also be present. Telecommunication infrastructure would not be permitted in this zone.

ADMINISTRATIVE ZONE

Resource Condition or Character

The natural environment would be modified for park operation needs, but they would be changed in a way that harmonizes with the natural environment. These areas would not be close to sensitive natural or cultural

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resources, if such resources could not be adequately protected.

Visitor Experience

These areas would not be intended for visitor use; however, if visitor use did not conflict with the primary use of the area, incidental use could be permitted.

Appropriate Kinds of Activities or Facilities

Facilities necessary for park operations or surrounding land uses are appropriate in this area, including park maintenance yards, residential areas, access roads, and utility areas and corridors. Telecommunication infrastructure would be permitted in this zone, in the following locations. For Wupatki, Sunset Crater, and Walnut Canyon radio repeater needs, NPS uses a site at O'Leary Peak on USFS lands. Installation of telecommunications equipment at this site would require permission from the Forest Service. A radio repeater was once located on Woodhouse Mesa near the park visitor center at Wupatki. The Park Service would consider requests for location of equipment at this site based on the ability to install the equipment without visual intrusion and without loss or disturbance of natural or cultural resources. Because of the fragile nature of the resource, no use of NPS land at Sunset Crater for telecommunications would be permitted. If a new visitor center were constructed near I-40 at Walnut Canyon, there could be an opportunity to locate telecommunication equipment there, or at the water tower that is part of the current administrative zone.

Boundary Criteria

WUPATKI

The National Park Service has long recognized that resources critical to the Wupatki story remain outside monument

boundaries; official boundary studies in 1935 and 1944 proposed expansion to include approximately 30,000 to 60,000 acres immediately south of the monument. Current scientific evaluations, including those recently conducted on a portion of the Coconino Plateau Natural Reserve Lands (CPNRL) immediately north of the park, reaffirm the uniqueness of these resources and their intimate relationship to those within Wupatki National Monument.

Expansion of current monument boundaries, to include critical resources and for administrative purposes, was considered as part of the planning process, as specified in Section 604 of the National Parks and Recreation Act of 1978 (16 U.S.C. 1a-5 et seq.). Authority for modifying boundaries is contained in the Land and Water Conservation Fund Act amendments of June 10, 1977 (Public Law 95-42). Consideration for modifications to the boundaries was based on one or more of the following criteria: (1) expansion would include significant resources or opportunities for public enjoyment, (2) expansion would address operational and management issues, or (3) expansion would protect monument resources critical to fulfilling the purpose of the park. Boundary expansions are considered practical or necessary if: (1) the added lands could feasibly be administered, taking into consideration the size of the proposed expansion, configuration, ownership, costs, and so on, and (2) that other alternatives for management and resource protection are not considered adequate. The following provides a brief description of the boundary expansion options that were considered and ultimately presented in various alternatives that were developed.

Current Conditions

Since Wupatki National Monument was established in 1924, boundary expansions and modifications have occurred on nine different occasions. The expressed intent was to include significant resources that contribute to the purpose and significance of the park. In all instances, and as currently represented, boundaries for the monument were drawn along section lines and private property boundaries. Development of the boundaries lines did not attempt to correspond to the topography or natural geologic features. Subsequent to the development of the existing boundaries, many of the monument's primary access roads were constructed in the most convenient and accessible locations. The monument's primary access road (FR545) and a significant number of the secondary administrative roads cross in and out of NPS land, other federal land, and private land.

Despite prior boundary expansion and modification, current boundaries of the monument do not fully encompass the Wupatki prehistoric settlement system and cultural and natural landscape. Approximately 38,000 acres of land south of the monument and approximately 23,000 acres of land north of the monument contain significant environmental and cultural features intimately related to the story of Wupatki.

In the years since the monument was established, archaeologists have learned that the set of archeological remains situated between Sunset Crater and Wupatki and to the north of the current monument boundaries are a direct extension of the cultural landscape partially preserved within the current monument boundaries. The archeology and landscape resources in these areas are comparable in terms of their quality, density, and diversity to the sites

currently protected within the boundaries of Wupatki National Monument, but many of the resources outside the monument boundaries complement, rather than duplicate, the ones currently within the monument.

The area located south of the current monument boundaries between US89 and FR545 has been included in at least three previous proposals for boundary expansion. In 1935, an official NPS boundary expansion of approximately 60,000 acres was proposed. Approximately half of this area was incorporated within the 1937 monument expansion. In 1945, a study of the Wupatki National Monument boundaries reaffirmed the desirability of eventually expanding the monument to include approximately 30,000 acres south of the monument, the same area that was proposed for monument status in 1935, but not included in the 1937 boundary expansion. In the 1945 study it was recommended that these lands be added to the monument at some point in the future because the area "contained a great number of archeological sites" and "some of the best scenery in the Wupatki vicinity" (Thompson 1945:17). For a variety of reasons, including rapid turnover of NPS managers in the late 1940s and early 1950s and lack of support by the U.S. Forest Service, the boundary expansion proposal did not move forward. In 1988, the National Parks and Conservation Association recommended a major expansion of monument boundaries to include all the U.S. Forest Service lands south of Wupatki and east of US89 to the boundary with Sunset Crater National Monument, an area of approximately 70,000 acres.

Only recently has consideration been given to expanding the boundaries of the monument to the north. This is based in part on recent archeological studies and interest expressed by the owners of the

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Coconino Plateau Natural Reserve Lands in selling, donating, or exchanging a portion of CPNRL lands to the NPS, or establishing conservation easements or cooperative management agreements to effectively manage approximately 23,000 acres along the existing north boundary of the park. Recent archeological studies in this area show that the density of archeological sites that exists within the monument continues for 1 to 2 miles north of the current northern monument boundary fence into Coconino Plateau Natural Reserve Lands. Archeologists who have studied this area (Brown and Downum 1997; Downum, personal comm. 1999) are convinced that these resources represent a direct extension of the cultural landscape partially preserved within the current monument boundaries.

Administrative Boundary Expansion to the South (Alternatives 1, 2, and 4)

Approximately 4,480 acres of land administered by the U.S. Forest Service located along the south boundary of the monument would be transferred to the NPS. This limited expansion and adjustment of monument boundaries would be primarily for management purposes and would be solely an administrative change of landownership between the National Park Service and the U.S. Forest Service. The primary intent of this expansion would be to incorporate the monument's primary access road (FR545) and the Doney Mountain picnic/viewpoint area within NPS boundaries. The picnic/viewpoint area is currently maintained by the NPS as one of the monument's primary developed interpretive areas under a Memorandum of Understanding with the U.S. Forest Service. The adjustment would also help regulate unauthorized access to closed areas of the monument. Although

placement of the boundaries would be along existing section lines, it would result in the inclusion within monument boundaries of entire minor topographic features, specifically Doney Mountain, Arrowhead Tank, and a portion of Deadman Wash, that directly contribute to the significance of the park. It would eliminate some of the impacts associated with the management and maintenance of the existing boundary lines and multiple fence lines. The fence along FR545 would be moved out of view of the visiting public and fencing currently used to control domestic animal grazing would be removed, enhancing antelope mobility in this section of the monument. Boundaries would be more logically placed in areas that enhance the preservation of significant cultural resources, geologic features, and wildlife and would allow for the placement of the required boundary delineations and fencing in less invasive and more manageable and maintainable locations.

The U.S. Forest Service is not supportive of any expansion or modification of monument boundaries onto Forrest Service lands at Wupatki. Because of this, no boundary expansions were presented in Alternative 3, the preferred alternative.

Boundary Expansion to the North, involving State and Private Lands (All Alternatives)

This expansion would involve state trust lands, private lands, and lands administered by the Bureau of Land Management that currently exist within the boundaries of the Coconino Plateau Natural Reserve Lands. It would expand monument boundaries by 23,000 acres. The primary purpose would be to include additional archeological resources directly related to monument purpose and to unify the management and protection of cultural and natural resources identified as critical

components of the Wupatki cultural landscape. In addition to protecting resources that contribute to the purpose of the monument, such inclusion would prevent future development or the exploitation of mineral resources. This area does contain heavy gravel deposits that could be subject to mining in the future. CPNRL has recently been approached about the potential for extracting gravel in one section immediately adjacent to the park. This request was not granted. This and any other potential development poses a severe threat to highly significant natural and cultural resources and to outstanding scenic values that exist on CPNRL lands as well as adjacent monument property.

For the existing private lands, the NPS would acquire a fee interest in these lands to protect resources. Lands owned by other federal agencies would be identified for transfer of administrative jurisdiction to the NPS. State Trust Lands would likely be acquired in fee. The State is currently trying to obtain the legislation needed to authorize land exchanges with federal agencies. In the interim, the NPS will explore opportunities to work in concert with nonprofit conservation organizations to lease State Trust Lands to preclude incompatible uses. The goal would be to facilitate conservation of the sensitive and scenic resources in these areas and on adjacent NPS land. The long-range goal would be to acquire fee interest in these lands. Eventual NPS ownership would be essential for management of visitation and for preservation of sensitive resources.

Actions Common To All Alternatives

Short-range planning is underway simultaneously with this GMP to meet immediate operational needs that will continue to exist regardless of the

alternative selected. These are identified in National Park Service-wide initiatives, in Flagstaff Area National Monuments planning documents, such as the Strategic Plan, Annual Performance Plan, Comprehensive Interpretive Plan, Fire Management Plan, and Resources Management Plan, and in local action plans to resolve safety, accessibility, facility maintenance, and similar issues.

A. PARTNERSHIPS AND BOUNDARY EXPANSION

All alternatives presented recognize the opportunity for partnerships, for the protection of cultural and natural resources, with the USFS, the State of Arizona, and private landowners. USFS lands south of Wupatki will continue under USFS management, in accordance with decisions reached in the USFS Flagstaff Lake Mary Ecosystem Analysis (FLEA) planning process, but the two agencies will actively coordinate a variety of activities. There will be continued monitoring of the effects of recreation, grazing, and other human uses on these lands; documentation of unacceptable impacts will provide a basis for management changes to control those effects.

The proposed expansion to the north will involve state and private lands now within the Coconino Plateau Natural Reserve Lands (CPNRL). Management consistent with NPS policies will be sought via boundary expansion, conservation easements, cooperative management agreements, and/or other means to satisfy the management goals of both NPS and CPNRL. Ranch owners are willing participants in this process.

B. INTERPRETIVE EXHIBITS

Planning and design of new wayside exhibits and museum exhibits is in progress, in accordance with the Flagstaff Areas Comprehensive Interpretive Plan, to improve visitor understanding and

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appreciation of Wupatki resources. New wayside exhibits will replace and expand the existing system of interpretive signs along FR545 and at major existing visitor use areas, that is, at Wukoki, Wupatki Pueblo, Lomaki, Citadel, and Doney Mountain picnic area. New museum exhibits will replace the outdated and inaccurate exhibits at the existing visitor center. Like the wayside exhibits, they will convey current knowledge of the park's natural and cultural resources and explain their significance.

C. ACCESSIBILITY

The National Park Service will remain committed to increasing accessibility to facilities, programs, and services for all visitors, including those with disabilities. New construction and modifications to existing public facilities will comply with the Americans with Disabilities Act and other requirements. To the extent feasible, access will be provided to natural and cultural resource features through modification of existing trails, pullouts, and so on. Where terrain or other constraints prevent physical access to major features, efforts will be made to provide alternative experiences through exhibits, photographs, electronic virtual tours, or other means.

D. SAFETY

Necessary actions will be taken in the course of all activities to ensure employee and visitor safety. All facilities work will be designed to upgrade and improve safety features.

New and remodeled facilities will be thoroughly evaluated during the design process to ensure that safety remains an upfront consideration. Actions will be taken as needed to address the threat of hantavirus, which is present in many older storage facilities throughout the park.

E. MAINTENANCE FACILITY

A new storage building will be constructed at New Heiser specifically to address the hantavirus problem and to centralize maintenance equipment storage at Wupatki. Upon completion of this new facility, hantavirus-prone storage buildings/trailers will be removed.

F. HABITAT RESTORATION

NPS plans to restore historic conditions at Heiser Spring, through removal of containment and diversion structures, restoration of original contours, and planting of riparian vegetation. Other selected impacted sites, such as abandoned roads and construction material quarries, will be restored to natural surface contours, and native vegetation will be reestablished.

G. BACKCOUNTRY CLOSURE

The backcountry of Wupatki National Monument (defined as all areas beyond designated roads, trails, or developed facilities within the monument) is closed to unguided entry.

From approximately 1988 to 1996, unguided access to portions of the park backcountry was allowed through a permit system. In response to specific acts of vandalism to archeological resources, lack of baseline data, and measured impacts to the sites from permitted public access, the backcountry was closed temporarily at that time. The closure was extended and formalized during 1998 General Management Plan (GMP) discussions. The closure will be made permanent through the formulation and publishing of a special regulation. While various alternatives may allow guided activities to continue in the park backcountry, there will be no unguided access.

ALTERNATIVE DESCRIPTIONS

No-Action Alternative: Existing Conditions

This alternative represents existing conditions, which are based on the exceptional state of preservation and high concentration of archeological sites with substantial standing walls, combined with outstanding scenic vistas that provide a remarkable visual setting. The existing use and development is based on planning initiated in the 1950s and put into place in the late 1950s to early 1960s. (See Existing Conditions map.) Additional details regarding the current use and development of the monument can be found in the Affected Environment, Operational Efficiency section.

Visitors to Wupatki National Monument generally arrive from the south via US89 and FR545, after passing through Sunset Crater Volcano National Monument. Most receive orientation to the monuments at Sunset Crater Volcano visitor center. USFS, state, and private lands located between the two monuments are generally viewed by visitors as part of the national park, although NPS jurisdiction through those lands is limited to the roadway corridor. This road connection between the two monuments facilitates the visitor's ability to connect the cultural and natural history of the two areas. The opportunity to view the remarkable transition of vegetation and landscape in a relatively short distance is a popular experience with the public and is an essential element of the interpretive story.

Visitor use is concentrated at the Wupatki visitor center, four of the park's primary archeological areas (Wupatki Pueblo, Wukoki, Lomaki/Box Canyon, and Citadel/Nalakihi), and the picnic/viewpoint area located at Doney

Mountain on USFS land. These areas have been specifically developed for interpretive use and contain short trails and interpretive media. Most visitor use of these resources/areas is unguided. The visitor center, located adjacent to Wuptaki Pueblo, contains a museum and bookstore. The Southwest Parks and Monuments Association operates the bookstore. By agreement with USFS, the Doney Mountain picnic area is maintained by the NPS and contains picnic tables and a short trail up Doney Mountain. Limited visitor use of the backcountry is provided via guided hikes.

Wupatki is usually visited as part of a larger travel itinerary, and the average visitor stay is two hours or less. Trails are open from sunrise to sunset, although FR545 is open 24 hours per day.

Resource protection messages and interpretation are accomplished through exhibits and personal contact at the visitor centers and are reinforced by media at the five developed visitor use areas. Personal services interpretation and resource protection patrols are sporadic at both the Wupatki pueblo and the other front country sites. The vast majority of visitors interact with these sites on their own with no on-site NPS presence. For resource protection purposes, areas of the park other than these developed sites and administrative areas are closed to unguided entry. Two types of guided activities are offered into the closed areas. Discovery hikes are generally a half-day excursion and follow routes consistent with resource protection concerns. Overnight hikes to Crack-in-Rock Pueblo are offered on eight weekends in April and October.

The NPS and USFS have long worked cooperatively in the areas of law enforcement, wildland fire, resource protection and management, interpretation, and facility management at Wupatki and will continue to do so.

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NPS staff frequently assists visitors in finding suitable USFS lands on which to engage in recreational and other activities that may not be suitable on NPS lands. Conversely, USFS staff direct visitors who are looking for more structured interpretive visits to NPS lands. Cooperation extends to the sharing of equipment and staffing, administration of special use and research permits, and a variety of other activities. Maintenance and administration of the Doney Mountain picnic area and USFS portions of FR545 are primarily the responsibility of the NPS through an agency Memorandum of Understanding. The distinct missions of the two agencies offer a greater range of opportunity for visitor activities.

Visitor satisfaction with the current park experience is high as measured by the visitor survey card responses. The 2000 survey showed that 95% of visitors were satisfied with opportunities for "learning about nature, history, or culture" and 94% were satisfied with "sightseeing opportunities." Outdoor recreation (camping, bicycling, boating, hiking, etc.) was the only topic with a substantial negative response (11% rated such opportunities as poor), although 67% responded that outdoor recreation opportunities were good or very good.

Alternative 1: Limit Motorized Sightseeing And Focus On Extended Learning

GENERAL CONCEPT

This alternative would enhance the protection of cultural resources by significantly changing the way people visit and experience the park (see Alternative 1 map). With increased emphasis on longer and more intensive educational programs, Wupatki would become a destination for many visitors,

rather than a short drive-through experience.

Visitors would enter the park via existing FR545 from Sunset Crater Volcano, proceed only as far as the existing visitor center-Wupatki Pueblo area, and return via the same route. A short spur road to Wukoki Pueblo would be maintained. The north entrance and other entry points would be eliminated to ensure that visitors receive orientation before encountering park resources. FR545 would be gated west of the visitor center to increase resource protection. Significant resources and landscapes north of the park would be preserved through partnerships with adjacent landowners or possible park boundary expansion. The proposed boundary expansion to the south would include that portion of the park entrance road that is on National Forest lands, allowing the NPS to manage access to the western half of the park. The current backcountry closure would be maintained to protect sensitive natural and cultural resources.

Convenient day-use access to Wupatki and Wukoki Pueblos would be maintained for self-guided tours by vehicle and short trails. Day use of the park would be concentrated in these areas. Fewer

archeological sites would be open to unguided or self-guided use than at present, resulting in less impact on those sites; however, there would be increased guided tours to cultural sites that have not been stabilized or previously developed for visitation. Visitor use impacts to archaeological sites would be monitored, and access would be modified accordingly.

This alternative responds to desires expressed through the scoping process to provide added educational emphasis, access to a wider variety of cultural sites, and more primitive backcountry

experiences. New interpretive programs would be developed to present a broader range of educational and interpretive opportunities than are available at present. Guided programs, both on foot and by vehicle, would be added for those with more time and interest. Special learning opportunities, ranging from half-day to multi-day adventures, would be offered to a wider variety of cultural sites in the Extended Learning and Guided Adventure Zones. Educational workshops and seminars could supplement these activities. Some of these experiences might be provided through partnerships with affiliated tribes, organizations, institutions, and/or other agencies. To accommodate the longer stay implied in this concept, a primitive campground would be developed, but use would be limited to groups attending sponsored programs.

Key Actions:

- Visitors would enter on existing FR545 from Sunset Crater Volcano and travel to the existing Wupatki visitor center. Visitors would exit the park via the same route, and the park entrance would be gated at night.
- FR545 between the Lomaki-Citadel area and US89 would be abandoned, and the pavement would be removed. A primitive road would be maintained along the former route for administrative uses. FR545 between the visitor center and the Lomaki-Citadel area would be closed to traffic except for guided access. Entrance to the park via FR150 would be eliminated. The Black Falls Crossing Road would be maintained for administrative purposes, including access for Navajo Reservation residents.
- The Wukoki spur road would be realigned to meet FR545 north of the visitor center. The current Wukoki parking area would be pulled back from the site, and the access trail would be lengthened accordingly, to at least one-quarter of a mile. This would eliminate vehicle traffic from the immediate vicinity of Wukoki Pueblo and provide a more peaceful visitor experience.
- Self-guided tours would be improved, and the number of guided tours would be increased. Wukoki and Wupatki Pueblos would be open for day use and visited on a self-guided basis, as they are now. Guided vehicle and walking tours would allow visitors to see and experience the Doney Mountain and the Citadel/Nalakihi and Lomaki/Box Canyon areas. Unguided hiking in the Resource Protection Zone would be prohibited.
- Additional in-depth learning would be achieved through ranger-led hikes (full day or multi-day) into the Guided Adventure Zone, including the Crack-in-Rock area. Visitor numbers would be managed to keep these experiences personalized and to minimize resource damage. Educational workshops and seminars could be offered in conjunction with, or to supplement, these activities.
- The existing visitor center and associated housing/maintenance area would be retained. A small primitive campground would be developed for use only in conjunction with sponsored park programs. To increase in-depth learning activities, one of the existing houses would be converted to educational and meeting space.
- Areas of the park not zoned for administrative or visitor use would remain closed to protect resources.

Alternative 2: Emphasize Motorized Sightseeing And Resource Protection Through On-Site Education

GENERAL CONCEPT

This alternative emphasizes improved vehicle access to more of the park for diverse motorized sightseeing experiences and ensures the presence of park personnel at popular use areas for visitor contact and site protection purposes (see Alternative 2 map). Wupatki's high concentration of archeological sites in an exceptional state of preservation and outstanding scenic vistas provide a highly desirable visual setting for sightseeing and on-site interpretation. The long-term integrity of archeological sites and natural resources would be enhanced under this alternative, because social studies and experience have shown that the best protection for archeological sites is afforded when there is on-site, personal orientation and education. In this alternative, there is no visitor center. Instead, park staff would interpret park resources where specific features and sites can be seen and/or visited. FR545 would remain open to 24-hour, two-way traffic. To ensure that park visitors are properly oriented before encountering park resources, a new contact station and associated wayside exhibits would be built at the north entrance from US89. The access roads and parking lots at Wukoki, Lomaki/Box Canyon, Citadel/Nalakihu, and Doney Mountain picnic area would be gated at night to deter after-hours visitation. The proposed boundary expansion to the south would include that portion of the park entrance road that is on National Forest lands, which would allow the NPS to manage access to the western half of the park.

In addition to maintaining motorized access to existing popular features, sightseeing would be expanded to new areas. The road to Black Falls Crossing would be opened to park visitors, and existing primitive roads in the north boundary expansion would be used for guided tours along a scenic backcountry loop. The tours would include a shorter interpretive hike to the Crack-in-Rock area. This experience might be provided through a concessionaire arrangement. The NPS would monitor impacts to resources resulting from tours and adjust visitation numbers accordingly. Other guided backcountry hiking experiences would not be offered.

Key Actions:

- FR545 would remain open to 24-hour, 2-way traffic and would provide the same access to Wupatki, Wukoki, Citadel/Nalakihu, and Lomaki/Box Canyon. Access to these front country areas would be gated at night.
- A new visitor contact station and wayside orientation exhibit would be constructed near the north entrance from US89. Park staff that were previously dedicated to the visitor center operation would instead be stationed at the Wupatki, Wukoki, Lomaki/Citadel, and Doney Mountain areas to provide on-site interpretation. Work schedules would be established to ensure staff presence during normal operating hours. The Wukoki, Lomaki/Box Canyon, and Citadel/Nalakihu areas would likely need minimal support facilities (e.g., backcountry toilets, shelters, picnic tables).
- Existing NPS visitor services operations at the visitor center would cease. The Southwest Parks and Monuments Association would be given the option to use a portion of the building for continued sales of books and educational materials. The rest of

the structure would be converted to offices and research/storage space.

- Existing housing and maintenance facilities would be retained.
- Existing roads to the Crack-in-Rock area and northern expansion lands would be gated and maintained in primitive condition. They would be used for escorted four-wheel-drive and/or mountain bike scenic tours to interpret a broader range of park themes, such as prehistoric culture, Navajo, and ranching history. Crack-in-Rock Pueblo would be visited on guided hikes during the four-wheel-drive tours. The scenic loop corridor would likely need minimal support facilities (e.g., backcountry toilets, shelters, picnic tables).
- The Black Falls Crossing Road would be maintained in current condition and open to park visitors. New waysides would be installed to interpret Navajo history and provide information on the neighboring Navajo Reservation.
- Areas of the park not zoned for administrative or visitor use would remain closed to protect resources.

Alternative 3 (Preferred): Preserve Sensitive Park Resources While Diversifying The Range Of Visitor Experiences

GENERAL CONCEPT

This alternative was developed to ensure the preservation of sensitive park resources while providing a greater diversity of visitor experiences and locations (see Alternative 3 map).

FR545 would remain open to 24-hour, two-way traffic. In order to ensure that southbound visitors are properly oriented before encountering park resources, a new contact station and associated

wayside exhibits would be built at the north entrance from US89. Motorized sightseeing would remain the same, focusing on existing developed areas. The access roads and parking lots at Wukoki, Lomaki/Box Canyon, and Citadel/Nalakihiu archeological areas would be gated at night to deter after-hours visitation. The current backcountry closure would be maintained to protect sensitive natural and cultural resources.

This alternative would improve upon existing visitor educational opportunities at popular use areas, and provide guided access into undeveloped areas of the park. The existing visitor center would remain open for the purpose of resource interpretation. Opportunities for independence and solitude would be provided by new self-guided trails and interpretive activities. Guided programs would be offered to a wide variety of cultural sites in the Extended Learning and Guided Adventure Zones, and occasional escorted activities would occur along existing administrative roads, including ranch roads into the partnership/expansion area to the north.

Key Actions

- FR545 would remain open to 24-hour, 2-way traffic and would provide the same access to Wupatki, Citadel/Nalakihiu, and Lomaki/Box Canyon archeological areas; access to these areas would be gated at night.
- The Wukoki spur road would be realigned to meet FR545 north of the visitor center. The current Wukoki parking area would be pulled back from the site, and the access trail would be lengthened accordingly to at least one-quarter of a mile. This would eliminate vehicle traffic from the immediate vicinity of the ruin and provide a more peaceful visitor experience.

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- Ranch roads within the proposed partnership/expansion area to the north would be maintained in existing condition for administrative purposes and occasional escorted activities. The Black Falls Crossing Road would be maintained in existing condition as an administrative road.
- A new visitor contact station and wayside orientation exhibit would be constructed near the north entrance from US89.
- The existing visitor center would remain open.
- A broader range of resources, both cultural and natural, would be interpreted in Extended Learning Zones around Wupatki, Lomaki/Box Canyon, Citadel/Nalakihu, and Wukoki archeological areas. Guided hikes would continue into a Guided Adventure Zone, including overnight trips to Crack-in-Rock Pueblo.
- A new trail would be constructed into the grassland ecosystem on Antelope Prairie. For visitors desiring a longer hike and greater opportunities for solitude, a trail would be constructed from the visitor center to Wukoki.
- Areas of the park not zoned for administrative or visitor use would remain closed to protect resources.

Alternative 4: Emphasize Integrated Story Between The Parks And Minimize Development

GENERAL CONCEPT

This alternative would restructure the way visitors gain access to and experience both Wupatki and Sunset Crater Volcano National Monuments to provide a more unified interpretive story and greater protection for natural and cultural resources (see Alternative 4 map). Visitors would enter only at Sunset Crater

Volcano. The portion of FR545 from the current Wupatki visitor center to US89 would be converted to a one-way road; the north entrance at US89 would be converted to exit-only. Expanded facilities, services, and visitor orientation would be concentrated at Sunset Crater Volcano. As visitors travel through Wupatki, they would encounter fewer facilities and more pristine resource conditions.

The goals of this alternative are to provide an integrated story for Wupatki and Sunset Crater Volcano while reducing duplicate facilities, minimizing development at Wupatki, and preserving outstanding park values. Although Wupatki and Sunset Crater have long been under one management, the parks were originally developed to have administration, maintenance, and most staff housed at Wupatki. Over the years, accommodation for these functions shifted to Sunset Crater and then to Flagstaff, leaving the parks with some facilities that no longer serve a purpose. Similarly, interpretation of the parks has shifted from separate stories, to a slightly related story, to the present emphasis on interpreting the bigger regional picture, of which these parks are only a small, but inextricably linked, part.

This alternative takes advantage of current visitor use patterns to lead visitors through a sequential learning experience that presents a unified picture. By concentrating visitor use in previously developed areas, minimizing new developments, and removing unnecessary structures, this alternative would preserve and enhance the minimally altered prehistoric cultural landscape, extensive grassland antelope habitat, seeps and springs, spectacular scenic views, and other key values that define Wupatki National Monument.

The proposed boundary expansion to the south would include that portion of the

park entrance road that is on National Forest lands, which would allow the NPS to manage access to the western half of the park.

Key Actions

- Visitors would enter at Sunset Crater Volcano only. FR545 would be modified to be a one-way exit road from the existing Wupatki visitor center to the north junction with US89. Twenty-four-hour, two-way traffic would be retained between Wupatki and Sunset Crater Volcano. The road would be gated at the beginning of the one-way and closed at night. The Black Falls Crossing Road and the portion of FR150 within the park boundary would be closed and reclaimed.
- The Wukoki spur road would be realigned to meet FR545 north of the visitor center. The parking area would be pulled back from the site, and the trail would be lengthened accordingly (trail would be about 1/4 to 1/2 mile long). For visitors wishing a longer hike and greater opportunity for solitude, a new primitive trail would be developed from the existing visitor center to Wukoki. Off-trail backcountry hiking would not be permitted.
- Most of the existing housing, maintenance, and administrative facilities at Wupatki would be removed and the areas rehabilitated. One historic structure would be retained as a residence, and the historic portion of the visitor center would be retained as a ranger station. The remainder of the visitor center would be removed. Minimal facilities would be provided at some locations, including backcountry toilets, drinking water, and picnic tables.
- Visitor opportunities at Wupatki would decrease with removal of the

visitor center/museum; however, extended learning would still be provided at each of the existing day use sites. Guided overnight hikes to Crack-in-Rock would be discontinued, but guided vehicle tours would be offered in their place, using existing primitive roads. The NPS would monitor impacts to resources resulting from tours and adjust the frequency of tours accordingly.

- Areas of the park not zoned for administrative or visitor use would be closed to protect resources.

Alternatives Considered But Eliminated From Detailed Evaluation

EXPAND PARK BOUNDARIES TO EMPHASIZE PRESERVATION OF CRITICAL RESOURCES AND INCREASE RANGE OF VISITOR EXPERIENCES

General Concept

This alternative would extend NPS management and protection by expanding park boundaries to include additional features, sites, and landscapes of primary park significance (see Expanded Boundary map). Motorized sightseeing would remain the same, focused on existing major visitor use areas; FR545 would remain open 24 hours, although individual sites would be gated at night. Visitor orientation would occur at a new contact station at the north entrance from US89 and at the existing visitor center. Diverse experiences would be provided via new trails and new interpretive media and activities, and guided hikes would be conducted to several cultural sites. Additional guided and/or unguided entry into the expansion areas would be considered following completion of resource inventories and impact assessments. Forest Service lands beyond

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the expanded boundaries would continue to be managed in accordance with the decisions reached in the FLEA process.

The Park Service has long recognized that resources critical to the Wupatki story remain outside park boundaries; official boundary studies in 1934, 1944, and 1977 proposed expansion to include approximately 30,000 acres immediately south of the monument. Recent archeological studies have significantly increased understanding of the Wupatki settlement system compared with what was known when Wupatki's current boundaries were created. The monument incorporates only a small fraction of the environmental zones and diversity of archeological sites that make up the prehistoric Wupatki community. The quality and density of archeological resources preserved in the monument are matched, and in some cases even exceeded, by those to the south and north of the existing park boundary.

This alternative is based on the most current scientific evaluations, which reaffirm the outstanding values of the resources located outside monument boundaries. The proposed expansion to the north would involve state and private lands now within the Coconino Plateau Natural Reserve Lands (CPNRL). Current boundaries for the park are drawn along section lines and at private property boundaries. In most instances, they do not correspond to the topography or natural geologic features and cut across drainages, ridges, and other similar features. The boundaries do not include many significant natural and cultural resources that contribute to the purpose and significance of the park. The boundaries also do not include many of the primary access roads into the park. Some of the primary administrative roads cross in and out of private property, making it impossible to enter some parts

of the park without crossing private land. Management consistent

with NPS policies would be sought via boundary expansion, conservation easements, cooperative management agreements, and/or other means to satisfy the management goals of both NPS and CPNRL. Ranch owners would be willing participants in this process. The proposed expansion to the south contains significant environmental zones and archeological features intimately related to, but not represented within, the park. Including these resources within park boundaries would provide maximum protection in accordance with NPS mandates and legislative authorities. This concept provides for interpretation of newly acquired resources as an integral part of the post-eruptive Sunset Crater-Wupatki story. It also retains the current level of motorized sightseeing opportunities and day use access to the developed sites along FR545.

Key Actions

The following key actions would be taken to achieve this alternative:

- Park boundaries would be expanded to the south, in cooperation with USFS, and to the north, in cooperation with local landowners, to include the key features previously described.
- FR545 would remain open to 24-hour, 2-way traffic and would provide the same access to Wupatki, Citadel, and Lomaki; these individual sites would be gated at night. The spur road to Wukoki would be shortened and realigned to meet FR545 north of the visitor center, and the trail would be lengthened, to remove vehicles from the immediate landscape.
- Access to some forest roads within the expanded south boundary would be limited, in order to provide greater protection to resources. FR782 would

be closed, as would much of FR150. The roads to Black Falls Crossing and Woodhouse Mesa would be maintained as administrative roads for authorized travel. FR779 and other roads outside the expanded boundary would be managed by USFS in accordance with the decisions reached in the FLEA process.

- Ranch roads within the expanded north boundary would be maintained for administrative purposes and considered for possible future use in historic tours.
- A new visitor contact station/wayside complex would be constructed for orientation and fee collection near the north entrance from US89. The existing visitor center would remain open, and new exhibits would be installed to reflect current understanding of the archeological story.
- Visitors would receive orientation before encountering park resources (via the new contact station to the north and/or the existing visitor center). Wayside exhibits would be installed along FR545 to improve interpretation of natural and cultural landscapes. Self-guided tours at Wupatki, Wukoki, and Lomaki would be improved, and a broader range of resources, both cultural and natural, would be interpreted near Lomaki. Guided hikes to Crack-in-Rock would continue, and additional resources near Cedar Ridge, FR150, and Doney Mountain would be experienced as guided adventures led by NPS staff.
- A new trail would be constructed near Lomaki to provide exposure to the grasslands environment. The parking area for Wukoki would be pulled back, as previously described, necessitating a longer trail to the site. For visitors desiring a longer hike and greater opportunities for solitude, an

alternative trail would be constructed from the visitor center to Wukoki. An additional hiking route would be available in Deadman Wash between the visitor center and the Doney Mountain picnic area.

- Within expanded boundaries, grazing and consumptive uses would be eliminated, and motorized vehicle access would be limited. A new resource inventory zone would be established for areas requiring detailed study. Although a variety of visitor uses might eventually prove to be appropriate in these expanded areas, they would not be designated until resource values were determined. Areas of the park not zoned for resource inventory, administrative, or visitor use would be closed to informal entry.

Basis for Rejection of This Alternative

This alternative was considered and rejected in light of the current planning efforts of the Coconino National Forest and their desire to work cooperatively with NPS in managing resources on lands south of Wupatki. The Forest Service expressed desires to work with NPS to increase efforts to preserve natural and cultural resources and to provide for public uses that would help sustain the integrity of those resources. With participation from both agencies, integrated programs could accomplish resource preservation and visitor use and education without a major boundary expansion.

SUNSET CRATER VOLCANO/WUPATKI: EMPHASIZE PRESERVATION AND LIMIT MOTORIZED SIGHTSEEING

General Concept

This alternative (identified in the third newsletter as Combined Alternative 2)

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would extend a high degree of protection to park resources. Consistent with a preservation emphasis, fewer areas of the parks would be seen by car, and in some cases, visitors would have to exert more effort to see sites at Wupatki. No new sites would be opened to visitation. Ranger-guided backcountry tours to Crack-in-Rock would cease. New wayside exhibits would be limited, and the parks would be physically closed at night. The number of facilities would be reduced and relocated to less-sensitive areas. Although there would be impacts from construction of new facilities, buildings would not intrude on cultural and natural landscapes and impact sites as they do now.

The parks would not be connected by a loop drive. Visitors would enter the parks at the existing US89 entrances and return via the same route. The new visitor centers would be located at the park entrances, and visitors would be oriented before encountering park resources. Visitors would experience a more natural, undisturbed, and quiet Sunset Crater Volcano with the removal of a portion of the park road. In both parks, emphasis would be placed on opportunities for learning about the parks via self-guided or ranger-led activities at existing sites and trails. Boundaries would be adjusted to incorporate Coconino National Forest land containing administrative facilities and some features essential to the monument's story; at Wupatki, the emphasis of boundary expansions would be on acquiring lands to enhance the preservation of cultural and natural systems rather than on providing for more diverse visitor experiences. The Combined Alternative 2 map shows how the parks would be zoned and how boundaries would be changed.

This alternative responds to scoping concerns about the need to educate visitors before they encounter park

resources (especially at the north entrance to Wupatki) and recommendations to restrict access and control use to ensure that resources are adequately protected. This is consistent with scoping suggestions that placing certain areas off-limits would be acceptable if they could be seen by other means and explanations were provided. This alternative also would reduce the impact caused by facilities and developments in prime resource areas and would simplify managed visitor use (shuttle systems, reservations, ticketing), should a future need arise. An increase in funding would be needed to build new facilities; however, NPS would not spend as much time and money as it does now providing 24-hour emergency service and maintaining multiple residences and 36 miles of FR545.

Key Actions

At Wupatki:

- Visitors would enter the park at the existing north entrance and return via the same route. FR545 would end at the junction with the Wukoki Road, and the remainder of the road to the south entrance would eventually be removed and rehabilitated. (A portion of the road would be retained for access to the Peshlakai residence until expiration of this special use permit). The road would be gated at the north entrance and closed at night. Provisions would be made for emergency access.
- Access to the current developed sites (Lomaki, Citadel, Doney Mountain, Wupatki, and Wukoki) would remain as it is now. Vehicle access could become managed if crowding/visitor experience indicators were exceeded and control of visitor numbers warranted.
- The road to Black Falls Crossing would be maintained for access to the

Navajo Reservation, and consistent with the concept of the alternative, would be used for administrative use. Access to the park via FR150 would be eliminated.

- To better accomplish visitor orientation/education, a new visitor center would be built at the north junction of FR545 and US89. Park administrative offices, maintenance facility, and minimal housing would be part of this complex. All existing maintenance, storage facilities, and park housing would be removed, except for one historical structure (residence #1), and the areas would be rehabilitated. Offices would be removed from the existing visitor center, creating space for curatorial storage/research.
- Existing picnic areas would be retained, but rest rooms would be upgraded to environmentally sound, sanitary facilities (e.g., use of dehydrating or composting systems, waterless soap, etc.).
- To make the most of existing sites developed for visitation, new interpretive media (guides, brochures, etc.) and programs would be developed.
- The function of the existing visitor center would shift from visitor orientation to being a museum with additional display of collections, new exhibits, and interpretive media, some of which would allow visitors to experience and "see" sites and resources that are otherwise inaccessible or closed.
- Consistent with the concept of this alternative, overnight backpacking trips to Crack-in-Rock and backcountry guided day hikes would be discontinued. Off-trail backcountry hiking would not be permitted. The existing primitive road to Crack-in-

Rock would be retained for patrol/resource protection functions.

At Sunset Crater Volcano:

- Vehicle access on existing FR545 would be from US89 to the Lava Flow Trail parking area only. Visitors would exit the park via the same route. O'Leary Peak Road would be closed to motorized access and promoted as a hiking opportunity. Off-trail backcountry hiking would not be permitted.
- Consistent with the concept of day use, Bonito Campground would be removed. The Park Service would seek an agreement with USFS to relocate camping to the west side of US89, near the junction of FR545. Park housing, maintenance facilities, and administrative offices would be removed and the areas rehabilitated. The existing visitor center, which is inadequate, would also be removed and a new visitor center built west of Bonito Park, affording a view of the volcano and increased educational opportunities. Minimal administration, maintenance, and housing facilities would be part of this complex.
- To acquire associated features, the proposed boundary would incorporate sections 21 and 22, and portions of sections 12, 15, 16, 17, and 20 of T23N, R8E.
- In addition to the current self-guided and ranger-led activities, FR545 from the Lava Flow Trail parking to the eastern park boundary would revert to a hiking trail with ranger-led activities and self-guiding interpretive media. Lenox Crater, Bonito Lava Flow, and pithouses near Bonito Park would be interpreted via a variety of media and activities. Wayside exhibits would be developed for the park road. A contact station and waysides

would provide improved orientation to the Lava Flow Trail and new extended learning opportunities accessed from that location.

BASIS FOR REJECTION OF THIS ALTERNATIVE

This alternative was rejected because significant public input discouraged closing the connecting loop road between the monuments. There was concern about access to the private property between the monuments and to the Navajo Reservation. There was also concern about losing the link between the two monuments' stories and about losing the transition from ponderosa pine into the lower desert environment and the scenic vistas that are available along FR545.

REGIONAL PLANNING CONSIDERATION

General Concept

The National Parks and Conservation Association (NPCA), in an earlier letter, urged the Park Service to expand boundaries at Sunset Crater Volcano and Wupatki National Monuments to include all the land between the two monuments. (See Regional Planning Consideration map.) The NPCA recommendation was based on acquiring features, sites, and landscapes primary to park purposes and on protecting park viewsheds, values, and the resources of these associated lands. Such an expansion would enhance interpretation of park themes, provide diverse visitor experiences, and transfer from the Forest Service to the National Park Service land that is in many ways perceived as part of the parks and within which NPS has de facto management by virtue of proximity and presence. The goals of the NPCA recommendation could also be achieved through partnership with USFS, rather than through boundary expansions.

Basis for Rejection of This Alternative

Analysis of this alternative indicated that joint planning/management with USFS could achieve the same goals without actual transfer of lands. Elements of this alternative were incorporated into Wupatki Alternative 3 and Sunset Crater Volcano Alternative 3.

MITIGATING MEASURES

Under any of the action alternatives proposed, mitigating measures would be used to reduce the effects of actions. They include the following:

Preservation, rehabilitation, and restoration, as well as the daily, cyclical, and seasonal maintenance of cultural resources, would be undertaken in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties (1995).

Prior to any land-modifying activity, a qualified professional archeologist would inspect the present ground surface of the proposed development site and the immediate vicinity for the presence of cultural remains, both prehistoric and historic. Should newly discovered or previously unrecorded cultural remains be located, additional investigations would be accomplished prior to earth-disturbing activities. Similarly, in those areas where subsurface remains appear likely, an archeologist would be on hand to monitor land-modifying actions.

Construction activities would affect the uppermost layers of earth as vehicles compact the soils and alter the horizontal and vertical distribution of buried archeological remains. These activities would also destroy surface sites by damaging and destroying artifactual remains and their contextual environments. Loss of these resources could be partially mitigated through

excavation and curation prior to construction. Additional archeological investigations, including recording and mapping, and a rigorous program of sampling/collecting/testing of archeological features and artifacts would be performed in those areas where cultural remains would be affected by the plan.

Wherever possible, new facilities would be placed to avoid impacts to important park resources and values. In many areas soils and vegetation are already impacted to a degree by various human and natural activities. Construction would take advantage of these previously disturbed areas wherever possible.

All new construction would be completed using sustainable practices, such as the use of environmentally friendly materials, sustainable building materials, and efficient utility systems. Components of such projects would also be assessed for visual quality. Utilities and support functions, such as water, sewer, electricity, roads, and parking areas would be evaluated and designed to mitigate visual impacts.

Temporary impacts associated with construction would occur, such as soil and vegetation disturbance and the possibility of soil erosion. In an effort to avoid introduction of exotic plant species, no hay bales would be used. Hay often contains seed of undesirable or harmful alien plant species. Therefore, on a case-by-case basis the following materials may be used for any erosion control dams that may be necessary: rice straw, straws determined by NPS to be weed-free (e.g., Coors barley straw or Arizona winter wheat straw), cereal grain straw that has been fumigated to kill weed seed, and wood excelsior bales. Standard erosion control measures such as silt fences and/or sandbags would also be used to minimize any potential soil erosion.

Potential compaction and erosion of bare soils would be minimized by conserving topsoil in windrows. The use of conserved topsoil would help preserve microorganisms and seeds of native plants. The topsoil would be respread as near to the original location as possible and supplemented with scarification, mulching, seeding, and/or planting with species native to the immediate area. This would reduce construction scars and erosion.

Although soil side-cast during construction would be susceptible to some erosion, such erosion would be minimized by placing silt fencing around the excavated soil. Excavated soil may be used in the construction project; excess soil would be stored in approved areas. If used, silt fencing fabric would be inspected weekly or after every major storm. Accumulated sediments would be removed when the fabric is estimated to be approximately 75% full. Silt removal would be accomplished in such a way as to avoid its introduction into any wetlands or flowing water bodies.

Revegetation plantings would use native species from genetic stocks originating in the park. Revegetation efforts would be undertaken to reconstruct the natural spacing, abundance, and diversity of native plant species. All disturbed areas would be restored as nearly as possible to pre-construction conditions shortly after construction activities are completed. The principal goal is to avoid interfering with natural processes.

Some petrochemicals from construction equipment could seep into the soil. To minimize this possibility, equipment would be checked frequently to identify and repair any leaks. Any blasting would conform with NPS-65, Explosives Use and Blasting Program (1991), specifications. All blasting would use the minimum amount of explosives necessary to

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accomplish the task, and would be used to shatter, not distribute, any material.

Construction zones would be identified and fenced with construction tape, snow fencing, or some similar material prior to any construction activity. The fencing would define the construction zone and confine activity to the minimum area required for construction. All protection measures would be clearly stated in the construction specifications and workers would be instructed to avoid conducting activities beyond the construction zone as defined by the construction zone fencing.

Prior to any land-modifying activity, a qualified professional archeologist would inspect the present ground surface of the proposed development site and the immediate vicinity for the presence of cultural remains, both prehistoric and historic. Should newly discovered or previously unrecorded cultural remains be located, additional investigations would be accomplished prior to earth-disturbing activities. Similarly, in those areas where the existence of subsurface remains appears likely, an archeologist would be on hand to monitor land-modifying actions.

Construction activities would affect the uppermost layers of earth as vehicles compact the soils and alter the horizontal and vertical distribution of buried archeological remains. These activities would also destroy surface sites by damaging and destroying artifactual remains and their contextual environments. Loss of these resources could be partially mitigated through excavation and curation prior to construction. Additional archeological investigations, including recording and mapping, and a rigorous program of sampling/collecting/testing of archeological features and artifacts would be performed in those areas where cultural remains would be affected by the plan.

Should construction unearth previously undiscovered archeological resources, work would be stopped in the area of any discovery and the park would consult with the State Historic Preservation Officer/Tribal Historic Preservation Officer and the Advisory Council on Historic Preservation, as necessary, according to §36 CFR 800.13, Post Review Discoveries. In the unlikely event that human remains are discovered during construction, provisions outlined in the American Indian Graves Protection and Repatriation Act (1990) would be followed.

The Park Service would ensure that all contractors and subcontractors are informed of the penalties for illegally collecting artifacts or intentionally damaging archeological sites or historic properties. Contractors and subcontractors would also be instructed on procedures to follow in case previously unknown archeological resources are uncovered during construction. Equipment traffic would be minimized in the area of the site. Equipment and materials staging areas would also avoid known archeological and ethnographic resources.

Efforts to identify ethnographic resources will continue in consultation with traditionally associated tribes. A traditional use study will be conducted to understand how associated tribes have used park resources in the past and will need to continue to use them in the future. Based on the results of the study, agreement documents will be developed with associated tribes to ensure access to traditionally used resources in keeping with NPS policies Executive Order 13007. Tribal consultation will continue to take place with the implementation of individual undertakings pursuant to the NHPA to ensure that previously unidentified ethnographic resources are not affected.

The flow of vehicle traffic on roads would be maintained as much as possible during construction periods. Construction delays would normally be limited. There may be some periods when the nature of the construction work may require temporary road closures. All efforts would be made to reduce these as much as possible and to alert park staff as soon as possible if delays longer than normal are expected. Visitors would be informed of construction activities and associated delays. Traffic would be managed to ensure timely access to private residents and ranches along the road.

Contractors would coordinate with park staff to reduce disruption in normal park activities. Equipment would not be stored along the roadway overnight without prior approval of park staff. Construction workers and supervisors would be informed about the special sensitivity of park values, regulations, an appropriate housekeeping.

SELECTION OF THE PREFERRED ALTERNATIVE

In order to develop proposed actions, all of the alternatives for each park were evaluated. To minimize the influence of individual biases and opinions, the team used an objective analysis process called "Choosing by Advantages" (CBA). This process, which has been used extensively by government agencies and the private sector, evaluates different choices (in this case, the alternatives for each park) by identifying and comparing the relative advantages of each according to a set of criteria.

One of the greatest strengths of the CBA system is its fundamental philosophy: decisions must be anchored in relevant facts. For example, the question "Is it more important to protect natural resources or cultural resources?" is "unanchored," because it has no relevant

facts on which to make a decision. Without such facts, it is impossible to make a defensible decision.

The CBA process instead asks which alternative gives the greatest advantage. To answer this question, relevant facts would be used to determine the advantages the alternatives provide. To ensure a logical and trackable process, the criteria used to evaluate the alternatives were derived from the impact topics in the EIS. Alternatives were evaluated to see how well they:

- **MAXIMIZE PROTECTION OF CULTURAL RESOURCES** (long-term integrity of archeological resources and cultural landscapes, historic character of the built environment, long-term integrity of ethnographic resources)
- **MAXIMIZE PROTECTION OF NATURAL RESOURCES** (long-term integrity of natural systems and processes, threatened and endangered species and sensitive species, long-term integrity of geological features, floodplains, and riparian habitat)
- **EXPAND DIVERSITY OF VISITOR EXPERIENCE** (ability to experience full range of resources related to significance, provide a diversity of opportunities to experience park resources, and perceived wild character)
- **LIMIT EFFECT ON NEIGHBORS** (park neighbors; local, state, and tribal land management; land/resource managing agencies)
- **IMPROVE OPERATIONAL EFFICIENCY** (health and safety, conservation, distance to work, management of resources, communication)

Alternatives for each of the three monuments were rated on the attributes relating to each of the factors just listed. Then the advantages of the attributes were compared and the alternative with

ALTERNATIVES

the most advantages was selected. Costs for each alternative versus advantages provided were compared and analyzed.

A GMP provides a framework for proactive decision making, including decisions on visitor use, natural and cultural resource management, and park development. The plan prescribes resource conditions and visitor experiences that are to be achieved and maintained over time. Park development is considered in general needs rather than in specifics. For the purposes of cost estimating, general assumptions are made regarding amounts and sizes of development. These assumptions are then carried across to all alternatives so that comparable costs can be considered for each alternative.

Staffing considerations are considered to be a part of life cycle costing. The existing staff for the three monuments totals 42, which includes shared management, division chiefs, and administration. Approximating a breakdown between the parks, the staffing is Wupatki, 16, Walnut Canyon, 14, and Sunset Crater Volcano, 12. The current staffing provides minimal resource protection and visitor service, and many tasks within the monuments are being deferred. The parks' 5-year FTE projection increases staffing levels in all three monuments by one-third. By park, the staffing would be Wupatki, 21.3,

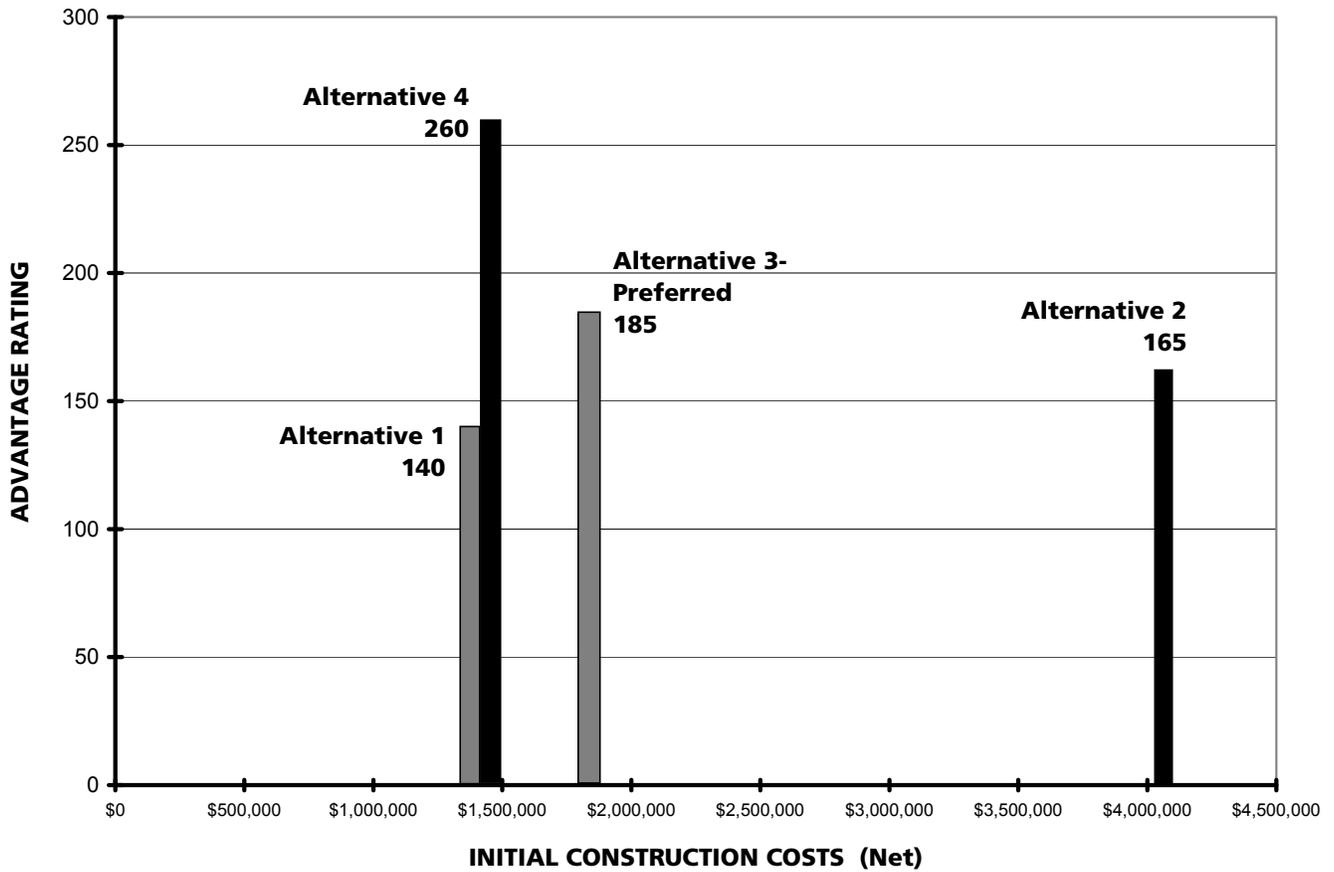
Walnut Canyon, 18.7, and Sunset Crater Volcano, 16. These figures are base staffing needed for the No-Action Alternative. Staffing increases needed by different alternatives are included in Appendix C. Those costs are included in Table 1: Summary of Comparative Costs.

Costs identified in the GMP are not intended to replace more detailed consideration of needs, sizes, and amounts of future development. They should not be used as a basis for money requests until further analysis has been completed. Costs and items considered are shown in Appendix C.

Comparative costs for the alternatives include both initial development costs and total life cycle costs. Initial development costs are the estimated construction costs of the alternatives. Demolition, labor and materials for buildings, roads, trails, exhibits, and parking are included. Estimated costs are based on costs for similar types of development in other parks from the Denver Service Center Class "C" Estimating Guide. Life cycle costs consider the costs of each alternative over a period of time. Life cycle costs include the costs of operating buildings, the staffing required, maintenance, and replacement costs of alternative elements. The life cycle costs below are for a 25-year period. It is important to note that all estimate are general, in keeping with the

Table 1: Summary of Comparative Costs				
(FY 2000 Dollars)				
	Alternative 1	Alternative 2	Alternative 3 - Preferred	Alternative 4
Initial Development Costs	\$1,373,000	\$ 4,063,000	\$1,845,000	\$1,436,000
Total Life Cycle Costs (Present Worth)	\$4,356,000	\$8,106,000	\$3,178,000	\$3,219,000

Choosing by Advantages



general nature of GMP alternatives, and should be used for comparison purposes only.

Selection of the preferred alternative considers the advantages provided by each alternative (from the CBA) as compared to the cost of the alternative. The chart that follows summarizes the results. Alternative 1 provided the fewest advantages at the lowest cost.

Alternative 4 the greatest amount of advantages at only a slightly higher cost than Alternative 1. However, there was little support for the boundary changes proposed in that alternative, especially by the Forest Service. Alternative 3 provided higher quality visitor experiences, slightly improved cultural resource protection, and slightly improved impacts on neighbors, for

approximately \$450,000 more in costs. Alternative 2 provides the highest amount of resource protection; however, it provides the lowest amount of advantages for visitor experience. The advantages of Alternative 2 are; therefore, slightly less overall than the preferred, Alternative 3, and the costs are excessively higher.

ENVIRONMENTALLY PREFERRED ALTERNATIVE

The environmentally preferred alternative is determined by applying the criteria suggested in the National Environmental Policy Act of 1969 (NEPA), which is guided by the Council on Environmental Quality (CEQ). The CEQ provides direction that "the environmentally preferable alternative is

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the alternative that will promote the national environmental policy as expressed in NEPA's Section 101:(1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations; (2) assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings; (3) attain the widest range of beneficial uses of the environment without degradations, risk to health or safety, or other undesirable and unintended consequences; (4) preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity, and variety, of individual choice; (5) achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and (6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources."

"Generally this means the alternative that causes the least damage to the biological and physical environment. It also means the alternative that best protects, preserves, and enhances historic, cultural, and natural resources." (Council on Environmental Quality, "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations" (40 CFR 1500-1508), Federal Register Vol. 46, No. 55, 18026-18038, March 23, 1981: Question 6a)

The No-Action Alternative represents the current management direction for Wupatki National Monument. The existing use and development of the park is based on planning initiated and implemented during the Mission 66 program. Personal services interpretation and resource protection patrols are sporadic at each of the four archeological interpretive areas, and the majority of visitors interact with these sites on their

own with no on-site NPS presence. For resource protection purposes, areas of the park other than the developed sites and administrative areas are closed to unguided entry. Because the No-Action Alternative maintains the Mission 66 designed visitor experience, the diversity for educational opportunities and the protection of cultural resources is limited. Protection of cultural resources and visitor opportunities would not be as enhanced as under Alternatives 1, 2, 3, or 4. The No-Action Alternative does not impact access to neighboring lands, unlike Alternatives 2 and 4. The No-Action Alternative does not fully realize provisions 3, 4, 5, and 6 of the goals.

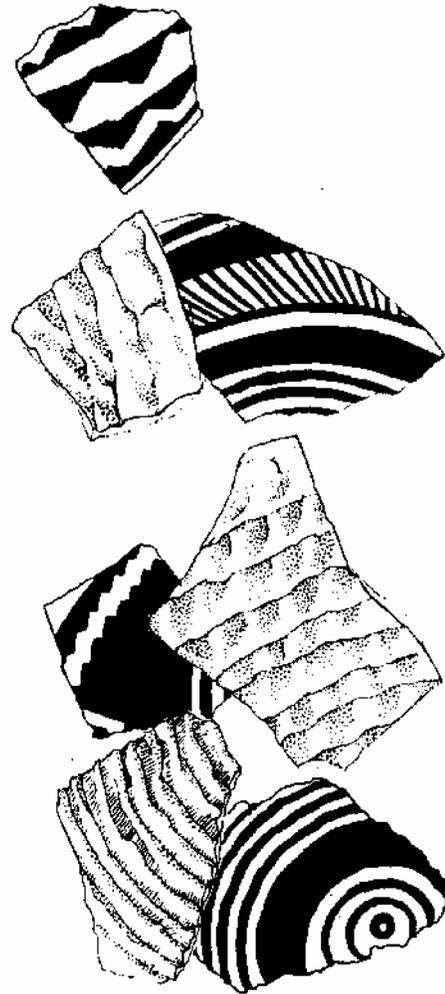
Alternative 1 strives to limit motorized sightseeing in the park and focus on longer and more intensive educational programs to enhance the protection of cultural and natural resources, thus meeting national environmental policy goal 6. This alternative restricts the visitor experience by eliminating the drive-through experience in favor of a longer intensive stay. This alternative also limits access by park neighbors to the Navajo Reservation, ranch land, and USFS lands surrounding the monument. National environmental policy goals 3, 4, and 5 are not fully realized under this alternative to the same extent as in Alternative 4. In addition, it does not fully realize provisions 3 and 5 of the goals when compared with Alternatives 2 and 3.

Alternative 2 promotes improved vehicle access to more of the park for diverse motorized sightseeing experiences and ensures presence of park personnel at popular use areas for visitor contact and site protection purposes. Motorized access to existing popular features would be maintained, and sightseeing would be expanded to new areas. The road to Black Falls Crossing would be opened to park visitors, and existing primitive roads in the north boundary expansion would

be used for guided tours along a scenic backcountry loop. Opening the Black Falls Crossing Road to motorized sightseeing could cause congestion for Navajo residents that use the road to commute to Flagstaff and could cause congestion for other American Indians seeking traditional cultural uses in that area. Alternative 2 meets national environmental policy goals 3 and 5 by providing access to more of the park's resources. It does not meet the national environmental policy goal 4 (preserve important historic, cultural, and natural aspects . . .) for those groups traditionally associated with the park

Alternative 3 provides for the greatest range of diverse visitor experiences and access to Wupatki National Monument. This alternative would improve upon existing visitor educational opportunities at popular use areas and provide guided access into undeveloped areas of the park. The traffic circulation pattern would remain the same and access to neighboring lands would remain unchanged. Areas of the park not zoned for administrative or visitor use would remain closed to protect resources. The four archeological areas of the park would be gated at night for protection. There may be some increased congestion for American Indians seeking traditional cultural uses from expanded visitor opportunities. Alternative 3 would realize each of the applicable provisions of the national environmental policy goals.

Alternative 4 restructures the way visitors gain access to and experience both Wupatki and Sunset Crater Volcano National Monuments to provide a more unified interpretive story and greater protection for natural and cultural resources. FR545 would be modified to a one-way exit road from the existing Wupatki visitor center to the north entrance of the Wupatki. The road would



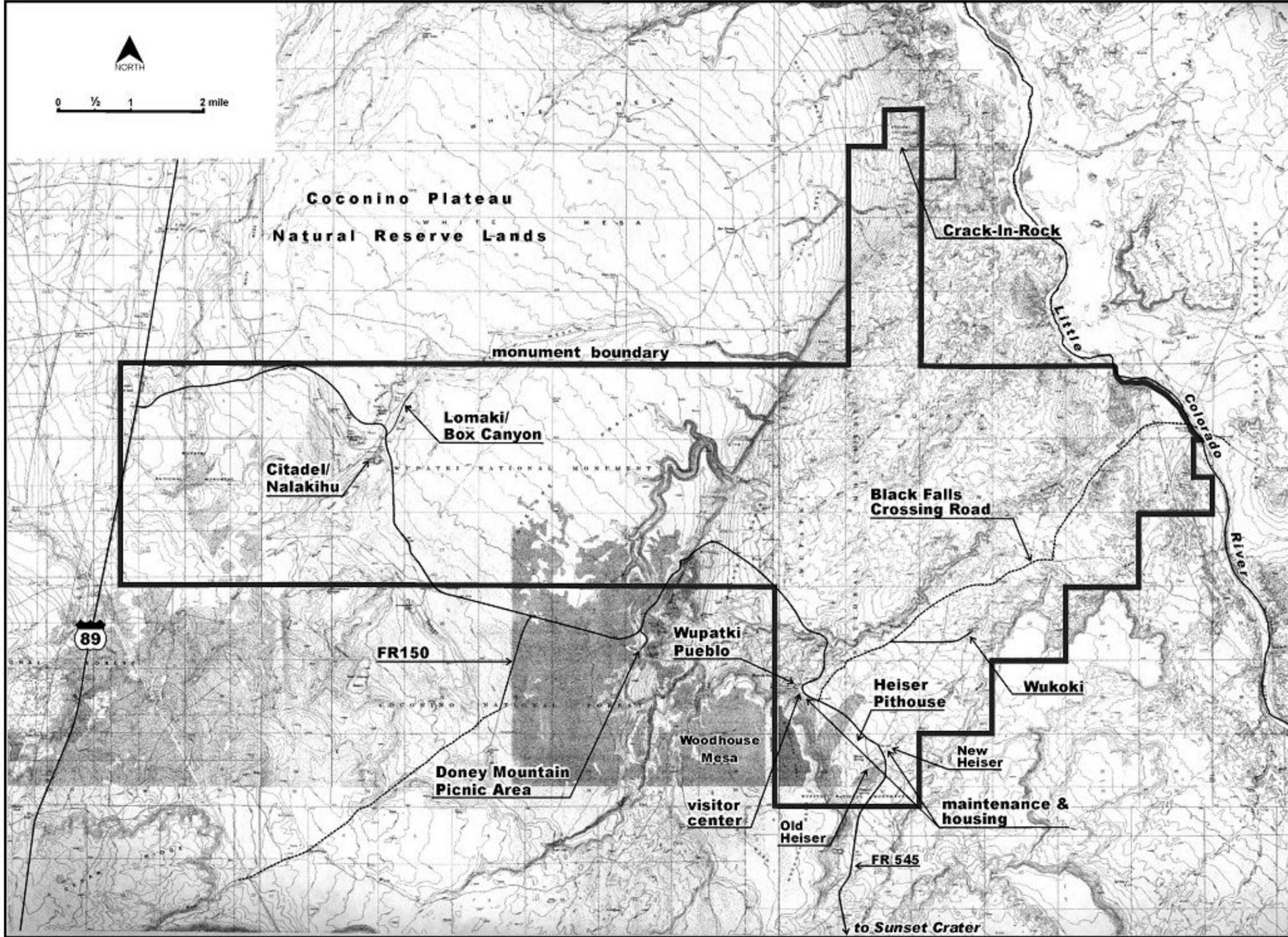
be gated at the beginning of the one-way and closed at night, impacting ranch and Navajo residents who use the road to commute to Flagstaff. Visitor opportunities would decrease with the removal of the visitor center/museum; however, extended learning would still be provided at each of the day use sites. Most of the existing housing, maintenance, and administrative facilities would be removed and the area would be rehabilitated to more closely resemble its historical appearance. Although Alternative 4 would realize most of the applicable provisions of the national environmental policy goals, it would fall short of satisfying criterion 5 by precluding access through the park by park neighbors to the Navajo

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Reservation, ranch land, and USFS lands surrounding the monument.

After careful review of potential resource and visitor impacts and developing proposed mitigation for impacts to natural and cultural resources, Alternative 3 has been determined to be the environmentally preferred alternative. Alternative 3 surpasses the other alternatives in best realizing the full range of national environmental policy goals as stated in §101 of the National Environmental Policy Act. Although other alternatives may achieve greater levels of individual protection for cultural resources or natural resources, or

better enhance visitor experience, Alternative 3 overall does (1) provide a high level of protection of natural and cultural resources while concurrently attaining the widest range of neutral and beneficial uses of the environment without degradation; (2) maintain an environment that supports diversity and variety of individual choice; (3) integrate resource protection with an appropriate range of visitor uses; and (4) accommodate the access needs of park neighbors and affiliated American Indian Tribes.

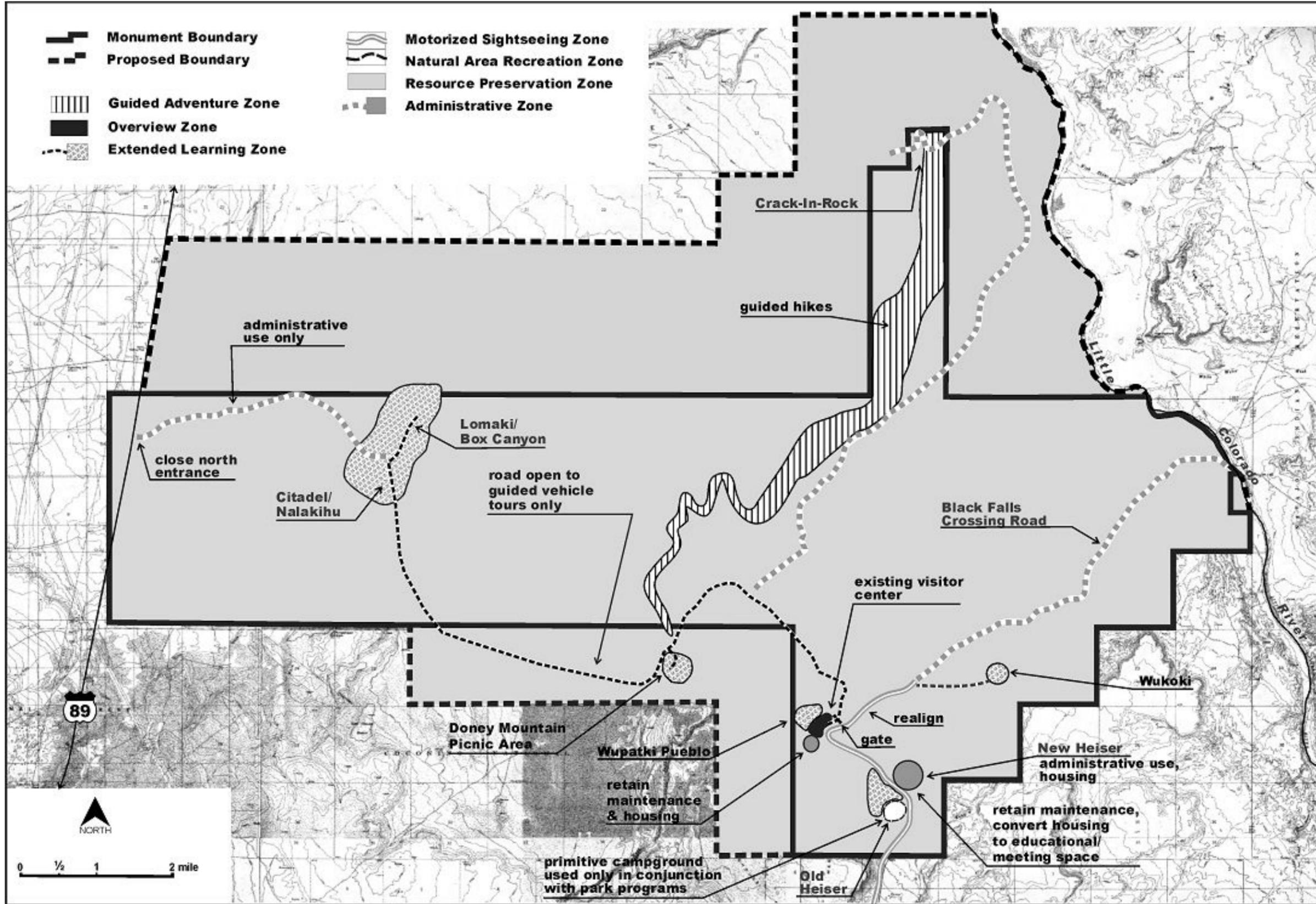


Wupatki National Monument - Arizona

Existing Conditions

UNITED STATES DEPARTMENT OF THE INTERIOR - NATIONAL PARK SERVICE

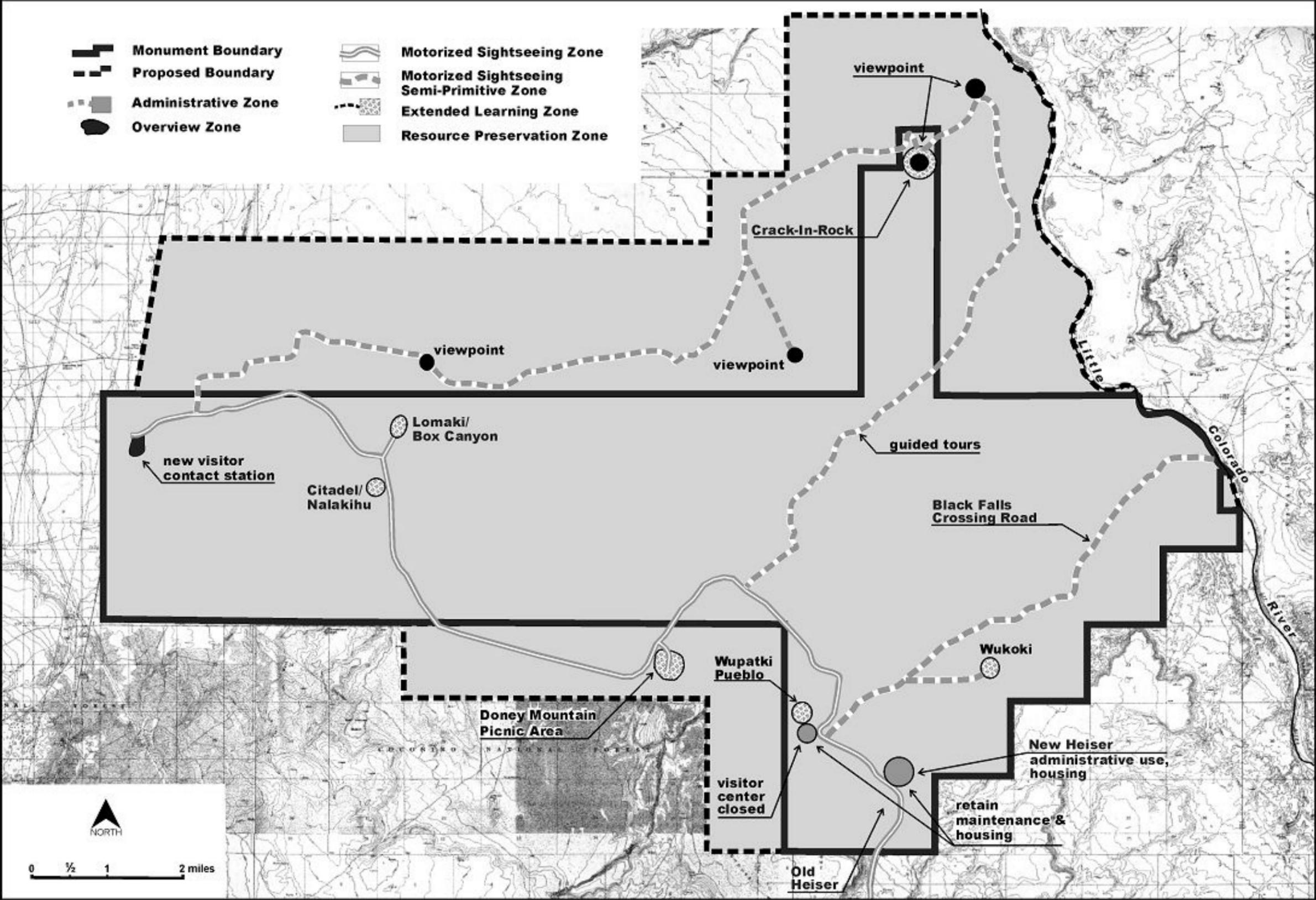
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Wupatki National Monument - Arizona

Alternative 1 UNITED STATES DEPARTMENT OF THE INTERIOR - NATIONAL PARK SERVICE

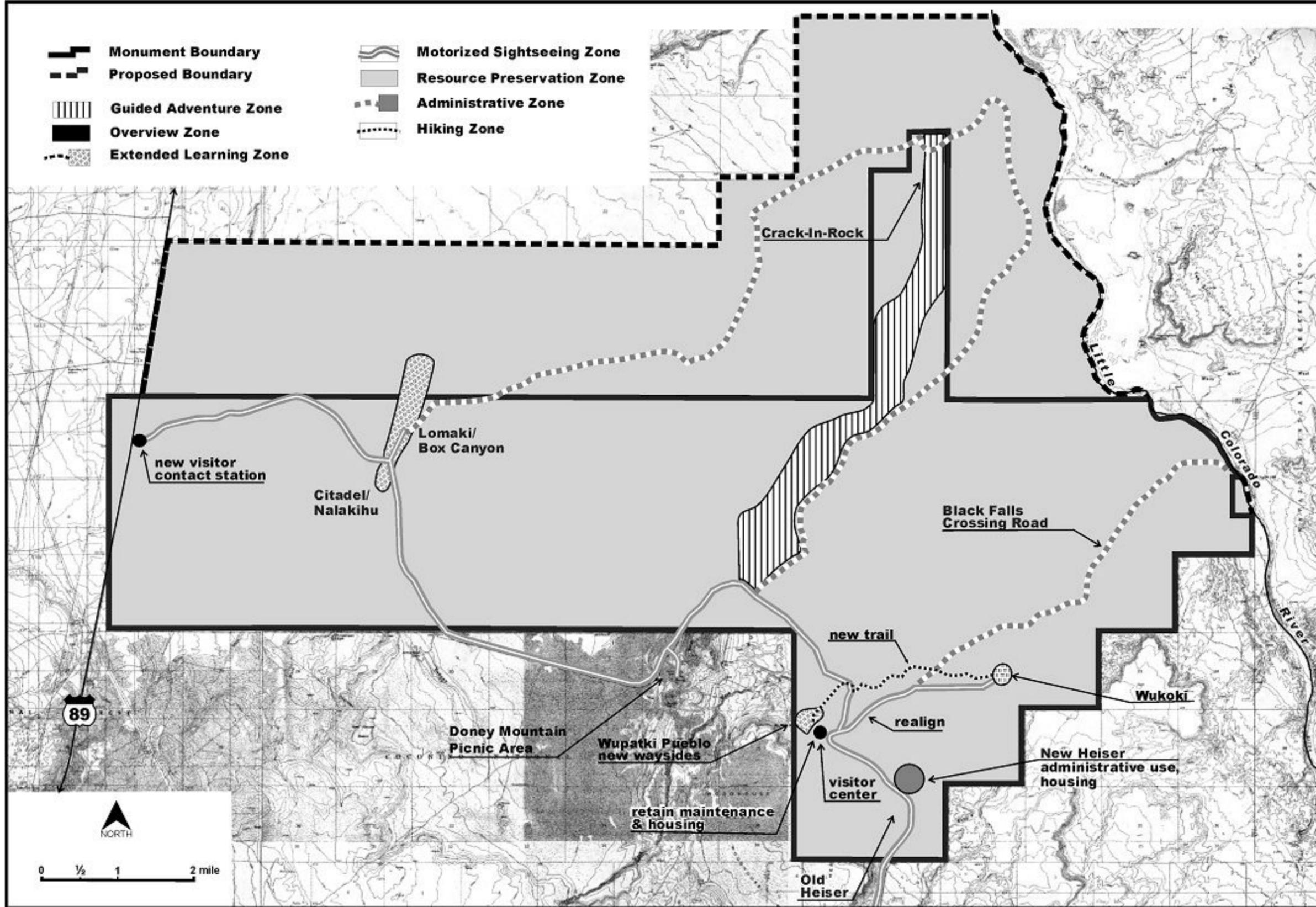
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Wupatki National Monument - Arizona

Alternative 2 UNITED STATES DEPARTMENT OF THE INTERIOR - NATIONAL PARK SERVICE

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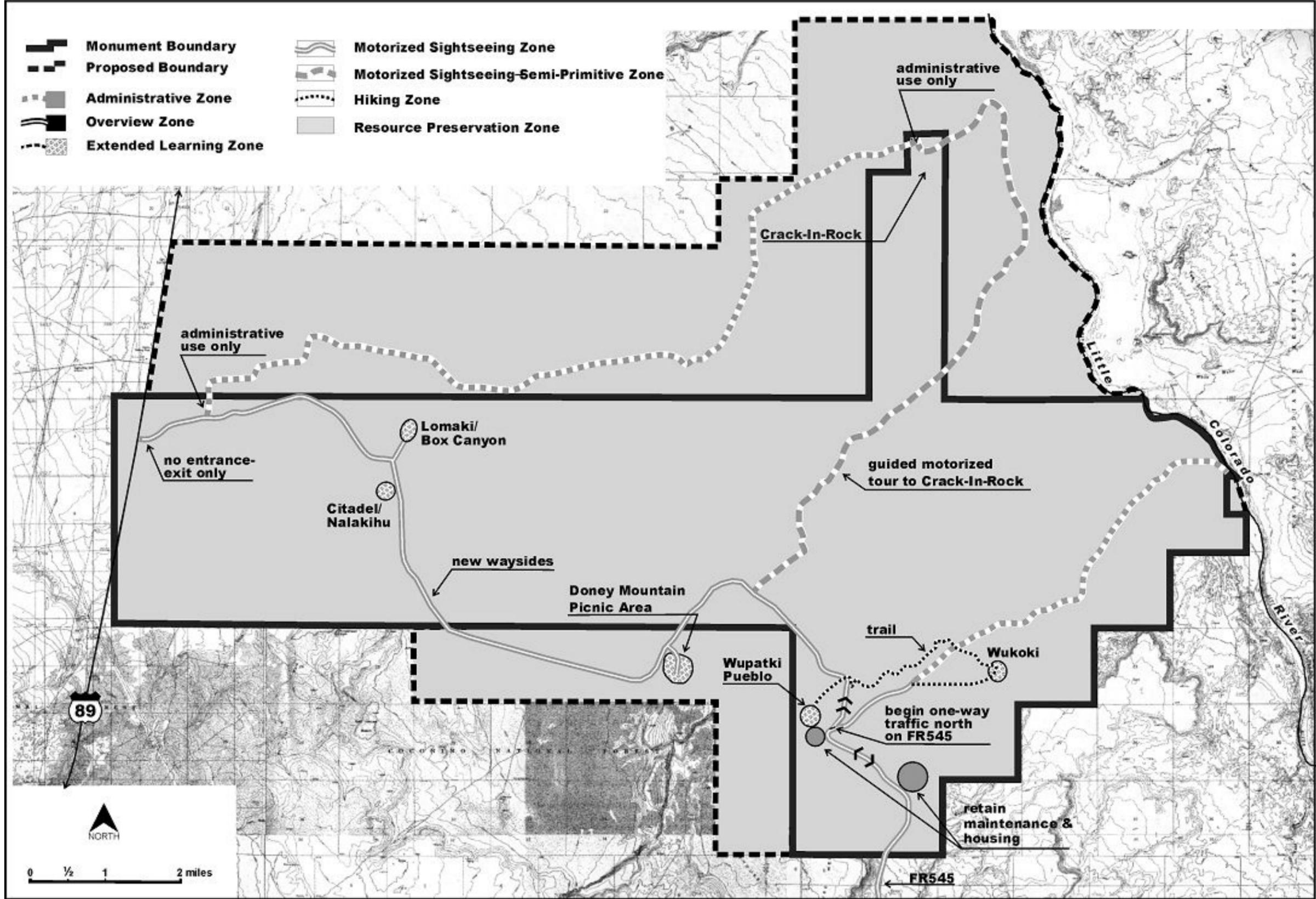


Wupatki National Monument - Arizona

Alternative 3 (Preferred)

UNITED STATES DEPARTMENT OF THE INTERIOR - NATIONAL PARK SERVICE

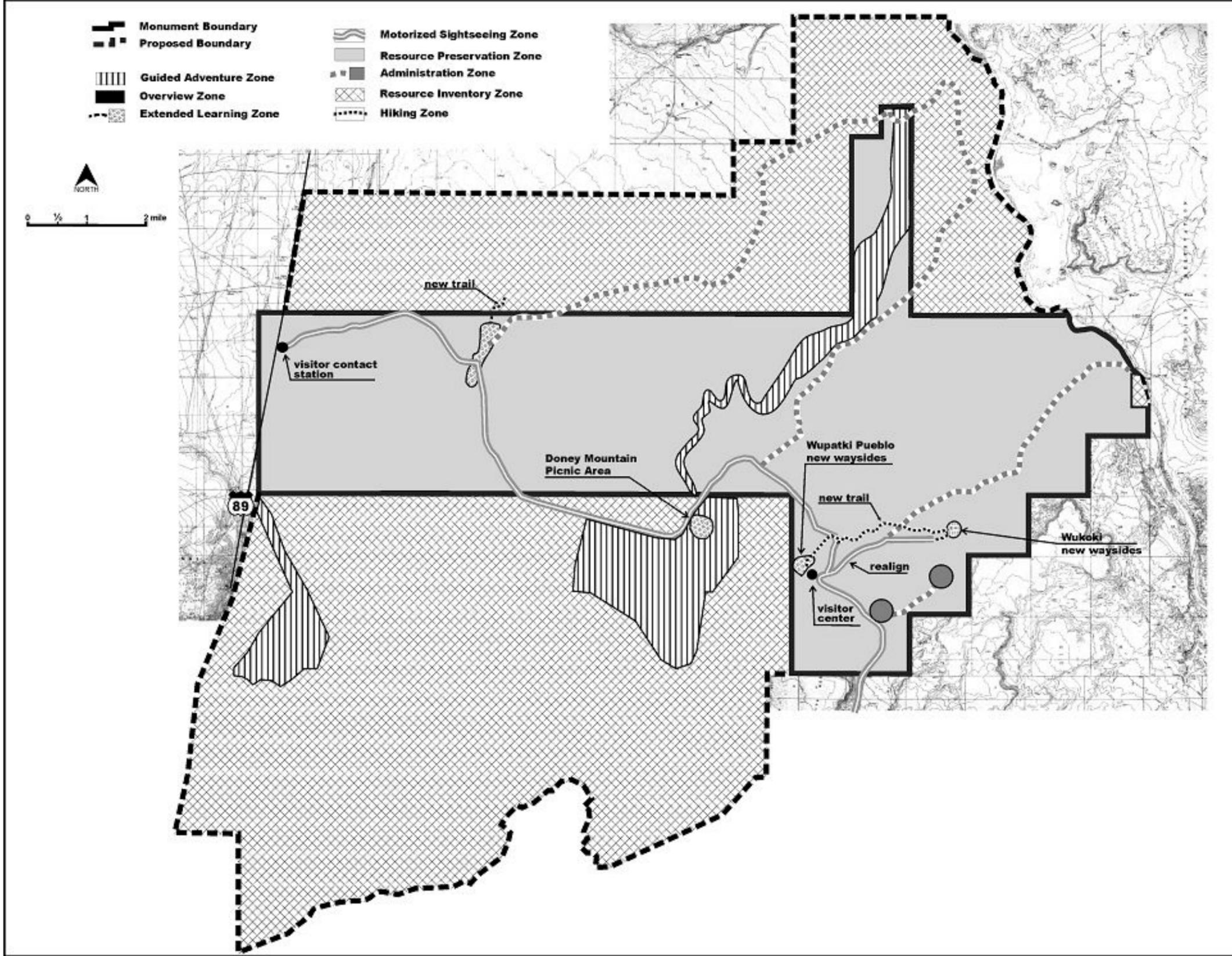
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Wupatki National Monument - Arizona

Alternative 4 UNITED STATES DEPARTMENT OF THE INTERIOR - NATIONAL PARK SERVICE

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Wupatki National Monument - Arizona
Alternative Considered But Rejected

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UNITED STATES DEPARTMENT OF THE INTERIOR - NATIONAL PARK SERVICE

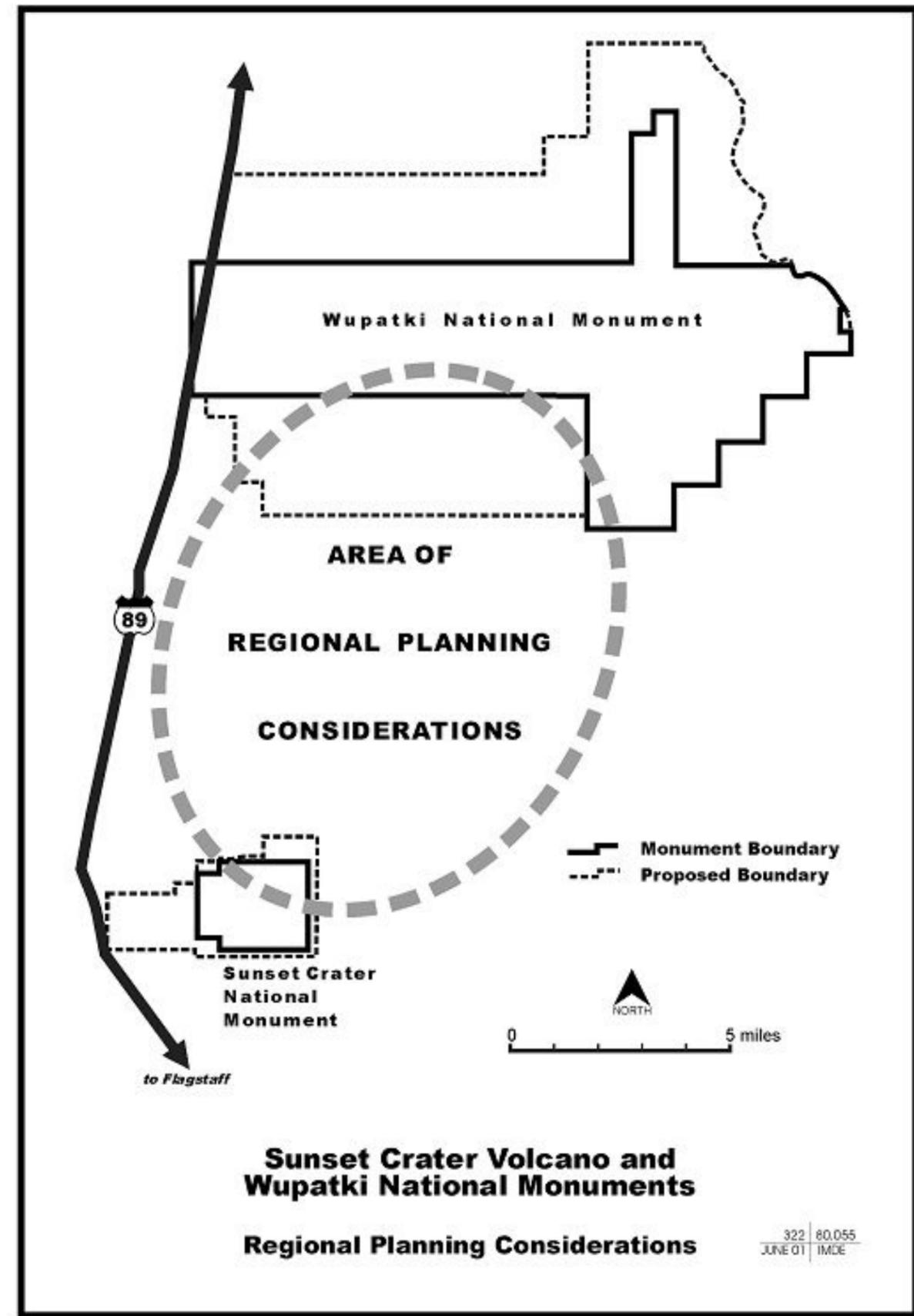
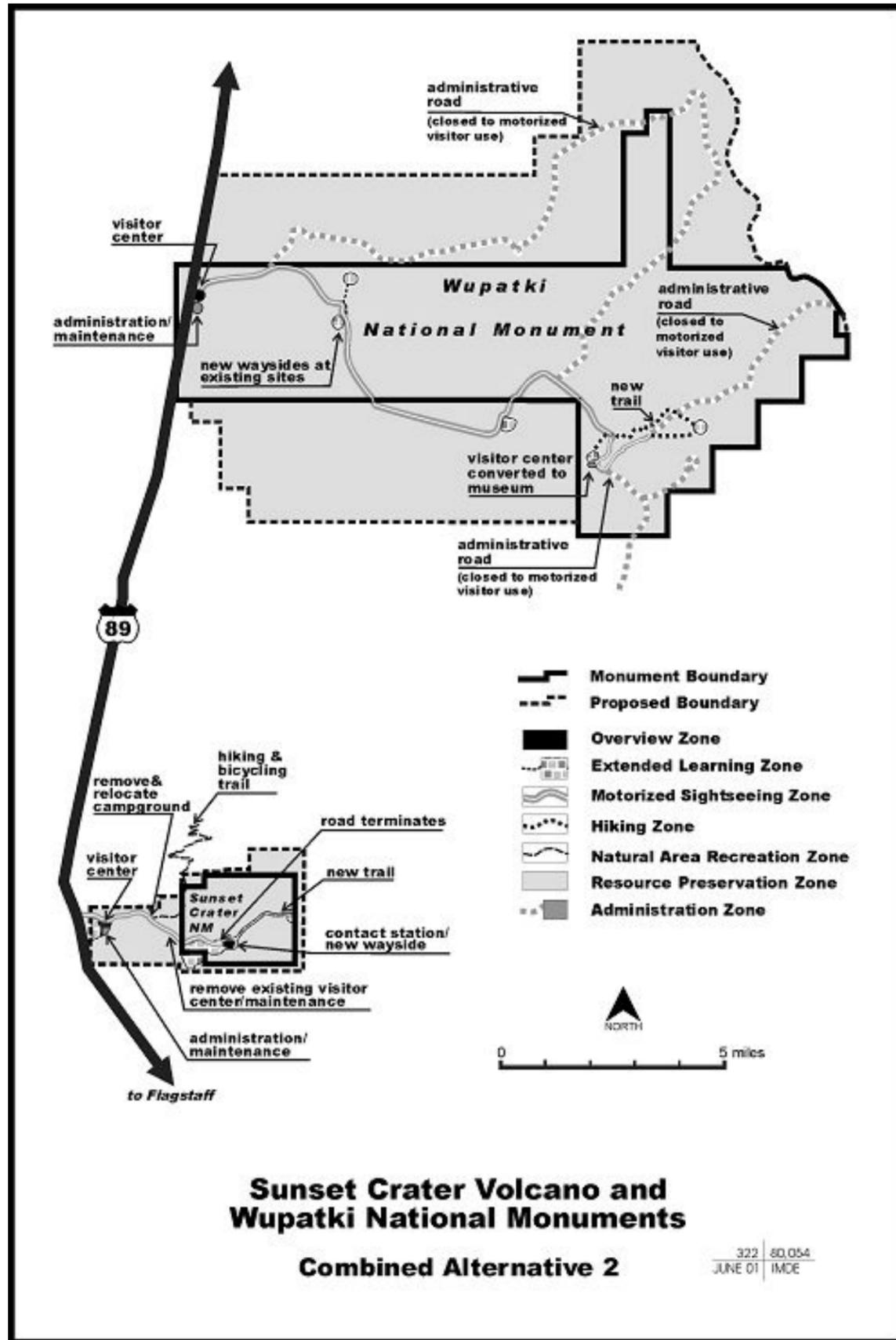


Table 2: Summary of Alternatives

No-Action	Alternative 1	Alternative 2	Alternative 3 (Preferred)	Alternative 4
<p>The No-Action Alternative would involve no new construction, no additional trail developments, and no road realignments. The existing CCC and Mission 66 visitor center would remain, as would the Mission 66 houses, apartment complex, and maintenance facility. Facilities would be maintained to support current activities, but no new facilities, other than a new storage building at New Heiser, specifically to address the hantavirus problem, would be built, and existing management activities would continue. Planning and design of new wayside exhibits and museum exhibits is in progress and would continue under the No-Action Alternative. Plans are in accordance with the Flagstaff Areas Comprehensive Interpretive Plan, to improve visitor understanding and appreciation of Wupatki resources. Plans are under way to restore historic conditions at Heiser Spring and would continue under the No-Action Alternative. The backcountry would remain closed for unguided visitor activities, and unguided visitor access to archeological sites would continue. Recent archeological studies show that the density of archeological sites within the monument continues for 1 to 2 miles north of the northern monument boundary fence into Coconino Plateau Natural Re-</p>	<p>Alternative 1 would significantly change the way people visit and experience Wupatki NM. Emphasis would be on maintaining easy access to the most popular features for most visitors, while creating special learning opportunities for those with more time and interest. Visitors would enter the park via existing FR545 from Sunset Crater Volcano, proceed only as far as the existing Wupatki visitor center and Wukoki Pueblo, and return via the same route. The park entrance would be gated at night to increase resource protection. FR545 between the Lomaki-Citadel area and US89 would be abandoned and the pavement would be removed. A primitive road would be maintained along the former route for administrative uses. FR545 between the visitor center and the Lomaki-Citadel area would be closed to traffic except for guided access. Entrance to the park via FR150 would be eliminated. The Black Falls Crossing Road would be maintained for administrative purposes, including access for Navajo Reservation residents. The Wukoki spur road would be realigned to meet FR545 north of the visitor center. The current Wukoki parking area would be pulled back from the site and the access trail would be lengthened to at least one-quarter of a mile, eliminating vehicle traffic from the immediate vicinity of Wukoki</p>	<p>Alternative 2 would emphasize improving vehicle access to more of the park to provide for diverse sightseeing experiences and on-site interpretation. Educational information would be provided on-site, allowing specific features/sites to be seen/visited, rather than being provided from a central facility, which would enhance long-term integrity of archeological sites and natural resources. FR545 would remain open to 24-hour, 2-way traffic and would provide the same access to Wupatki, Wukoki, Citadel/Nalakihi, and Lomaki/Box Canyon as it does now. Access to these areas would be gated at night. A new visitor contact station and wayside orientation exhibit would be constructed near the north entrance from US89. Park staff previously dedicated to the visitor center operation would be stationed at the Wupatki, Wukoki, Lomaki/Citadel, and Doney Mountain areas to provide on-site interpretation. Wukoki, Lomaki/Box Canyon, and Citadel/Nalakihi areas would likely need backcountry toilets, shelters, and picnic tables. NPS visitor services operations at the visitor center would cease.</p>	<p>The preferred alternative was developed to ensure the preservation of sensitive park resources while providing a greater diversity of visitor experiences and locations. FR545 would remain open to 24-hour, 2-way traffic and would provide the same access to Wupatki, Citadel/Nalakihi, and Lomaki/Box Canyon archeological areas as it does now; access to these areas would be gated at night. The Wukoki spur road would be realigned to meet FR545 north of the visitor center. The current Wukoki parking area would be pulled back from the site, and the access trail would be lengthened to at least one-quarter of a mile, eliminating vehicle traffic from the immediate vicinity of the ruins and providing a more peaceful visitor experience. Ranch roads within the proposed partnership/expansion area to the north would be maintained in existing condition for administrative purposes and occasional escorted activities. The Black Falls Crossing Road would be maintained in its existing condition as an administrative road. A new visitor contact station and wayside orientation exhibit would be constructed near the</p>	<p>Alternative 4 would restructure the way visitors access and experience both Wupatki and Sunset Crater Volcano NMs to provide a more unified interpretive story and greater protection for natural and cultural resources. Visitors would enter at Sunset Crater Volcano only. FR545 would be modified to be a one-way exit road from the existing Wupatki visitor center to the north junction with US89. Twenty-four-hour, two-way traffic would be retained between Wupatki and Sunset Crater Volcano. The road would be gated at the beginning of the one-way and closed at night. The Black Falls Crossing Road and the portion of FR150 within the park boundary would be closed and reclaimed. The Wukoki spur road would be realigned to meet FR545 north of the visitor center. The parking area would be pulled back from the site, and the trail would be lengthened to about one-quarter to one-half of a mile. For visitors wishing a longer hike and greater opportunity for solitude, a new primitive trail would be developed from the existing visitor center to Wukoki. Off-trail backcountry hiking would not be permitted.</p>

Table 2: Summary of Alternatives

No-Action	Alternative 1	Alternative 2	Alternative 3 (Preferred)	Alternative 4
<p>serve Lands. Archeologists believe that these resources are a direct extension of the cultural landscape partially preserved within current monument boundaries. In order to provide protection for these valuable cultural resources, expansion of the park boundary to the north has been proposed. Management actions consistent with this goal would continue under the No-Action Alternative.</p>	<p>Pueblo and providing a more peaceful visitor experience. Self-guided tours would be improved, and the number of guided tours would be increased. Wukoki and Wupatki Pueblos would continue to be open for day use and visited on a self-guided basis. Guided vehicle and walking tours would allow visitors to see and experience the Doney Mountain and the Citadel/Nalakihu and Lomaki/Box Canyon areas. Unguided hiking in the Resource Protection Zone would be prohibited. Additional in-depth learning would be achieved through ranger-led hikes (full day or multi-day) into the Guided Adventure Zone, including the Crack-in-Rock area. Visitor numbers would be managed to keep these experiences personalized and to minimize resource damage. Educational workshops and seminars could be offered in conjunction with, or to supplement, these activities. The existing visitor center and associated housing/maintenance area would be retained. A small primitive campground would be developed for use only in conjunction with sponsored park programs. To increase in-depth learning activities, one of the existing houses would be converted to education and meeting space. Areas of the park not zoned for administrative or visitor use would remain closed to protect resources.</p>	<p>The Southwest Parks and Monuments Association would be given the option to use part of the building for continued sales of books and educational materials. The rest of the structure would be converted to offices and research/storage space. Existing housing and maintenance facilities would be retained. Existing roads to the Crack-in-Rock and northern expansion lands would be gated and maintained in primitive condition. They would be used for escorted four-wheel-drive and/or mountain bike tours to interpret a broader range of park themes, such as prehistoric culture, Navajo, and ranching history. Crack-in-Rock Pueblo would be visited on guided hikes during the four-wheel-drive tours. The scenic loop corridor would likely need backcountry toilets, shelters, and picnic tables. The Black Falls Crossing Road would be maintained in its current condition and opened to park visitors. New waysides would be installed to interpret Navajo history and provide information on the neighboring Navajo Reservation. Areas of the park not zoned for administrative or visitor use would remain closed to protect resources.</p>	<p>north entrance from US89. The existing visitor center would remain open. A broader range of resources, both cultural and natural, would be interpreted in Extended Learning Zones around Wupatki, Lomaki/Box Canyon, Citadel/Nalakihu, and Wukoki archeological areas. Guided hikes would continue into a Guided Adventure Zone, including overnight trips to Crack-in-Rock Pueblo. A new trail would be constructed into the grassland ecosystem on Antelope Prairie. For visitors desiring a longer hike and greater opportunities for solitude, a trail would be constructed from the visitor center to Wukoki. Areas of the park not zoned for administrative or visitor use would remain closed to protect resources.</p>	<p>Most of the existing housing, maintenance, and administrative facilities at Wupatki would be removed and the areas rehabilitated. One historic structure would be retained as a residence, and the historic portion of the visitor center would be retained as a ranger station. The remainder of the visitor center would be removed. Minimal facilities would be provided at some locations, including backcountry toilets, drinking water, and picnic tables. Visitor opportunities at Wupatki would decrease with removal of the visitor center/museum; however, extended learning would still be provided at each of the existing day use sites. Guided overnight hikes to Crack-in-Rock would be discontinued, but guided vehicle tours would be offered in their place, using existing primitive roads. The NPS would monitor impacts to resources resulting from tours and adjust the frequency of tours accordingly. Areas of the park not zoned for administrative or visitor use would be closed to protect resources.</p>

Table 3: Summary of Major Impacts

	No-Action Alternative	Alternative 1	Alternative 2	Alternative 3 (Preferred)	Alternative 4
Archeological Resources	<p>The No-Action Alternative would have the greatest adverse effect on archeological resources, because a large number of sites (up to 25%) would potentially be open to some form of visitation. Adverse impacts from visitation would be offset to some degree by positive benefits derived from visitors receiving education and an enhanced appreciation of the resources from participating in guided adventures. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.</p>	<p>In comparison to existing conditions, Alternative 1 would have a beneficial effect on archeological resources because fewer sites would be open to visitation and most visitation would be restricted to guided tours. However, more visitors would be concentrated in specific areas, including Wupatki, Wukoki, the Antelope Canyon-Doney Cliffs area, and the Citadel-Lomaki area, leading to greater impacts to the sites in those areas. Adverse impacts from more concentrated visitation would be offset to some degree by positive benefits derived from visitors receiving more education and an enhanced appreciation of the resources from participating in guided adventures. In addition to those mentioned, there would be other, less-severe effects as a result of implementing this alternative.</p>	<p>In comparison to existing conditions, Alternative 2 would have a major beneficial effect on archeological resources, because visitation would be largely restricted to stabilized front country sites and Crack-in-Rock Pueblo. In comparison to existing conditions, considerably fewer archeological resources would be impacted, because substantially less backcountry area would be open to visitation and the associated impacts from human use. Visitation impacts at Crack-in-Rock Pueblo would increase relative to existing conditions, and sites in close proximity to the Crack-in-Rock and Black Falls Crossing Roads could sustain damage from cyclic maintenance activities, but these adverse impacts would be offset to some degree by positive benefits derived from visitors receiving more education and an enhanced appreciation of the resources. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.</p>	<p>The preferred alternative would have a moderately beneficial effect on backcountry archeological resources relative to existing conditions, because visitation would be restricted to stabilized front country sites, sites in the Lomaki-Citadel vicinity, the Doney Cliffs area, and Crack-in-Rock Pueblo. In comparison with existing conditions, considerably fewer archeological resources would be impacted by visitation. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.</p>	<p>In comparison to existing conditions, Alternative 4 would have a major beneficial effect for most archeological resources, because visitation would be restricted to stabilized front country sites and Crack-in-Rock Pueblo. The creation of a new trail to Wukoki would offset these benefits slightly. Impacts at Crack-in-Rock Pueblo would increase substantially relative to existing conditions, but the vast majority of sites in the monument would be protected from incremental degradation from long-term visitor use. In addition to those mentioned, there would be other, less-severe effects as a result of implementing this alternative.</p>

Table 3: Summary of Major Impacts

	No-Action Alternative	Alternative 1	Alternative 2	Alternative 3 (Preferred)	Alternative 4
Historic Character of the Built Environment	The No-Action Alternative would have minor to moderate impacts on the CCC and Mission 66 built environments. Any future alterations to the Mission 66 landscape, in conjunction with the minor, cumulative effects of previous changes and this alternative could result in moderate cumulative effects to the Mission 66 designed landscape. Other minor impacts would also result from implementation of this alternative.	Alternative 1 would have a long-term moderate adverse impact on the pre-historic landscape, a minor impact on the Old Heiser maintenance yard and housing area, and a minor to moderate adverse impact on the designed Mission 66 landscape. There would be an overall reduction of integrity in the prehistoric and Mission 66 landscapes, but not to the extent that they would no longer be eligible for listing on the National Register of Historic Places. Any future alterations to the prehistoric and Mission 66 landscapes, in conjunction with the moderate adverse, cumulative effects of previous changes and this alternative could result in moderate, adverse cumulative effects to the prehistoric and Mission 66 designed landscape. Other minor impacts would also result from implementation of this alternative.	Alternative 2 would have minor to moderate, adverse impact(s) on the visitor center and the Black Falls Crossing Road and would have a moderate adverse impact on the prehistoric cultural landscapes at the north entrance to the monument and at Crack-in-Rock Pueblo. Future alterations to the prehistoric landscape, the visitor center, or the Black Falls Crossing Road, in conjunction with the minor and moderate adverse impacts of this alternative could result in moderate, adverse cumulative effects to the prehistoric landscape. Other minor impacts would also result from implementation of this alternative.	The preferred alternative would have long-term moderate adverse impacts on the prehistoric landscape and the Mission 66 landscape. There would be an overall reduction of historic integrity of both landscapes, but not to the extent that they would no longer be eligible to be listed on the National Register of Historic Places. Any future alteration to the prehistoric and Mission 66 landscapes, in conjunction with the moderate, adverse cumulative effects of previous changes and this alternative could result in moderate, adverse cumulative effects to both designed landscapes. Other minor impacts would also result from implementation of this alternative.	Alternative 4 would have long-term moderate adverse impacts on the prehistoric and Mission 66 landscapes. There would be an overall reduction of historic integrity in the landscapes, but not to the extent that they would no longer be eligible to be listed in the National Register of Historic Places. Any future alterations of the landscapes, in conjunction with the adverse, cumulative effects of previous changes and the preferred alternative, could result in major, adverse cumulative effects to the prehistoric and Mission 66 landscapes. Other minor impacts would also result from implementation of this alternative.
Ethnographic Resources	The No-Action Alternative would continue to have moderate to major adverse effects on ethnographic resources to the extent that visitor access continues to have an adverse effect on	Alternative 1 would have long-term, beneficial effects on ethnographic resources by increasing their protection from the vandalism that could result from visitor access, as well	Alternative 2 would provide overall beneficial effects to ethnographic resources. Other minor impacts would also result from implementation of this alternative.	Alternative 3 would provide overall beneficial effects to ethnographic resources. Tribal consultation would be imperative to ensure there are no adverse effects on	Alternative 4 would provide a beneficial effect on tribal cultural values and would provide the greatest protection to ethnographic resources of all proposed alternatives. Other minor

Table 3: Summary of Major Impacts

	No-Action Alternative	Alternative 1	Alternative 2	Alternative 3 (Preferred)	Alternative 4
	<p>archeological resources. Some of the actions common to the No-Action Alternative and all alternatives, including proposed boundary expansions, updating of interpretive exhibits, restoration of the Old Heiser spring, and backcountry closures, have the potential to produce moderate to major beneficial impacts to ethnographic resources, provided these actions are implemented in consultation with the traditionally associated tribes. Other minor impacts would also result from implementation of this alternative.</p>	<p>as by increasing visitor education through updated interpretive media and messages. Other minor impacts would also result from implementation of this alternative.</p>		<p>ethnographic resources as a result of developing new self-guided trails and overnight trips to Crack-in-Rock. Other minor impacts would also result from implementation of this alternative.</p>	<p>impacts would also result from implementation of this alternative.</p>
Natural Systems and Processes	<p>The existing management of Wupatki National Monument has resulted in few long-term adverse impacts to natural systems and processes. Under the No-Action Alternative, the NPS would manage for the continued recovery of natural systems from historic land uses, control nonnative species when feasible, and restore disturbed areas and other natural processes, such as fire, to the ecosystem. The proposed boundary expansion would have long-term beneficial impacts, espe-</p>	<p>The presence of Wupatki as a recreational area might contribute to community growth around Flagstaff, and thus to cumulative effects upon regional natural systems, but these impacts are believed to be negligible and considerably offset by the value of the monument as a long-term resource conservation area. In addition to these impacts, there would be other, less severe impacts as a result of implementing this alternative.</p>	<p>Alternative 2 would have an overall long-term, minor beneficial impact on the natural systems and processes of Wupatki National Monument. The NPS would manage for the continued recovery of natural systems from historic land uses, control nonnative species when feasible, and restore disturbed areas and other natural processes to the ecosystem. The impacts from proposed changes to visitor access would result in negligible impacts within the Extended</p>	<p>Alternative 3 would have an overall long-term, moderate beneficial impact on the natural systems and processes of Wupatki National Monument. The NPS would manage for the continued recovery of natural systems from historic land uses, control nonnative species when feasible, and restore disturbed areas and other natural processes to the ecosystem. Impacts of re-routing the Wukoki Pueblo access road and trail would be mitigated through restoration of the old access</p>	<p>Alternative 4 would have an overall long-term, moderate beneficial impact on the natural systems and processes of Wupatki National Monument, especially with regard to maintaining the integrity of the natural grassland within the western half of the monument. The NPS would manage for the continued recovery of natural systems from historic land uses, control nonnative species when feasible, and restore disturbed areas and other natural processes to the ecosystem. Impacts of re-</p>

Table 3: Summary of Major Impacts

	No-Action Alternative	Alternative 1	Alternative 2	Alternative 3 (Preferred)	Alternative 4
	<p>cially to wildlife. Traffic along FR545 and Black Falls Crossing Road contributes to increased mortality rates of wildlife. The presence of Wupatki as a recreational area might contribute to community growth around Flagstaff and cumulative effects to regional natural systems, but these impacts are believed to be negligible and considerably offset by the value of the monument as a long-term resource conservation area. In addition to these impacts, there would be other, less severe impacts as a result of implementing this alternative.</p>		<p>Learning Zone, and long-term, minor beneficial impacts to areas that receive occasional visitor use under existing conditions. Impacts of building new support facilities would be very localized, minor, and offset by promotion of appropriate visitor behavior. The impacts of the scenic loop and visitor use along the Black Falls Crossing Road would depend on the timing of road traffic and the size of guided groups. The proposed road changes would likely result in long-term, negligible to locally minor impacts to soils, intermittent drainage patterns, vegetation, and increased noise and disturbance to wildlife, as well as more pronounced, long-term, moderate adverse impacts within the grassland ecosystem and wildlife populations in the western portion of the monument. The presence of Wupatki as a recreational area would have the same effects as it would in the No-Action Alternative. In addition to these impacts, there would be other, less severe impacts as a result of implementing this alternative.</p>	<p>road and parking lot. The area receiving increased visitor use could see localized, long-term, negligible to minor adverse impacts to soils, vegetation, intermittent drainages, and wildlife. Increased human presence in a larger area around the Citadel and Lomaki Pueblos and along the new grassland trail would have long-term, minor to moderate adverse impacts to native grassland integrity and wildlife in the western half of Wupatki. The impacts of Wupatki as a recreational area would be the same as under the No-Action Alternative. In addition to these impacts, there would be other, less severe impacts as a result of implementing this alternative.</p>	<p>routing the Wukoki Pueblo access road and trail would be mitigated through restoration of the old access road and parking lot. The proposed new trail between Wupatki and Wukoki Pueblos would result in long-term, negligible to minor adverse impacts to soils, intermittent drainage patterns, vegetation, and wildlife. Impacts of Wupatki as a recreational area would be the same as under the No-Action Alternative. In addition to these impacts, there would be other, less severe impacts as a result of implementing this alternative.</p>

Table 3: Summary of Major Impacts

	No-Action Alternative	Alternative 1	Alternative 2	Alternative 3 (Preferred)	Alternative 4
Threatened/ Endangered Species	No threatened or endangered species are known to occur within Wupatki National Monument. Vegetation and wildlife habitat within the monument will continue to recover from former ranching activities. There are 11 sensitive plant and 7 sensitive animal species known to occur within Wupatki or within similar nearby habitats. The back-country closure effectively protects most sensitive plant habitats from disturbance. Current visitor activity near developed areas and demand for traditionally used species may cause increased threats to plants. Occasional incidental trampling of vegetation during off-trail activities likely has long-term, negligible to minor adverse impacts on plant "species of concern." Current visitor use and NPS operations at Wupatki likely have long-term, negligible to minor adverse impacts to the Wupatki pocket mouse, Townsend's big-eared bat, and spotted bat. The NPS is cooperating with other agencies and landowners to improve conditions, for pronghorn. The existing access road and ongoing juniper woodland expansion have long-term, mod-	Alternative 1 would cause no adverse impacts to threatened and endangered species at Wupatki National Monument. Most of the monument would remain closed to general visitor access, and the impacts for many sensitive species and unique habitats would likely be similar to those identified for the No-Action Alternative. The proposed changes in the road system would eliminate most traffic through the western half of the monument, which would have long-term, moderate beneficial impacts to pronghorn. Development of a campground and establishing an Extended Learning Zone around Heiser Spring would deter NPS efforts to restore the spring as a source of drinking water for wildlife, which would have a long-term, moderate adverse impact to pronghorn within the monument. Minor impacts could result from local realignment of the Wukoki Pueblo access road and extension of the trail. The larger Extended Learning Zone around the Citadel-Lomaki area would increase human presence and disturbance to grass-	Alternative 2 would cause no adverse impacts to threatened and endangered species at Wupatki National Monument. Most of the monument would remain closed to general visitor access, and the impacts for many sensitive species and unique habitats would likely be similar to those identified under the No-Action Alternative. Increase to road system and vehicle access within the monument would have long-term, moderate adverse impacts to pronghorn and increase disturbance to sensitive plant habitats. Construction of a new visitor orientation station at the north entrance would permanently impact a local area of habitat for the Wupatki pocket mouse and pronghorn. Pronghorn movement and foraging patterns would be moderately disrupted by increased human presence. The Extended Learning Zone around the Citadel-Lomaki area would increase human presence and potential disturbance to grassland habitat, karst features, several sensitive plant species, Townsend's big-eared bat, spotted bat, pronghorn, and golden	The preferred alternative would cause no adverse impacts to threatened and endangered species at Wupatki National Monument. Most of the monument would remain closed to general visitor access, and the impacts for many sensitive species and unique habitats would likely be similar to those identified under the No-Action Alternative. The construction of a new visitor orientation station at the north entrance would permanently impact a local area of habitat for the Wupatki pocket mouse and pronghorn. Pronghorn movement and foraging patterns would be moderately disrupted by increased human presence. The proposed learning zone around the Citadel-Lomaki area would increase human presence and potential disturbance to grassland habitat, karst features, several sensitive plant species, Townsend's big-eared bat, spotted bat, pronghorn, and golden eagle. The a new orientation facility combined with increased visitor access within the western half of the monument would slightly increase cumulative adverse	Alternative 4 would cause no adverse impacts to threatened and endangered species at Wupatki National Monument. Most of the monument would remain closed to general visitor access, and the impacts for many sensitive species and unique habitats would likely be similar to those identified under the No-Action Alternative. The proposed changes in the road system would eliminate nighttime traffic through the western half of the monument, which would have long-term, moderate beneficial impacts to pronghorn. Minor impacts could result from local realignment of the Wukoki Pueblo access road and extension of the trail. Abandonment of the Black Falls Crossing Road would eliminate potential off-road driving and incidental hiking impacts to sensitive plants adjacent to the road corridor. Eliminating vehicle use would decrease road mortality and have long-term, minor beneficial impacts to the Wupatki pocket mouse. Eliminating guided "discovery hikes" and dispersed hiking access to Crack-in-Rock Pueblo would benefit a large area

Table 3: Summary of Major Impacts

	No-Action Alternative	Alternative 1	Alternative 2	Alternative 3 (Preferred)	Alternative 4
	<p>erate adverse impacts. The boundary fence and visitor use have long-term, minor adverse impacts. Road traffic and visitor use may interfere with breeding golden eagles. Accordingly, the NPS recently decided to close the Citadel Pueblo to visitors during the breeding season. Continued human disturbance of nesting sites likely results in long-term, moderate to major impacts within the monument. A number of unique habitats exist within the monument, and most of them are located within the closed back-country area, which protects them from most impacts. The proposed boundary expansion would nearly double grassland habitat and have long-term, moderate, beneficial impacts to grassland-dependent species. Existing visitor use and NPS operations have minor impacts upon karst features and negligible to minor impacts upon the cinder alluvial fan and the Doney Monocline. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.</p>	<p>land habitat, karst features, and several sensitive species. An increase in the level of dispersed hiking with the proposed Guided Adventure Zone, especially around Crack-in-Rock Pueblo, would result in increased impacts to habitat for several sensitive plant species. If visitor numbers, access patterns, and the timing of guided visits are appropriately managed by the NPS, this alternative would result in long-term negligible to minor impacts to most sensitive species and unique habitats. Other minor impacts would also occur as a result of implementing this alternative.</p>	<p>eagle. Opening the Black Falls Crossing Road to park visitors would result in increased road mortality of Wupatki pocket mouse and trampling of rare plant habitats adjacent to the road corridor. The elimination of guided "discovery hikes" and dispersed hiking access to Crack-in-Rock Pueblo would benefit a large area of sensitive plant habitat. If visitor numbers, access patterns, and the timing of guided visits are appropriately managed by the NPS, this alternative would result in long-term negligible to minor impacts to most sensitive species and unique habitats, except perhaps for pronghorn. Other minor impacts would also result from implementation of this alternative.</p>	<p>impacts to the integrity of grasslands and have long-term, minor to moderate adverse impacts on the pronghorn herd. Minor impacts could result from local realignment of the Wukoki Pueblo access road and extension of the trail. An increase in the level of dispersed hiking with the proposed Guided Adventure Zone, and the establishment of two new trails would increase off-trail vegetation trampling and have negligible to long-term, minor impacts to suitable habitat for several sensitive plant species. Other minor impacts would also result from implementation of this alternative.</p>	<p>of sensitive plant habitat. The removal of facilities at Wupatki would provide a negligible increase in suitable habitat for a number of sensitive plant species known to occur within the eastern half of the monument. The reduction in NPS personnel stationed at Wupatki would delay responses to reported resource violations, which could result in long-term, minor adverse impacts to sensitive species and unique habitats. Other minor impacts would result from implementation of this alternative.</p>

<p>Wetlands, Floodplains and Riparian Habitat</p>	<p>Historic and continuing land use within the Little Colorado River basin and manipulation of the Little Colorado River through impoundments have severely impacted wetland, floodplain, and riparian resources within Wupatki National Monument. The No-Action Alternative would likely have negligible to minor impacts to existing wetlands, floodplains, and riparian resources along the Little Colorado River. Historic ranching and NPS management actions have severely impacted the only three springs within the monument. The NPS proposal to eventually restore early historic conditions at Heiser Spring would have long-term, moderate beneficial impacts to wetland and riparian resources within the monument. The NPS would coordinate with the U.S. Forest Service to address potential impacts to the recharge area in the Coconino National Forest. In addition, there would be other, less severe effects as a result of implementing this alternative.</p>	<p>The impacts to wetlands, floodplains, and riparian habitats would be the same as identified for the No-Action Alternative, except increased visitor activity around Heiser Spring would potentially deter NPS efforts to restore wetlands and riparian habitat at the spring. Other minor impacts would also result from implementation of this alternative.</p>	<p>Except for the impacts of increased vehicle use on intermittent drainage channels and floodplains, under Alternative 2, the impacts to wetlands, floodplains, and riparian habitats would be the same as under the No-Action Alternative. There would be some other negligible to minor adverse impacts as a result of implementing this alternative.</p>	<p>Except for the impacts of increased visitor use on intermittent drainage channels and floodplains, the impacts to wetlands, floodplains, and riparian habitats would be the same as under the No-Action Alternative. There would be some other negligible to minor adverse impacts as a result of implementing this alternative.</p>	<p>Abandoning the Black Falls Crossing Road, rendering the Little Colorado River crossing obsolete would have a negligible to long-term, minor beneficial impact to wetlands, floodplains, and riparian habitat along the river. This benefit might be offset by cost and time required for proposed tamarisk control projects. Increased vehicle use along Crack-in-Rock Road would likely result in long-term, minor adverse impacts where the road crosses the floodplains of intermittent drainages. Visitor use on proposed Wupatki-Wukoki trail would have a negligible to long-term, minor adverse impact to one mile of intermittent floodplain within Deadman Wash. Most other impacts would be the same as for the No-Action Alternative. There would be some other minor impacts as a result of implementing this alternative.</p>
<p>Ability to Experience Full Range of Resources</p>	<p>The overall effect of the No-Action Alternative on access to park resources by the general public and by visitors with disabilities would be moderate and long term, with both bene-</p>	<p>The overall effect of Alternative 1 on access to park resources by the general public and for visitors with disabilities would be moderate and would have both beneficial and adverse ele-</p>	<p>Visitors would have an opportunity to experience more variety of resources in this alternative compared with the No-Action Alternative. More restrictive uses of lands</p>	<p>Within the park boundaries, visitors would have access to all of the park resources that are available under existing conditions, with the exception of the Black Falls Crossing Road.</p>	<p>Under alternative 4, elimination of access to the Black Falls Crossing Road would remove this area from visitor experience, meaning that significant parts of the Wupatki story</p>

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	<p>ficial and adverse elements. The ability to see the real thing and the ability to experience a minimally altered environment would be changed moderately. The ability to understand park resources and the regional context of the parks would be moderately beneficial. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.</p>	<p>ments. The ability to understand park resources and the regional context of the parks would be affected moderately in a beneficial way. Elimination of the drive-through experience would have a significant impact on regional visitors and would be a more educational experience. There would be a greater opportunity to experience natural soundscapes. More kinds of ecological resources would be open to the public than under the No-Action Alternative. Fewer visitors would be likely to access areas that would be available only on guided tours. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.</p>	<p>previously under other jurisdictions would decrease the ability of visitors to experience resources related to park significance. The overall impact to visitor experience would be one of decreased ability to view resources. Some new areas would be open on ranger-led programs, which would allow access to more of the tangibles and intangibles of the Wupatki landscape and cultures than in the No-Action Alternative. In combination with actions being taken outside of the park, an increase in visitation seems likely. There would be other, less severe effects as a result of implementing this alternative.</p>	<p>Visitors would have added access to the new trail to Wukoki and the grasslands near Lomaki. With enhanced interpretation, visitors would gain a greater understanding of all park resources, including those on expanded lands, although many of the parks' resources would be off limits to visitation. The overall impact to visitors' experience of the park resources would be long term and beneficial, but minor. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.</p>	<p>would be more difficult to comprehend. However, guided trips to Crack-in-Rock would add opportunities to see sites that have not been previously developed for visitation. This alternative would cause a moderate adverse impact on visitors' ability to experience a full range of resources related to park significance. Because of the more primitive setting for Wupatki, regional visitors might be apt to stop at the Sunset Crater visitor center only, and not venture into Wupatki, causing them to miss out on the views and other available park resources. This would be a minor to moderate negative effect on regional visitors. Other minor impacts would also result from implementation of this alternative.</p>
<p>Park Neighbors</p>	<p>Within existing conditions, the management actions for the NPS provide beneficial impacts to other agencies, neighbors, and American Indian tribes. The existing conditions result in only minor impacts to the workloads of others in terms of additional administrative tasks, interpretive planning, agreement reviews, and joint planning efforts. Other minor impacts also exist.</p>	<p>Cooperative management and protection efforts with the USFS, the Navajo Nation, and the CPNRL would continue to produce major, long-term, positive impacts in law enforcement, resource management, wildfire management, protection, and visitor services. Closure of FR545 as a park entrance and exit could have a moderate, long-term, adverse impact on neighbors, other land and resource managers, and residents of the</p>	<p>Cooperative management and protection efforts with the USFS, the Navajo Nation, and the CPNRL would continue to produce major, long-term beneficial impacts in law enforcement, resource management, wildfire management, protection, and visitor services. For-fee interpretive programs conducted by partners or concessionaires could have major, long-term, beneficial impacts from profits gained. Increased</p>	<p>Cooperative management and protection efforts with the USFS, the Navajo Nation, and the CPNRL would continue to produce moderate, long-term beneficial impacts in law enforcement, resource management, wildfire management, protection, and visitor services. Increased congestion and contact with others could have a moderate, long-term adverse impact on American Indian tribes seeking traditional cultural uses. Other</p>	<p>Cooperative management and protection efforts with the USFS, the Navajo Nation, and the CPNRL would continue to produce major, long-term benefits in law enforcement, resource management, wildfire management, protection, and visitor services. Conversion of FR545 to a one-way road would have a major, long-term, adverse impact on the residents living on the CPNRL north of the park, some residents living in</p>

		<p>Navajo Nation, who would normally use that road for access to and from the north. Increased congestion and contact with others could have a moderate, long-term impact on American Indian tribes seeking traditional cultural uses. Other minor impacts would also result from implementation of this alternative.</p>	<p>congestion and contact with others could have a moderate, long-term adverse impact on American Indian tribes seeking traditional cultural uses. Other minor impacts would also result from implementation of this alternative.</p>	<p>minor impacts would also result from implementation of this alternative.</p>	<p>Alpine Ranchos, and those living across the Little Colorado River on the Navajo Reservation, because their access from US89 would be restricted and rerouted through Sunset Crater. Boundary expansion could have a moderate, long-term, adverse impact on access by American Indian tribes. Closure of the Black Falls Crossing Road and increased congestion and contact with others could have a moderate, long-term impact on American Indian tribes seeking traditional cultural uses. Other minor impacts would also result from implementation of this alternative.</p>
<p>Operational Efficiency</p>	<p>The No-Action Alternative would result in no substantial change in park operations. The effects of implementing the No-Action Alternative would be minor to moderate. Most of the major roads providing access to the park will see a likely increase in visitor and commuter traffic, which would result in additional congestion and accidents. Maintenance needs would increase. Increased use of roads leading to the park would increase the difficulties that already exist in protecting park resources, including accessing areas of the park that are closed</p>	<p>Alternative 1 would have a long-term moderate beneficial effect on the operational efficiency of the park. It would dramatically change the use of the park from a drive-through experience to a destination park, which would result in a major increase in the management of unregulated use and access into the park, affording greater protection of park resources. Proposed actions would have a moderate impact on park operations, resulting in higher operational costs and an increase in the need for maintenance of the roadway segment between</p>	<p>Alternative 2 would result in minor changes in operational efficiency. The most substantial change would be the modified use of the existing visitor center and the dispersal of park staff to day-use locations. There would be increased demands on the park infrastructure, including roads and facilities. Proposed boundary expansions coupled with how adjacent land managers propose to manage their land would have a moderate beneficial impact on operational efficiency. Other minor impacts would also result from implementation of this alternative.</p>	<p>Changes resulting from implementation of this alternative would have an overall beneficial impact on operational efficiency. There would be some short-term moderate impacts as a result of the construction of the new visitor contact facility at the north entrance, new trails, and the realignment of the Wukoki spur road. Once this construction has been completed there would be a minimal to moderate impact to operational efficiency. Most impacts would be in the form of increased staff to operate the new contact station, perform</p>	<p>This alternative would dramatically change how visitors and staff access the park, and it would substantially remove most of the facilities that support direct park operations. There would be a major long-term benefit resulting from the more restricted access and the conversion of a major portion of the park from a drive-through 24-hour use to day use only. There would be a major adverse effect to operational efficiency with the removal of many of the existing support facilities and the transfer of staff to distant work locations. There</p>

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	<p>to visitation and intentional and unintentional damage to archeological resources. The effects to facilities, utilities, and staffing would be minor to moderate adverse. Many improvements are needed to protect visitor and staff health and safety. Current staff levels have achieved a certain level of efficiency, however, limitations do exist that inhibit the park's ability to provide adequate levels of resource protection and preservation, maintenance of existing facilities, and visitor services. Other minor impacts would also result from implementation of this alternative.</p>	<p>Wupatki and Sunset Crater Volcano and a new primitive campground. Proposed limited boundary expansion coupled with changes in how adjacent land managers propose to manage their land would have a moderate beneficial impact on the park. The level of protection and preservation of park resources would be greatly increased. Other minor impacts would also result from implementation of this alternative.</p>		<p>maintenance on the facilities and trails, and see to increased resource preservation needs. The proposed changes in visitor use would significantly improve and diversify visitor experience; however, there would be increased resource protection and preservation needs. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.</p>	<p>would be a greater need for improved communication, and vehicle costs would increase. Park staff would spend a substantial amount of time commuting between various work locations. The long-term beneficial impacts would include a reduction in overall facility and utility costs. Removal of the facilities would positively affect the cultural landscapes and the park's natural resources. This alternative would dramatically reduce and streamline park operations, but would have a major adverse impact on the effectiveness of park operations. Other minor impacts would also result from implementation of this alternative.</p>
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Table 4: Objectives Met by Alternatives

Objective	No-Action Alternative Existing Conditions	Alternative 1 Limit Motorized Sightseeing and Focus on Extended Learning	Alternative 2 Emphasize Motorized Sightseeing and Resource Protection through on-Site Education	Alternative 3 (Preferred) Preserve Sensitive Park Resources while Diversifying the Range of Visitor Experiences	Alternative 4 Emphasize Integrated Story between the Parks and Minimize Development
1. Maximize Protection of Cultural Resources	Resource protection messages are accomplished through exhibits and personal contact at the visitor center and reinforced by media at the five developed visitor use areas. Resource protection patrols are sporadic at Wupatki Pueblo and other front country sites. For resource protection purposes, areas of the park other than these developed sites and administrative areas are closed to unguided entry.	Cultural resource protection would be enhanced with increased emphasis on longer and more intensive educational programs. Wupatki would become a destination rather than a short drive-through experience.	The long-term integrity of cultural resources would be enhanced through on-site protection and orientation.	The access roads and parking lots at Wukoki, Lomaki/Box Canyon, and Citadel/Nalakihi archaeological areas would be gated at night to deter after-hour visitation. Areas of the park not zoned for administrative or visitor use would remain closed to protect resources.	To enhance cultural resource protection, the portion of FR545 from the current visitor center to US89 would be converted to a one-way road; the north entrance of US89 would be converted to an exit only. By concentrating visitor use in previously developed areas, minimizing new developments, and removing unnecessary structures, this alternative would preserve and enhance the minimally altered prehistoric cultural landscape.
2. Maximize Protection of Natural Resources	Resource protection messages are accomplished through exhibits and personal contact at the visitor center and reinforced by media at the five developed visitor use areas. Resource protection patrols are sporadic at Wupatki Pueblo and other front country sites. For resource protection purposes, areas of the park other than these developed sites and administrative areas are closed to unguided entry.	Natural resource protection would be enhanced with increased emphasis on longer and more intensive educational programs. Wupatki would become a destination rather than a short drive-through experience.	The long-term integrity of natural resources would be enhanced through on-site protection and orientation.	Areas of the park not zoned for administrative or visitor use would remain closed to protect resources.	By concentrating visitor use in previously developed areas, minimizing new developments, and removing unnecessary structures, this alternative would preserve and enhance the minimally altered extensive grassland antelope habitat, seeps, springs, and spectacular scenic views.
3. Expand Diversity of Visitor Experience	Visitor use is concentrated at Wupatki visitor center, four of the park's primary	Fewer archeological sites would be open to unguided or self-guided use	Motorized sightseeing would be maintained and would be expanded to new	A broader range of resources, both cultural and natural, would be inter-	This alternative would take advantage of current visitor use patterns to lead

Table 4: Objectives Met by Alternatives					
Objective	No-Action Alternative Existing Conditions	Alternative 1 Limit Motorized Sightseeing and Focus on Extended Learning	Alternative 2 Emphasize Motorized Sightseeing and Resource Protection through on-Site Education	Alternative 3 (Preferred) Preserve Sensitive Park Resources while Diversifying the Range of Visitor Experiences	Alternative 4 Emphasize Integrated Story between the Parks and Minimize Development
	archeological areas, and the picnic/viewpoint area located at Doney Mountain. The vast majority of visitors interact with the four archeological areas on their own with no on-site NPS presence. Two types of guided activities are offered into the closed areas (discovery hikes and overnight Crack-in-Rock Pueblo hikes). Wupatki is usually visited as part of a larger travel itinerary, and the average visitor stay is two hours or less.	than at present. There would be an increase in the number of guided tours to cultural sites that have not been stabilized or previously developed for visitation. New interpretive programs would be developed to present a broader range of educational and interpretive opportunities.	areas of the park. The road to Black Falls Crossing would be opened to park visitors, and existing primitive roads in the north boundary expansion would be used for guided tours along a scenic backcountry loop.	preted in the Extended Learning Zones around Wupatki, Wukoki, Lomaki/Box Canyon, and Citadel/Nalakihu archeological areas. Guided overnight hikes would continue to Crack-in-Rock Pueblo. A new trail would be constructed in the grassland ecosystem on Antelope Prairie, and a trail would be constructed from the visitor center to Wukoki Pueblo.	visitors through a sequential learning experience. Visitor opportunities would decrease with removal of the visitor center/museum. Extended learning would still be provided at each of the existing day use sites. Guided overnight hikes to Crack-in-Rock would be discontinued, but guided vehicle tours would be offered in their place.
4. Limit Effect on Neighbors	USFS, state, and private lands located between Sunset Crater Volcano and Wupatki are generally viewed by visitors as part of the national parks, although NPS jurisdiction through those lands is limited to the roadway corridor.	FR545 between the visitor center and the Lomaki/Citadel area would be closed to traffic, except for guided access. FR545 between Lomaki/Citadel and US89 would be abandoned and the pavement would be removed.	The Black Falls Crossing Road would be open to park visitors. Tours to Crack-in-Rock Pueblo might be offered through a concessionaire arrangement.	FR545 would remain open to 24-hour, 2-way traffic and would provide the same access to Wupatki, Citadel/Nalakihu, and Lomaki/Box Canyon archeological areas. Ranch roads within the proposed partnership/expansion area to the north would be maintained in existing condition for administrative purposes and occasional escorted activities. The Black Falls Crossing Road would be maintained in its existing condition as an administrative road.	The proposed boundary expansion to the south would include that portion of the park entrance road that is on National Forest lands, which would allow the NPS to manage access to the western half of the park.
5. Improve Operational Efficiency	The existing use and development of the park is based on planning	The north entrance of the park and other entry points would be	The access roads and parking lots at Wukoki, Lomaki/Box Canyon, Citadel/	FR545 would remain open to 24-hour, 2-way traffic and would provide the	The proposed boundary expansion to the south would include that portion

Table 4: Objectives Met by Alternatives

Objective	No-Action Alternative Existing Conditions	Alternative 1 Limit Motorized Sightseeing and Focus on Extended Learning	Alternative 2 Emphasize Motorized Sightseeing and Resource Protection through on-Site Education	Alternative 3 (Preferred) Preserve Sensitive Park Resources while Diversifying the Range of Visitor Experiences	Alternative 4 Emphasize Integrated Story between the Parks and Minimize Development
	initiated in the 1950s and implemented in the 1960s.	eliminated to ensure that visitors receive orientation before encountering park resources. Day use of the park would be concentrated at Wupatki and Wukoki Pueblos.	Nalakihi, and Doney Mountain picnic area would be gated at night to deter after-hours visitation. The proposed boundary expansion to the south would include that portion of the park entrance road that is on National Forest lands, which would allow NPS to manage access to the western half of the park.	same access to Wupatki, Citadel/Nalakihi, and Lomaki/Box Canyon archaeological areas. Ranch roads within the proposed partnership/ expansion area to the north would be maintained in existing condition for administrative purposes and occasional escorted activities. The Black Falls Crossing Road would be maintained in its existing condition and used as an administrative road. A new visitor contact station and wayside orientation exhibit would be constructed near the north entrance from US89.	of the park entrance road that is on National Forest lands, which would allow the NPS to manage access to the western half of the park. Most of the existing housing, maintenance, and administrative facilities would be removed and the areas rehabilitated. The historic ranger residence and CCC portion of the visitor center would remain. Areas of the park not zoned for administrative or visitor use would be closed to protect resources.

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LONG-TERM INTEGRITY OF ARCHEOLOGICAL RESOURCES

Impact topics were identified through the scoping process. Concerns covered by this section include maintaining the long-term scientific integrity and culturally sensitive values of archeological sites, including prehistoric and historic architecture, shrines, humanly modified landforms, agricultural field systems, rock art, and other cultural features.

Region

The high, arid Colorado Plateau region of the American Southwest is world-renowned for its abundant, well-preserved archeological resources. Archeological remains in the region reflect several distinct lifeways and adaptive strategies, including hunting and gathering, horticulture, livestock grazing, and, after the mid-19th century, participation in the Euro-American global economy. Wupatki National Monument preserves an important piece of the prehistoric story of human occupation and adaptation on the southern edge of the Colorado Plateau. The monument was created to protect concentrations of well-preserved prehistoric architecture, specifically dating to the 12th and early 13th centuries, when formerly scattered families began to consolidate into larger village communities and build substantial multiroom structures.

In addition to protecting impressive concentrations of prehistoric architecture, the monument contains a representative cross section of the types and variety of archeological sites found throughout the Four Corners region. Site types include masonry pueblos, pithouses, cliff dwellings, rock shelters,

open campsites, agricultural field systems, ceremonial shrines, Navajo hogans, historic cabins and corrals, rock art panels, miscellaneous artifact scatters, and a variety of other physical remains. These archeological remains reflect the diverse cultures and differing economic strategies of the various people who have attempted to make a living in this beautiful, yet challenging, environment during the past 12,000 years.

Almost as soon as the first Wupatki National Monument was established in 1924, local archeologists and Flagstaff town fathers advocated expanding the monument to include additional abundant archeological sites located north and south of the current monument boundaries. Like Wupatki National Monument itself, the immediate surrounding area contains literally thousands of sites. Some sites predate the eruption of Sunset Crater at approximately A.D. 1065, but the vast majority date to the period after the eruption until about A.D. 1275, contemporary with the prehistoric occupation of Wupatki. The lands surrounding the monument contain an exceptionally well-preserved archaeological landscape, including residential sites, ceremonial ballcourts, lithic quarries, agricultural fields, shrines, rock art, and other features created primarily during the 12th and 13th centuries. The current level of preservation of this landscape is largely due to the previous lack of residential development, lack of commercial timber prospects, and generally limited commercial value of this area. Most historic use of the land around the monument has been limited to woodcutting, grazing, and hunting, but this situation is starting to change with

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recent expansion of residential development near the monument and increasing recreational pressures on Forest Service land around Flagstaff and nationwide.

The archaeological sites and features of the surrounding landscape are integral to the Wupatki story. Recent archaeological studies by Northern Arizona University, Desert Archaeology, Northland Research, Coconino National Forest, and other archeological research groups, have significantly increased our understanding of the prehistoric occupation of the Wupatki area compared to what was known when the monument's current boundaries were created. We know that after Sunset Crater erupted, a settlement system arose to the north and east of Sunset Crater, populated by people from diverse backgrounds living in multiple environmental zones and interacting across those zones. We understand that Wupatki currently incorporates only a small fraction of the environmental zones and diversity of archaeological sites that made up this "post-eruptive" settlement system. We know that the quality and density of the archeological resources preserved in Wupatki National Monument is matched, and in some cases even exceeded, by those outside the monument. The area encompassed within the current boundaries of Wupatki National Monument today represents only the northernmost expression of that prehistoric settlement system.

Park

At Wupatki, archeological remains associated with prehistoric ancestral Puebloan groups (Cohonina, Sinagua, and Anasazi) are well represented, along with historic Navajo and Anglo ranch sites. Lt. Lorenzo Sitgreaves, who passed through the region in 1851, first brought the remarkable prehistoric ruin now known as Wupatki Pueblo to the

attention of Euro-Americans. John Wesley Powell, founder of the Bureau of American Ethnology, reported on the presence of prehistoric ruins near the Citadel area in 1885. The first formal archeological investigation of the Wupatki area occurred in April 1900, when local prospector Ben Doney guided Jesse Walter Fewkes of the Smithsonian Institution to the ruins. Several additional surveys of the Wupatki area were conducted subsequent to Fewkes's initial study (Barrett in 1924, Colton in the 1920s). The work of Fewkes and Harold Colton, founder of the Museum of Northern Arizona, was instrumental in having the area set aside as a national monument in 1924.

Wupatki NM was originally set aside to preserve and interpret several large pueblos with standing architecture: Wupatki, Wukoki, Citadel, Nalakihi, Lomaki, and the two Box Canyon pueblos. Subsequent legislation added Crack-in-Rock Pueblo to the monument. These eight prominent architectural sites have been the focus of most past and present interpretive efforts and preservation work at Wupatki NM. In addition to the seven front country sites and Crack-in-Rock Pueblo, approximately 45 other sites in the monument have received some form of stabilization treatment. At least 50 additional architectural sites have been identified as needing some form of preservation treatment in the foreseeable future.

A complete inventory of archeological resources within Wupatki NM was completed in the mid-1980s, revealing a total of 2,668 archeological sites (Anderson 1990). This total did not include the four largest front country sites---Wupatki, Wukoki, Citadel, and Nalakihi---which brings the total number of documented sites to 2,672. Of this total, 2,405 are prehistoric or have prehistoric components and 2,214 sites

have architectural remains. Site components recorded during the inventory were characterized according to their most predominant features. Site types included pithouse villages (28), pueblos (176), rock art sites (132), hogans (89), corrals (57), sweathouses (16), slab-lined features (141), terraced field systems (18), ramadas (18), isolated hearths (16), rock shelters (177), burials (49), cairns (63), dams and reservoirs (8), fences (6), walls (125), fieldhouses (1,374), depressions (139), shrines (13), kivas (3), catchments (19), camps (24), historic trash dumps (44), artifact scatters (52), borrow pits (7), borrow dumps (43), windbreaks (78), quarries (31), enclosures (779), check dams (55), earth cracks (9), field systems (278), modified springs (3), and miscellaneous other historic sites (10).

Based on the results of the archeological inventory, the prehistory of Wupatki National Monument can be reconstructed. The earliest recorded remains in the monument consist of an isolated Clovis point dating to 11,500-11,000 B.P. (9500-9000 B.C.). A number of younger spear points and some rock art elements apparently dating to the Archaic Period, 9,000-3,000 B.P. (7000-1000 B.C.) have also been recorded in the monument. Colton (1946: 57, 63) speculated on the possible presence of Basketmaker II people living at the site of Wupatki Pueblo, based on the presence of cist-like features found beneath the floor of the "amphitheater." Besides these isolated occurrences, however, no archeological sites unequivocally associated with preceramic use or occupation of the monument have been identified.

The first evidence of Puebloan occupation does not appear until after A.D. 1000 and is confined to only a couple of small sites. The Wupatki Archeological Inventory Survey of 1981-

87 (hereafter referred to simply as the Wupatki Survey) identified only two sites dating prior to the eruption of Sunset Crater in A.D. 1064-1065. The vast majority of archeological sites in the monument date between A.D. 1100-1250.

Wupatki has been characterized as a cultural frontier zone, where numerous prehistoric cultures came together and intermingled following the eruption of Sunset Crater (Colton 1946). Pottery evidence indicates extensive use and occupation of the area by three contemporary prehistoric groups in the 12th and early 13th centuries A.D. Archeologists refer to these groups as the Cohonina, Sinagua, and Kayenta Anasazi. Evidence of occupation or at least ceramic trade contacts with people affiliated with the Prescott culture and the Little Colorado (Winslow) Branch of Anasazi are also present in the monument.

Colton (1946) speculated that this cultural interaction zone developed as the result of a prehistoric "land rush," which came about after the eruption of Sunset Crater created a water-retaining cinder mulch over a widespread area, allowing land that was previously unsuitable for cultivation to sustain a large farming population. Pilles (1974) has been an outspoken critic of the Colton hypothesis. Pilles argues instead for local population increases accompanied by changes in settlement strategies brought about by widespread favorable climatic conditions during the 11th century A.D. to explain the apparent population surge in the Wupatki area during the Pueblo II and early Pueblo III periods.

Whatever the explanation, it is clear that site populations within the monument increased dramatically and rapidly after A.D. 1065, with 18+ sites ceramically dated between A.D. 1060 and 1130, 99+

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sites dated between A.D. 1130 and 1160, and 369 sites dated between A.D. 1160 and 1220. (There are twice as many sites with ceramic assemblages spanning more than one period that are not included in these minimum numbers.) Of the 2,668 sites recorded during the Wupatki Survey, 2,397 exhibited artifacts, petroglyphs, and/or architecture indicative of prehistoric use, and of these, 977 were datable on the basis of associated ceramics. Of the 977 dated sites, 949 or 97% dated between A.D. 1065± and 1220±.

The vast majority of recorded sites in the monument are small unit pueblos or pithouse villages with fewer than six rooms. Of the 2,397 recorded prehistoric sites, 1,080 have one room or one pithouse and 723 have two to six rooms or pithouses. The large sites such as Wupatki Pueblo (100+ rooms) and the Citadel (50+ rooms) clearly stand out as unusual structures.

Wupatki Pueblo was apparently a center for trade, ceremonial activity, and cultural interaction within the region. Its prominence is probably due to its strategic location on or near several natural travel corridors. Natural travel routes included the east-west Little Colorado Valley, Deadman Wash (part of an ancient NE-SW trade route linking the Hopi Mesas with the San Francisco Peaks), plus a series of mountain passes to the south and east of Wupatki that allowed travelers to pass from the low country below the Mogollon Rim to the Colorado Plateau highlands. Ideas and trade goods flowed into and out of Wupatki Pueblo, as evidenced by abundant woven cotton fabrics, turquoise and shell jewelry, and the largest concentration of scarlet macaws in the American Southwest. The Pueblo also contains a diverse assortment of ceramics, as well as non-local architectural features, such as the Hohokam-style ballcourt and Chacoan-

style banded masonry. Although the decorated pottery at Wupatki Pueblo is mostly from the Kayenta Anasazi region in NE Arizona, the vast majority of pottery at Wupatki Pueblo is Alameda Brownware, the local Sinagua utility ware. Hence, despite exhibiting numerous outside cultural influences, Wupatki Pueblo is generally considered to be a Sinagua site.

In contrast to Wupatki Pueblo and a few other sites in the immediate vicinity, the majority of masonry pueblos in Wupatki National Monument appear to be affiliated with the Kayenta branch of the Anasazi (Ancestral Pueblo) culture. This is based on the predominance of distinctive Anasazi decorated and "corrugated" utility pottery at most prehistoric sites in the monument. Cohonina pottery is common at many of these sites, particularly in the western reaches of the monument, but unequivocal Cohonina residences are quite rare within the monument. It is interesting to note, however, that concentrations of large Cohonina pithouse villages are found only a few miles to the south and west of the monument.

The intense period of building and occupation in the Wupatki area is sometimes referred to as the "Wupatki Phenomenon." The "phenomenon" was relatively short lived, lasting approximately 120-150 years. Site population decreased dramatically after A.D. 1220, and the area was apparently abandoned by the mid-13th century. The ultimate cause of the abandonment is unclear, although climatic deterioration and the accompanying removal and redistribution of water-retaining cinder mulch by wind action has been suggested as one possible cause.

The area continued to be used on a sporadic basis after the 13th century, primarily by Hopi travelers and later by ancestral Havasupai for seasonal hunting

and gathering. Beginning sometime in the 1800s, Navajo herders moved into the region and began using the Wupatki Basin as a seasonal residence.

Approximately 220 of the 2,668 sites recorded during the Wupatki Survey are attributed to the historic Navajo occupation of the area. Of these 220 sites, approximately 170 have architectural features (hogans, corrals, ramadas, masonry dams, and/or sweat lodges) associated with them.

HISTORIC CHARACTER OF THE BUILT ENVIRONMENT

Region

The historic built environment of the region has been shaped like many small Western towns, by timber, cattle grazing, and the mining industry (Cline 1994). A few grand homes survive in the area constructed by Flagstaff's first entrepreneurs of the late 19th century. The majority of structures built during Flagstaff's early days represent the working class. Areas like Milton (mill town) housed mill workers and their families (Cline 1976).

Science and education also shaped the historic built environment of the region. In 1894 Flagstaff was chosen as a site for Lowell Observatory, and in 1899 Northern Arizona Normal School (now Northern Arizona University) opened as a preparatory school for teachers.

The Civilian Conservation Corps (CCC) added much to the region, constructing roads, trails, fences, phone lines, and a golf course club house in Flagstaff (Cline 1994).

The landscapes of the region are many and span great lengths of time. Landscapes from the prehistoric Sinagua culture overlap with other prehistoric groups, including the Kayenta Anasazi and Cohonina. Melded in this region are

natural features and cultural elements shared by historic Navajo and Pai groups, early cattle and sheep ranchers, and lumbermen.

Park

The historical built environment at Wupatki represents two eras of National Park Service development. These two eras—dedicated to harmonizing, to the extent possible, the construction of roads, trails, and buildings—include the CCC period of rustic architecture followed by the Mission 66 construction program.

Two CCC structures are in current use. Ranger residence 1 (designed by Cecil Doty and constructed in 1938), and the original visitor center (a small semi-subterranean structure now part of the Mission 66 visitor center), have been melded into the Mission 66 setting, which includes the visitor center, planned parking, apartments, and two detached houses. Other CCC construction in the park includes Black Falls dam, constructed at Black Falls Crossing on the Little Colorado River. The dam was constructed to support agriculture on the adjacent Navajo Reservation. Emmett Kellam constructed a trading post on what is now park land to support farming Navajo families. The park bulldozed the Black Falls Trading Post in 1964 (Boston 1991).

The Wupatki visitor center complex (visitor center, houses, and apartments) was constructed as part of the NPS Mission 66 construction program. "The Mission 66 program was intended to improve and expand visitor services by . . . constructing modern facilities, and upgrading existing roads, trails, campgrounds, and other facilities in national parks" (McClelland 1998). The complex represents a Park Service era influenced by techniques of design and construction to provide for the greatest amount of enjoyment of our national

parks. Trails and roads were constructed to coincide with the complex in order to promote the best experience.

The Wupatki visitor center complex and associated roads and trails have not been adequately documented. A general, Service-wide moratorium has been placed on major changes to structures built during the NPS Mission 66 era, but in the Intermountain Region this has been modified to include review by a Mission 66 review board. Proposed changes are reviewed by the board and a determination to proceed with construction can be granted, based upon criteria (e.g., the significance of the structure, how any character-defining features of the structure would be affected, and whether or not the work would be done in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties). In addition, the eligibility of Mission 66 era structures for listing on the National Register of Historic Places can be determined by the review board prior to completion of the context study.

The visitor center and houses constructed during the Mission 66 program represent an era of modern methods of landscape and architectural design. The visitor center reflects the Mission 66 concept of open design, wide floor-to-ceiling windows, and light-controlled areas for displaying artifacts.

The majority of visitors to Wupatki enter the Mission 66 portion of the visitor center and walk the nearby Wupatki Pueblo trail. Recent changes to the visitor center are the direct result of increasing numbers of visitors and the design limitations of the building. A central dividing wall was removed to reduce congestion and to encourage a traffic flow pattern. The Mission 66 apartments and houses are visible from the visitor parking lot and were constructed to blend in with the surroundings. Recently,

pitched roofs were added to one of the houses and the apartment complex. Ranger residence 1, constructed by the CCC, is adjacent to the Mission 66 visitor center and is part of the first view visitors get upon arrival at the park. In the 1980s a foam roof and solar panels were added to ranger residence 1. These additions have resulted in significant interior wall damage. Improper techniques were also used to treat the stone walls of the residence and have added to the structure's deterioration.

Cultural landscapes at Wupatki have never been identified. A cultural landscape inventory (CLI) needs to be conducted to identify issues such as historic land uses and the location and character of significant resources. A CLI is needed to avoid adverse effects and/or loss of unidentified landscapes.

LONG-TERM INTEGRITY OF ETHNOGRAPHIC RESOURCES

Region

NPS guidelines describe ethnographic resources as "variations of natural and standard cultural resource types. They are subsistence and ceremonial locales and sites, structures, objects, and rural and urban landscapes assigned cultural significance by traditional users. The decision to call resources 'ethnographic' depends on whether associated peoples perceive them as traditionally meaningful to their identity, as a group, and to the survival of their lifeways. When natural resources acquire meaning according to the different cultural constructs of a particular group, they become ethnographic and thus cultural resources as well" (NPS 1997).

Wupatki National Monument in north-central Arizona is part of a region lying between extensive high-altitude national forest lands to the southwest and semi-desert mesas of the Hopi and Navajo

Indian Reservations to the northeast. The latter forms the largest block of Indian tribal lands in the United States, including more than 25,000 square miles. These contemporary reservations are only a small portion of the customary lands occupied aboriginally and historically by the tribes, and to which the tribes retain deeply rooted traditional associations. The three Flagstaff Area monuments are an integral part of this larger traditional landscape. Many of the geographic features and natural and cultural resources identified by the tribes as culturally significant within the three monuments are historically or ceremonially interconnected with other landscape elements, geographic features, and archeological sites throughout the tribes' entire customary land bases. In addition to the Hopi and Navajo Tribes, who currently occupy the tribal lands adjacent to or near the monuments, many of the other tribes originally consulted early in the GMP planning process retain customary associations with many of the same resources and places throughout the region. A good literature-based overview of tribal associations with the Flagstaff Area monuments and surrounding region can be found in Brandt (1997). Tribal perspectives on the regional context of the parks' ethnographic resources were provided in reports prepared by individual tribes for this planning process.

Park

As indicated in the Purpose and Need and Consultation/Coordination sections, NPS consulted initially with ten tribes and in depth with three tribes in identification of ethnographic resources for the purposes of this plan. The Hopi, Navajo, and Zuni Tribes conducted field research using culturally appropriate methods to identify ethnographic resources about which they might have concerns in the context of this GMP.

Although tribal representatives identified those resources of particular concern for this EIS, it should be stressed that the resources identified for this project are not necessarily all the ethnographic resources that exist in the three parks.

The three tribes identified many ethnographic resources of concern to each tribe and identified several resources in common. Resources identified as culturally significant included archeological sites in general (both pre-Columbian and historic), which include petroglyph panels and pre-Columbian agricultural field features, numerous plant species, and culturally significant natural resources, such as springs, blowholes, and certain geographic features, such as hills, the Little Colorado River, river crossings, trails, and various ceremonial locales. The identification of plants and other natural resources and geographic features as having particular cultural significance points to the fact that ethnographic resources include resources that have conventionally been distinguished as natural and cultural. When considered as ethnographic resources, the distinction becomes meaningless, because natural resources also are imbued with cultural meaning.

LONG-TERM INTEGRITY OF NATURAL SYSTEMS AND PROCESSES

The integrity of the natural systems and process within Wupatki National Monument depends on conserving native plant and animal communities, maintaining geomorphic and soil formation processes, and ensuring that intermittent drainage systems function properly. During the public and agency scoping process, specific environmental impact issues were identified, including: preservation of microhabitats;

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preservation of unfragmented natural systems; movement of herd species, wildlife, migratory birds; character/condition of Wupatki grasslands; healthy function of intermittent drainage systems; integrity of natural systems for ecological research; and exclusion of exotics. Additional summaries of affected threatened, endangered, and sensitive species, unique habitats, and wetlands, floodplains, and riparian resources are presented in separate sections below.

Region

Wupatki National Monument is located in the southern part of the Colorado Plateau. In this general region north of the Mogollon Rim, elevations vary from a low of 2,400 feet above sea level at the bottom of the Grand Canyon, to a high of 12,670 feet above sea level at the San Francisco Peaks, fewer than fifty miles away. The plateau was shaped by erosion to reveal geologic outcrops of red sandstone and white limestone. The area surrounding the monument is also characterized by an extensive volcanic field (the San Francisco Volcanic Field) with prevalent cinder cones and lava flows. The Painted Desert stretches east from Wupatki to Petrified Forest National Park. Soil types also vary within the region, depending on whether they are derived from weathered limestone, sandstone, shale, or volcanic bedrock. Unique areas of relatively young, deep cinders are also present, where soils are still forming and vegetation is colonizing.

The climate of the region varies tremendously with elevation above sea level. The Little Colorado River basin adjacent to Wupatki lies near 4,300 feet in elevation, receives approximately 6 to 7 inches of precipitation per year and experiences temperatures from -4° to 105° F. The visitor center at Sunset Crater Volcano National Monument, 15 miles south of Wupatki is located at 7,000 feet

elevation, receives about 20 inches of precipitation annually, and generally has colder winters and milder summers. Another 20 miles to the south, Walnut Canyon National Monument, also at 7,000 feet elevation, receives similar precipitation to Sunset Crater Volcano and experiences temperatures from far below 0° to the 90°s F. Above 10,000 feet on the adjacent San Francisco Peaks, annual precipitation exceeds 40 inches, temperatures are considerably cooler, and the growing season is remarkably shorter.

The remarkable combination of geologic, elevation, and climatic differences within a relatively small geographic area has contributed to a considerable diversity of the plant communities. This diversity is exhibited by the range of vegetation communities from alpine tundra on top of the San Francisco Peaks to Sonoran Desert at the bottom of the Grand Canyon. Within Wupatki, Walnut Canyon, and Sunset Crater Volcano National Monuments surrounding Flagstaff, one can observe many of the dominant vegetation types. Juniper woodlands, Colorado Plateau grasslands, and Colorado Plateau desert scrub communities are common at Wupatki. Traveling a short distance to Sunset Crater Volcano, one passes through pinyon-juniper woodland, ponderosa pine forest, and lava flow and cinder barrens. Walnut Canyon contains a narrow stand of broadleaf deciduous forest along the bottom of the canyon, mixed-coniferous forest on north-facing slopes, and ponderosa pine forest and parkland above the canyon rim, respectively. Higher elevations harbor aspen groves, and spruce and fir forests.

Prehistoric, historic, and current land uses have undoubtedly played a major role in shaping the landscape of the area as well. In addition to relying heavily upon agricultural land use, prehistoric peoples

utilized native plants and animals, and used fire to modify the environment. Regional Navajo shepherding dates to the period of Spanish settlement of the Southwestern United States. A number of tribes, including the Navajo and the Hopi, continue to use plants, animals, and other natural resources in the region.

Fire has played a major role in shaping the vegetation in the entire region, as it has in most of the Southwestern United States. In ponderosa pine areas, fire suppression has had a well-documented effect on the forests of this area.

Densities of trees have risen dramatically because fire has been excluded from the forests for the past 75 to 100 years. In some areas, tree densities have increased so drastically that there is severe risk of catastrophic fire. This type of fire is a dramatic contrast to the low-level natural fires that existed when pine stands were open and fires burned primarily in the understory.

Historic and modern influences, including logging, agriculture, cattle ranching, hunting, mining, fire suppression, community development, and road and utility construction have together greatly affected and fragmented regional natural systems and processes. Ecologists theorize that ranching activity and grazing pressure caused or contributed to a wide range of historic changes in ecosystems throughout the Southwestern United States, including: loss of grassland cover and plant species diversity; reduction or extirpation of grassland-dependent wildlife; extirpation or extinction of predators; accelerated soils erosion and gulying of intermittent drainage systems; decreasing wildfire size and frequency; and loss of cottonwood-willow riparian vegetation, which has had significant adverse impacts to both migratory and breeding birds, and development of artificial water sources and alteration or elimination of natural

surface waters for native plant and animal species. Grazing also favors the establishment of nonnative species. Environmental changes may be more apparent at lower elevations, where there is a documented increase in desert vegetation and noxious plants. Ranching and cattle stocking rates are changing as a result of widespread concerns over these impacts. Even though many of the changes to regional natural systems are likely permanent, ranching activity is trending more toward long-term ecological sustainability within the region.

Juniper woodland has been rapidly expanding into grasslands during the last century, but the underlying causes are the subject of scientific debate. Many ecologists believe that cattle grazing in combination with range-fire suppression is favoring juniper encroachment into grasslands. Cattle remove much of the grass and forbs and enhance the ability of juniper seedlings to germinate and establish in what were once continuous grassland areas. Other scientists believe that we are witnessing a natural succession process in which junipers are returning to formerly occupied habitat. Human occupation of much of the region certainly must have included the use of any available wood sources for fuel and construction purposes.

Modern landownership patterns and uses have also resulted in increased habitat fragmentation within the region. Fences, especially double-fenced highway rights-of-way, prevent the regional movement of numerous wildlife species, including pronghorn antelope. Roads throughout the area serve as conduits for the spread of exotic weedy plants. Much of the land within the region is managed by the U.S. Forest Service for sustained multiple uses, including hunting, firewood collecting, grazing, off-highway vehicle use, backpacking, and hiking. A large area of

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the region belongs to sovereign American Indian tribes. Their culture is traditionally tied to their lands, but little information is generated or available to understand the environmental impacts of tribal land management.

Large areas of arid lands within Southwestern United States have been invaded by nonnative plant species. On the Colorado Plateau, much of the remaining grasslands has been extensively invaded by nonnative annual brome grasses, drastically altering natural fire regimes, displacing native perennial bunchgrasses, and reducing or eliminating forage or cover for grassland-dependent wildlife species. Riparian vegetation has been severely altered by tamarisk invasion, which has outcompeted most native cottonwood and willow stands and particularly affected both migratory and breeding birds.

Park

Wupatki National Monument harbors a sizable natural area of relatively undisturbed vegetation and wildlife habitats. An inventory of natural resources within Wupatki was completed during the late 1970s (Bateman 1976, 1979). This study remains the best available documentation of the monument's flora and fauna. A soil survey was completed in 1971 (Schurig). The vegetation is currently being mapped (Thomas 2001). Wupatki is roughly divided in half by the Doney Monocline, with each half having distinct geology, elevation, and dominant vegetation. At lower elevations to the east of the monocline, the monument is dominated by sandstone and shale geologic formations, saline soils, and open desert scrub vegetation. At higher elevations to the west of the monocline, the monument is dominated by limestone and volcanic formations, fertile

soils, and juniper savanna and grassland vegetation.

The natural systems and processes within Wupatki National Monument were heavily influenced by former ranching activity, game hunting, and predator control. Cattle grazing was discontinued during the late 1980s. Occasionally, a cow from a neighboring ranch strays into the monument until the owner removes it. Under a "life estate" agreement between the NPS and a Navajo resident, a small flock of sheep continues grazing a small area on the east side of the monument. The grazing history and associated impacts at Wupatki have not been specifically studied and are difficult to assess. However, in view of the documented regional impacts of historic ranching activities, grasslands in the western half at Wupatki are still dominated by native perennial bunchgrasses and believed to be in good condition. Biologists are increasingly concerned about the growing population of juniper trees in the southwestern portion of the monument. The desert areas in the eastern half are more likely altered by Navajo sheep herding and ranching, especially the intermittent drainage system and riparian areas. Under continued NPS management, the natural resources of Wupatki should continue to recover from historic livestock grazing impacts, and relatively pristine grassland should only increase in ecological importance and scientific value.

Until the last century, grassland and savanna areas of Wupatki likely experienced periodic wildfires, which played a major role in plant dominance and succession in these natural systems. The NPS plans a limited management-ignited fire program to test the impacts of fire on juniper woodland and grassland within the western half of Wupatki. Prior to conducting test burns,

the NPS must prepare a Fire Management Plan and accompanying environmental assessment to review potential impacts.

Of the total 35,400 acres within Wupatki, approximately 5% is currently affected by fences, roads, NPS facilities, and visitor activity. A number of fences around the boundary, together with FR545 and US89, generally dissect grassland habitat around the western half of Wupatki, and effectively hinder the movement of pronghorn and other wildlife in and around the monument. Roads were planned and constructed with regard for natural drainage patterns and only cause local ponding on upslope sides or limited erosion at culvert downspouts. In the past, nonnative plants have dispersed into the monument along road corridors and become established in areas disturbed by maintenance activities. NPS operations include facilities that are concentrated around the visitor center and at New Heiser. Visitor use is primarily concentrated along existing roads, parking lots, visitor center, trails, four archaeological interpretive areas, and the Doney Mountain picnic area. Visitor and NPS operation impacts are primarily evident around these areas and include native vegetation trampling, soil compaction, unplanned trail development, minor alterations in drainage patterns, noise, and disturbance to wildlife. Local populations of nonnative plants, including Russian thistle (*Salsola kali*) are persisting in disturbed areas and along trail corridors.

In 1998, most of the area within Wupatki National Monument was closed to public access to protect sensitive resources. Up until then, backcountry use was readily permitted, but the effect on natural systems is difficult to assess because the NPS maintained no statistics on visitation numbers or commonly visited areas. Backcountry access continues for

authorized special uses, such as research and educational activities. There is also occasional unauthorized hiking within the closed area, which will likely continue. Occasional guided day hikes and vehicle trips, and as many as eight overnight guided backpacking trips are made per year to the Crack-in-Rock Pueblo. Although dispersed hiking is encouraged instead of hiking on a developed trail, hikers are narrowly confined by rugged terrain in certain reaches, and short trail segments are evident. Around the Crack-in-Rock area, unplanned trails become established between the interpreted archaeological sites. Localized vegetation trampling, soil compaction, and accelerated erosion is occurring, and local patches of nonnative Russian thistle (*Salsola kali*) are also evident. Although these impacts are very localized, they illustrate how sensitive the desert environment can be to low levels of human activity.

There are numerous abandoned roads and construction material quarries at Wupatki. Most of these are within the closed area and remain as scars on the landscape today. Projects are currently proposed or already under way to inventory disturbed lands. Many of the older and more remote roads and sites are probably best left to recover under natural ecological processes. Some impacted sites, including several materials quarries, are currently being considered for restoration treatments, which would include: reshaping surface contours, promoting natural soil development, restoring local drainage patterns, reestablishing native vegetation, and controlling nonnative plant infestations.

There currently is little information on the distribution or impacts of nonnative plants within the monument. Nonnative plant infestations, predominantly Russian thistle (*Salsola* spp.) and a few other

small annual plant species, are generally confined to road corridors, developed areas, or areas of heavy visitation. These species benefit from the additional runoff associated with paved surfaces and often out-compete native vegetation along road shoulders. Nonnative plants may also rapidly colonize areas where the ground surface is heavily disturbed by equipment or heavy foot traffic. Annual brome-grasses (*Bromus* spp.) have been observed at Wupatki, but the area of infestation has yet to be assessed. There is no feasible method for controlling these small, weedy annuals. Camelthorn (*Alhagi maurorum*), a tenacious shrub species, has also invaded an estimated 20 acres of intermittent drainages within Wupatki. Some nonnative species have been planted by employees around their residences, but none of these are believed to be naturalizing and escaping into the surrounding environment. The monument currently lacks sufficient staff or funding to actively monitor or attempt to control nonnative species; however, attention to these issues is anticipated in the near future. Many species can potentially be controlled with persistent efforts to remove plants and control root systems with herbicides. Success in controlling an invasive species would be predicated upon early detection of infestations before they grow out of control, or upon the availability of ecologically sound and affordable technology.

A neighboring landowner is currently proposing to donate more than 20,000 acres to Wupatki National Monument. The proposed boundary expansion would increase the area within the monument by 60% and effectively double the area of grassland and riparian habitat. The NPS remains concerned that illegal activities occurring on U.S. Forest Service lands south of the monument are adversely affecting the condition of large watersheds that drain through the

monument. Illegal poaching, woodcutting, and off-road-vehicle use have resulted in unauthorized access within the closed area of the monument. The NPS hopes to alleviate these concerns through increased communication, monitoring ecosystem conditions, and better coordination with the U.S. Forest Service. Both the boundary expansion and coordination with the U.S. Forest Service could lead to the removal or closure of some roads, removal of fence segments, and joint fire management near the current monument boundary.

THREATENED, ENDANGERED, AND SENSITIVE SPECIES

This section complements the preceding section on natural systems and processes and is intended to specifically address compliance with the Endangered Species Act. In addition to legally protected threatened and endangered species, a number of "species of concern" occur within the region surrounding Wupatki, and their status is regularly assessed by regional federal, state, and tribal agencies. During the public and agency scoping process, pertinent impact issues were identified regarding the conservation of federally listed threatened and endangered species, candidate species, and designated critical habitats that might be affected by a proposed action. The potential impacts to a number of sensitive plant and animal species and unique habitats are also considered.

Region

The diversity of landscapes and habitats in the region naturally provides for impressive species diversity. Habitats range from alpine tundra on the San Francisco Peaks to Sonoran Desert at the bottom of the Grand Canyon. Old-growth coniferous forests and other vegetation communities in the region,

combined with physiographic features such as canyons and mountains, provide habitat for a number of threatened, endangered, and sensitive species. Within Coconino County, Arizona, there are 5 plant, 9 animal (including fish), and 1 invertebrate species that are formally listed as threatened or endangered. There are another 54 plant, 51 animal (including fish), and 5 invertebrate species that may be exceedingly rare and are being monitored by the U.S. Fish and Wildlife Service, Arizona Game and Fish Dept., U.S. Forest Service, and Navajo Natural Heritage Program (Arizona Heritage Data Management System 2001).

Among all biological groups within the region, fish are threatened to the greatest extent. Several other plant, animal, and invertebrate species also require perennial streams, wetlands, or riparian habitats, reflecting the widespread alteration of entire region's freshwater ecosystems.

Of the region's rare plant species, several are endemic to the Mogollon Highlands and San Francisco Mountains, including the San Francisco Peaks groundsel (*Senecio franciscianus*), listed as threatened, and Bebb's willow (*Salix bebbiana*). The Sunset Crater penstemon (*Penstemon clutei*) and cinder lady's tresses (*Phacelia welshii*) are endemic to the volcanic cinder deposits surrounding the San Francisco Volcanic Field. Riparian areas also harbor numerous plant species of concern, such as Navajo sedge (*Carex specuicola*), Alkali grass (*Puccinella parishii*), which occurs at lower elevations in wetter sites north of the Little Colorado River, Mogollon columbine (*Aquilegia desertorum*), which occupies seeps and springs, and alcove bog orchid (*Platanthera zothecina*). A number of species, such as the Flagstaff pennyroyal (*Hedeoma diffusum*), inhabit ponderosa pine parklands and likely

depend on fire to maintain an open forest canopy so that sunlight penetrates to the ground. Many species within the cactus family occupy very limited habitats and are sensitive to disturbance, including livestock grazing. Because of their popularity with horticulturists, all cactus species within Arizona are protected under state law.

The threatened Mexican spotted owl (*Strix occidentalis lucida*) is found within the region in dense, mixed-conifer forests, particularly in canyons. The U.S. Fish and Wildlife Service is in the process of designating critical habitat for the species. The owl occurs along the Grand Canyon, in Walnut Canyon, and near Sunset Crater Volcano. The Southwestern willow flycatcher, an endangered bird species, depends upon very specific riparian habitat conditions along perennial streams within the region. Relatively large numbers of bald eagles (*Haliaeetus leucocephalus*) winter in the region, especially near Lake Mary, Mormon Lake, and Marshal Lake. Although recently removed from the endangered species list by U.S. Fish and Wildlife Service, the peregrine falcon (*Falco peregrinus anatum*) inhabits steep cliff sites in the region. Even though the species is no longer considered threatened, population levels will continue to be monitored for a period of five years. Other raptors that are considered species of concern include the northern goshawk and ferruginous hawk (*Buteo regalis*).

Although the golden eagle (*Aquila chrysaetos*) is not formally listed or considered a species of concern, wildlife managers and the general public are concerned about it, because of its low population density, ecological importance as predators and indicators of environmental quality, and traditional importance to American Indians. As with other wide-ranging raptor species, the

numbers of golden eagles have declined as a result of habitat loss, historic predator control programs, and power line electrocution. Eagles are legally protected from being killed or taken under the Eagle Protection Act. The U.S. Fish and Wildlife Service administers this Act and annually issues permits to American Indian tribes to take specified numbers of golden eagles and feathers for ceremonial use. Golden eagles are solitary animals, and little is known about their distribution, number, and status around Wupatki. Although the U.S. Fish and Wildlife Service recently proposed a study to assess the status of the species throughout the Western United States, there is no regional management framework for ensuring the species remains viable.

Bat species are considered to have specialized habitat requirements and sensitivity to environmental impacts. Twelve species are currently monitored as species of concern.

Although not formally listed or considered a species of concern, pronghorn antelope (*Antilocapra americana*) are the focus of considerable wildlife management effort, because they are attractive large herbivores and an important game species, and the public is concerned about their continued survival. The species was historically overhunted and nearly extirpated in the Southwestern United States. The continuing decline is primarily attributed to habitat fragmentation caused by conventional range fences, which antelope do not jump over and therefore must find weak sections of fence to cross under. Pronghorn herds are effectively confined and prevented from moving to water and forage during drought years or to lower elevations during severe winters. Other causes of decline include road mortality and continuing loss of grassland habitat. Wildlife managers are

concerned about the pronghorn decline in the population in northern Arizona over the past few decades, including the herd west of Wupatki and north of the San Francisco Mountains (Bright and Van Riper III 2000). Local coyote populations have been controlled to protect pronghorn fawns from predation (Terry Miller, AZGF, pers. comm.).

Park

The Arizona Heritage Database (Arizona Game and Fish Department 2001) was consulted via the internet to generate a list of threatened and endangered species and other species of concern for Coconino County, Arizona. This list was compared with the inventory of natural resources within Wupatki completed by Bateman (1976, 1979), which remains the best available documentation of the monument's flora and fauna. In addition, a survey for special status plants at the Flagstaff Area National Monuments, including Wupatki, was just completed (Huisinga et al. 2000). Currently, no federally listed threatened or endangered plant or animal species are known to occur in Wupatki National Monument.

At Wupatki, there are three plant species of concern for which there are historic or recent records: *Pediocactus simpsonii*, *Phacelia serrata*, and *Psoralea thompsoniae* var. *whitingii*. The distribution of these within the monument is not well known. Another six species of concern are known from similar habitats nearby the monument, including *Astragalus lentiginosus* var. *ambiguus*, *Cymopterus megacephalus*, *Errazurizia rotunda*, *Pediocactus peeblesianus* var. *fickeiseniae*, *Phacelia welshii*, and *Puccinella parishii*. Field searches and mapping efforts are needed to assess the distribution and status each species. In addition to these, other plants at Wupatki, including *Amsonia peeblesiana*, *Phragmites communis*, and

Poliomintha incana, are considered to be increasingly threatened by over-collection for traditional uses by Native Americans. *Phragmites communis* occurs at only one location in the monument and could easily be eliminated by over-collection. Although little is known about these plants, existing roads, trails, and facilities in the monument are limited in extent and avoid most available habitat. Site-specific surveys are required prior to any ground or vegetation disturbing activity to ensure they are not impacted.

Three animal species of concern are known to occur within the monument, including Wupatki pocket mouse (*Perognathus amplus cineris*), spotted bat (*Euderma maculatum*), and Townsend's big-eared bat (*Corynorhinus townsendii*). The Wupatki pocket mouse is documented in grasslands in the western half of the monument. Very little is known about the distribution or status of the subspecies, but it is presumed that it would be impacted by development and land use activities in similar ways as other grassland-dependent wildlife. At Wupatki, this would include disturbance from the entrance road and from visitor activities. Spotted bats and Townsend's big-eared bat occur in several of the cave-like karst features in the Lomaki/Box Canyon area. These geologic features may also serve as unique habitats for other rare species, especially invertebrates, and preliminary surveys and biological inventory efforts have just begun. Some of these features are near popular visitor use areas, and have been impacted from prior NPS management activities, including attempts to block entrances as a public safety precaution. However, most visitor use and support facilities avoid karst habitats, and the NPS is planning to restore the historically impacted entrances.

Two bird species of concern, the ferruginous hawk (*Buteo regalis*) and

burrowing owl (*Athene cunicularia* ssp. *hypugaea*) are known from similar habitats near the monument. The ferruginous hawk inhabits open grassland surrounding Wupatki. The burrowing owl inhabits burrows constructed by many mammals. Although some burrowing mammal communities have been observed within the monument, the presence of burrowing owls has not been confirmed. Very little is known about the distribution or status of either species, but it is presumed that both would be impacted by development and land use activities in similar ways as other grassland-dependent wildlife.

Although not formally listed as a species of concern, the pronghorn antelope (*Antilocapra americana*) herd within Wupatki was identified as a management issue during the public and agency scoping process. The pronghorn population has declined in and around Wupatki during the last few decades (Bright and Van Riper III 2000). The species is being affected by regional habitat fragmentation and loss, including loss of habitat within the monument as juniper woodland takes over available grassland. The boundary fence confined the herd within Wupatki during heavy snows in the mid-1970s and was blamed for a number of deaths. Perennial water sources are scarce, and the animals must move back and forth to water on adjacent lands. Recent boundary fence modifications should allow the animals to move between neighboring lands. Existing roads within the monument are not fenced, and from time to time animals are killed by automobiles.

Although golden eagles (*Aquila chrysaetos*) are not formally listed as a species of concern, their status within Wupatki was identified during the public and agency scoping process. Golden eagles have historically nested within Wupatki, though no nesting pairs were

discovered during recent surveys (Britten 1999, Drost 2000). The best nesting habitat, as evidenced by old nests, is in the Citadel Sink, Doney Mountain, and Doney Anticline areas. In the past, public visitation, especially to the Citadel Pueblo area, may have interfered with breeding eagles. They are known to be sensitive to human presence. If disturbed by noise or rapid movements, adult birds may fail to use a nest site or temporarily abandon their eggs or chicks, which exposes them to undue cold temperatures and/or predators. Some biologists recommend establishing a 1/4- to 2-mile-diameter buffer zone around nests. Accordingly, park managers recently decided to close the Citadel Pueblo to visitors during the breeding season.

In addition to grasslands and karst features (and riparian areas, which are discussed separately in the Wetlands, Floodplains, and Riparian Habitat section below), two other unique plant communities were identified by Bateman (1976). The first is the alluvial fan of vegetated cinder dunes to the east of Woodhouse Mesa. The second is the massive, exposed limestone faces of the Doney Anticline, in the center of the monument, including Antelope Canyon, which bisects the anticline. Although these areas are generally not critical habitat for the sensitive plants or animals listed above, they harbor numerous plants not otherwise found (e.g., *Echinocactus polycephalus*) and greatly contribute to overall biodiversity within the monument. The cinder dune fan is bisected by the entrance road, but is mostly within the area that is closed to general visitor access. The established backcountry hiking route to Crack-in-Rock Pueblo follows along the base of the Doney Anticline and near the mouth of Antelope Canyon. Although dispersed hiking is encouraged instead of hiking on a developed trail, hikers are narrowly confined by rugged terrain in certain

reaches, and short trail segments are evident. Some visitor use impacts are locally evident around the Crack-in-Rock area, including unplanned trails, localized vegetation trampling, soil compaction, accelerated erosion, and patches of nonnative Russian thistle (*Salsola kali*). Although these impacts are very localized, they illustrate how sensitive the desert environment can be to low levels of human activity.

WETLANDS, FLOODPLAINS, AND RIPARIAN HABITAT

This section complements the preceding section on natural systems and processes and is intended to specifically address compliance with executive orders mandating wetlands conservation and floodplain planning requirements. Many floodplains and wetlands in the Southwestern United States harbor unique riparian habitats and rare species. During the public and agency scoping process, pertinent impact issues were identified regarding the potential impacts to floodplains associated with intermittent drainages (dry washes and/or arroyos), perennial springs, and the Little Colorado River. This includes the development of facilities and accommodation of visitor activities in potential flashflood areas. The primary concern expressed about wetlands, floodplains, and riparian habitat was ensuring that these very unique resources are conserved at Wupatki.

Region

The southern Colorado Plateau receives a limited amount of precipitation, and surface waters are scarce. Accordingly, streams, wetlands, and riparian areas within the region surrounding Wupatki National Monument are extremely scarce and precious resources. Among all biological groups within the region, the fishes have the greatest number of

species that are formally protected under the Endangered Species Act (Arizona Game and Fish Department 2001). Numerous protected and sensitive plants, animals, and invertebrates are restricted to perennial streams, wetlands, or riparian habitats, reflecting widespread alteration and threats to most of the region's freshwater ecosystems.

The region typically experiences a period of drought from early spring through summer, a strong thunderstorm "monsoon" from late summer through early autumn, and unpredictable precipitation during the winter. Precipitation amounts strongly correlate with elevation. Most of the regional watershed drains northeastward from the San Francisco Mountains and surrounding Coconino Plateau into the Little Colorado River. The Little Colorado River headwaters reach 200 miles southeast into New Mexico. A small area of the regional watershed drains south of Flagstaff into Oak Creek and the Verde River basin.

All perennial streams and intermittent tributary washes are heavily impacted by human uses, primarily from livestock grazing, but also by damming, diversion, and groundwater withdrawals for public water supply, hydropower generation, limited agriculture and industry, and public recreation. Narrow galleries of cottonwood, willow, and sycamore trees once dominated most stream banks, but are now almost entirely replaced by thickets of nonnative tamarisk and desert scrub. Available riparian habitat and water sources for wildlife have also diminished during the last century, especially for birds.

Reliable springs and seeps are rare throughout the region and even scarcer in the northern half. Although springs support small riparian areas, these are usually rich in plant species and provide important surface water for wildlife such

as elk, deer, and antelope. Springs are fed either from shallow, perched aquifers or from the large, regional Coconino Aquifer (Bills et al., 2000). Winter precipitation seems to play an important role in recharging these aquifers. Most springwater within the Inner Basin of the San Francisco Mountains is completely used as part of the public water supply for Flagstaff. Many reliable springs that are near areas with good rangeland have been fully contained and diverted for livestock use and are no longer available to wildlife. Some, such as Oak Creek, are now popular public recreation attractions.

Considerable vegetation change has occurred within the regional watershed during the last century, which is likely having a measurable influence on groundwater recharge rates. Fire suppression at higher elevations is leading to overcrowded forest stands. At mid-elevation, fire suppression and livestock grazing are believed to contribute to woodland encroachment into existing grasslands. Livestock grazing at lower elevations has favored the expansion of desert scrub into former arid grasslands. Increased forest and woodland tree numbers are intercepting groundwater in the root zone before it can infiltrate and recharge aquifers. Increasing aridity and loss of herbaceous cover at lower elevations promote rapid precipitation runoff and decreases soil infiltration rates.

The combined extreme nature of summer thunderstorms, rapid spring snowmelt during some years, reduced herbaceous cover, and thin hydrophobic soils over much of the watershed make flash flooding a real safety threat within the region. Many of the major washes and Little Colorado River flood quite frequently following these events. Storm runoff patterns in most intermittent tributary washes that feed the Little

AFFECTED ENVIRONMENT

Colorado are also influenced by the construction of numerous stock tank impoundments in support of ranching operations.

Other regional surface water sources include windmills and powered pump wells. Because reliable groundwater is typically limited to the Coconino Aquifer at depths of 1,700 feet or more, the use of water wells is fairly cost-prohibitive. Passive precipitation catchment systems, or "guzzlers" have recently become popular for supporting wildlife, ranching, and recreational activities.

Park

Wupatki National Monument is largely included within the upland watershed that drains the east and northeast San Francisco Mountain slopes, including the San Francisco Volcanic Field. Wetland, floodplain, and riparian resources at Wupatki are restricted to the Little Colorado River banks and two perennial springs-Peshlaki Spring and Heiser Spring. Approximately 1 1/2 to 2 miles of the Little Colorado River flow along the monument's eastern boundary. Wetlands that meet U.S. Fish and Wildlife Service jurisdictional criteria under Section 404 of the Clean Water Act are likely only found on the bed of the intermittently flowing Little Colorado River. Here, jurisdictional wetlands are probably restricted to the scoured cobble and stone riverbed, which is almost devoid of vegetation and may be dry for months at a time during an average year. Peshlaki Spring and Heiser Spring have no measurable surface flow, and surface water is typically available only if a shallow basin is dug and maintained. Above Peshlaki Spring, *Phragmites communis* grows over approximately 750 square feet. This is the only obligate wetland plant species recorded within Wupatki. Although extremely limited in area, Peshlaki Spring may also meet jurisdictional wetland criteria.

The Little Colorado River floodplain is very distinct, and supports a narrow band of riparian vegetation. It was likely dominated by cottonwood-willow gallery forest in the early 1900's. Now, the floodplain is mostly dominated by nonnative tamarisk thickets, likely as a result of long-term grazing pressure and altered flood regimes from upstream impoundments and diversions. Local Navajo residents continue to graze livestock on both banks upstream and downstream from the monument, and the NPS is prevented from fencing the sizeable riparian area within the monument because intense flooding would likely destroy any fence structures near the riverbed. At a few areas where large tributary washes meet the Little Colorado River, such as Deadman Wash, a high water table supports tamarisk thickets. These areas may be far enough removed from river flooding that they can be effectively fenced to exclude livestock and restored to native vegetation. The proposed boundary expansion would more than double the area of river floodplain, including a few remnant cottonwood groves.

Currently the only human development within the floodplain at Wupatki is the Black Falls Crossing. Local Navajo residents cross the river at this location year-round, except during high water. Continual use and maintenance has caused ruts, erosion, and gradual widening of the crossing, which locally influences hydrology and sediment movement for less than 100 feet downstream within the river channel. During the 1940s, the Black Falls Dam was built 1/8 mile upstream from the crossing (Westheimer 1988). At one time the dam site and affected river reach were within the monument boundary, but the lands were withdrawn to the Bureau of Reclamation. The Black Falls Dam silted up several years ago and now holds only a small amount of water. The

Bureau of Reclamation has administratively transferred jurisdiction of the site to the Bureau of Land Management. The riverbed crossing and dam have locally altered this reach of the Little Colorado River floodplain.

There are three natural springs within Wupatki National Monument: Peshlaki, Heiser, and Wupatki. All of them were modified historically by Navajo occupants, ranchers, and/or the NPS, and they are likely the most severely impacted natural resources within the monument. Prior to the arrival of Anglo culture, the springs were undoubtedly used by American Indian peoples and would have been critical water sources for wildlife. Water flow at all three is believed to have steadily diminished during the 20th century. The reasons for this are not known, but it is likely a combined result of long-term weather and vegetation change within the recharge area. Peshlaki Spring was heavily relied upon by local Navajo shepherders, and still has an installed water containment and animal trough system. Heiser Spring was first modified by the Heiser family ranching operation, and was later distributed to NPS residences for drinking water. Installed "spring-boxes" divert springwater through piping to a local Navajo property inholder, leaving no surface water at the spring site. Wupatki Spring was also developed by the NPS as the original water supply for the visitor center. Wupatki Spring ceased flowing during the 1950s, possibly as a result of NPS efforts to stimulate its flow.

Peshlaki Spring is the only remaining perennial spring with available surface water for wildlife within the monument. The NPS is planning to eventually restore Heiser Spring, including removing containment and diversion structures, restoring original contours, and planting riparian vegetation. Several intermittent

seeps have also been recorded in the monument, but a full inventory and condition assessment is needed for seeps and ephemeral water sources.

There is a shallow water table along the river, but the water is highly gypsiferous and very poor in quality. Peshlaki Spring, Heiser Spring, and the former Wupatki Spring flow from a local, perched aquifer within interbedded sandstone and shale in the Moenkopi Formation. Spring flows are highly variable, increasing during winter and spring, and declining through the summer and fall. Flows do not correlate directly with annual precipitation amounts. The aquifer is recharged within the area of heavily fractured surface basalts from Woodhouse Mesa southward of the monument boundary at least five miles to the Strawberry Crater area. Most of the recharge area is managed by the U.S. Forest Service. Land use and vegetation condition within the recharge area likely affects the spring flows.

Five major intermittent drainage systems traverse the eastern half of the monument-Citadel Wash, Antelope Wash, Doney Mountain Wash, Deadman Wash, and Kana-a Wash. Each drains a sizeable area, and all are subject to infrequent, but intense flash flooding. The wash beds are characteristic braided sand sands and gravels. Thicker desert scrub vegetation lines the drainages. Except for a few road crossings, there are no NPS facilities within the intermittent drainage floodplains. None of the washes possesses hydrologic, soil, or vegetation characteristics indicative of jurisdictional wetlands. Except for their respective confluences with the Little Colorado River, none would be considered riparian habitat.

There are a few human-made earthen stock tank impoundments within the monument, which are left over from former ranching operations. Several

abandoned gravel and cinder quarries also seasonally hold water. All of these are used by wildlife, including pronghorn.

ABILITY TO EXPERIENCE PARK RESOURCES

The scoping process identified the visitors' ability to experience park resources related to park significance as an issue. Concerns include access to park resources by the general public, access to information provided by museum collections and ability to see the "real thing" (actual artifacts, dwellings, etc., as opposed to replicas or simulations); minimally altered environment; access to a full spectrum of park resources for visitors with disabilities; ability of the public to understand park resources; ability to experience scenic, recreational, and educational pursuits; visitor understanding of regional context; uncrowded visitor experiences; visibility of night skies and natural soundscapes; and ability to hear natural sounds. Concerns also include personal freedom (inside and outside park boundaries); traditional employee/visitor experiences (interpretation through personal services, access to favorite sites); and traditional recreational activities (biking, climbing, etc.).

Region

The Flagstaff Area monuments are relatively small enclaves of National Park Service management located within a geographic area dominated by the much larger Coconino National Forest. Although natural and cultural resources within the monuments are recognized and protected for their special significance, they cannot be separated from their regional context. The geologic, natural, historic, and prehistoric stories of these places continue across monument and forest boundaries and

throughout much of northern Arizona; they can be fully appreciated and understood only as part of this larger picture.

Similarly, outdoor recreational opportunities abound in northern Arizona, on lands managed by a variety of agencies. The Flagstaff Area monuments are managed in accordance with the NPS mandate "to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." Concerns about traditional and proposed visitor experiences and recreational activities in the parks are evaluated in this context; it is recognized that certain activities, while inappropriate on NPS lands, are both appropriate and encouraged elsewhere. As population and development increase both locally and regionally, demand for recreational opportunities on public lands will increase accordingly. NPS information/education efforts are designed as part of a cooperative interagency effort to direct visitors to the best locations for their desired activities, whether on NPS, USFS, or other lands.

The public's ability to experience park resources is thus closely related to availability of resources on nearby non-NPS lands. Interpretation of park resources as part of a regional system is crucial, but not currently being accomplished. In all three Flagstaff Area monuments, wayside and museum exhibits are outdated and inaccurate and fail to emphasize the desired big picture. A major interpretive planning effort to replace wayside interpretive signs along trails and roadsides and to redo museum exhibits in the visitor centers is under way, concurrent with this GMP. The new exhibits will present a cohesive story,

linking the natural and cultural resources of these three monuments with NPS, USFS, and other sites throughout the region. They will be designed for full accessibility, to serve visitors with disabilities and/or different learning styles. And they will enhance visitors' ability to see the "real thing," using the actual structure, feature, or artifact whenever possible, or models, electronic images, virtual tours, or other means when necessary. Programmatic accessibility for visitors with vision, hearing, and mental impairments is being addressed in the Comprehensive Interpretive Plan.

The opportunity to present this type of interpretive message in a comprehensive manner is great, since travel patterns of visitors to the Flagstaff Area monuments are fairly well defined. Visitor surveys (1998) indicate that the majority of Sunset Crater Volcano/Wupatki visitors travel from south to north along FR545, the 36-mile scenic road connecting the two parks. Most (68-70%) are engaged in a longer trip and are en route to Grand Canyon National Park and/or points north. Of Wupatki visitors, 92% also go to Sunset Crater Volcano and 35% to Walnut Canyon; for 68% this is part of a longer trip.

Park

As described in the Purpose and Need section, Wupatki's purpose is to "preserve, protect, care for, and manage the ancestral Hopi sites, other prehistoric remains, and cultural and natural resources of historic, ethnographic, and scientific interest."

Thousands of archeological sites are protected within the monument. Major pueblos (Wupatki, Wukoki, Lomaki, Citadel) have been developed for self-guided interpretation and "hardened" for visitation; these are reached via short spur trails leading from parking areas.

Short interpretive programs, both talks and guided walks, are offered when staffing permits. The Crack-in-Rock area and other backcountry sites are visited via ranger-led programs available four to eight times per year. The rest of the park is currently closed to visitation.

For most visitors, Wupatki is largely a drive-through experience. The typical visit includes the visitor center and museum exhibits and walks to one or two of the pueblos. For visitors with mobility impairments, accessibility of the archeological sites is difficult or impossible. A viewing platform is available for Wupatki Pueblo, and limited views of some of the other structures are possible from the parking areas. The visitor center/museum itself is accessible.

Throughout the park, broad vistas of desert grasslands, mesas, buttes, and volcanic hills contrast sharply with the San Francisco Peaks, which are visible in the distance. Spectacular views of the landscape within and beyond the monument are a major part of the road trip through both Sunset Crater Volcano and Wupatki National Monuments. Associated plants and wildlife can be viewed from the roadside and designated trails.

Many significant features occur outside park boundaries, on U.S. Forest Service or private land. Most park visitors remain unaware of their existence or significance, with the exception of those who stop at the Doney Mountain picnic area and viewpoint, where interpretive displays inform visitors of the geology and archeology of the Doney Mountain area. Recreational opportunities, including hiking, horseback riding, mountain biking, backpacking, four-wheel-drive excursions and off-highway vehicle use, are available on nearby USFS lands.

According to recent visitor surveys (Lee and Treadwell 1999), visitors are generally satisfied with their experience in the park. Most are incorporating their trip to Wupatki as part of a larger travel plan, and the vast majority are on their way to or from Grand Canyon National Park. The majority of visitors are expecting to experience archeological ruins and are motivated by a desire to learn about the way of life of the people who built the structures. Visitors also expressed a desire to view scenery and to share the park with others (many are locals who are giving a tour to family and/or friends).

PARK NEIGHBORS; LOCAL, STATE, AND TRIBAL LAND MANAGEMENT PLANS; AND LAND/RESOURCE MANAGING AGENCIES

Concerns covered by this section include effects on neighbors' access and emergency response, economic contribution of the park to local economies, access to culturally sensitive areas by traditional users, traditional land uses external to park boundaries, and possible conflicts between the proposed action and local, state, or Indian tribal land use plans, policies, or controls.

Region

Wupatki National Monument is located 35 miles north of the City of Flagstaff, Arizona, and 185 miles north of Phoenix, a rapidly growing metropolitan complex of more than two million people. Flagstaff, a major community of northern Arizona, has a population of approximately 55,000 and offers numerous services for the extensive ranching, lumber, and tourism activities of northern Arizona. The area between Flagstaff and Sunset Crater Volcano and

Walnut Canyon is being subjected to increasing residential and business development. The remainder of the region surrounding the monuments is sparsely populated, although a private development (known as Alpine Ranchos) is increasing in population northeast of Sunset Crater Volcano, leading to substantial increases in nonpark travel on park roads.

Land use in the region varies from the expanding urban influences of Flagstaff near Sunset Crater Volcano and Walnut Canyon to low-intensity grazing at Wupatki. The Coconino National Forest, which borders Wupatki on the south and west, is under multiple-use management. The primary uses near the monuments are recreation and grazing.

Information from the U.S. Geological Survey indicates that some lands in the vicinity of the monuments are prospectively valuable for oil and gas, geothermal steam, and associated geothermal resources. Because of the lack of surface indications and drilling data, the potential for geothermal energy development and for discovery of oil and gas in the area is unknown at the present time. The Coconino National Forest and adjacent region are currently being studied by the U.S. Geological Survey and private corporations for potential geothermal development. Permits have been granted by the U.S. Forest Service to energy-related firms for research on Forest Service lands adjacent to the Wupatki boundary. Based on present information, there are no additional valuable leasable minerals. Minerals, including cinder, pumice, gypsum, miscellaneous clays, sulfur, and uranium, are reported in the area surrounding the park, and meteorites and meteorite diamonds have been reported in the vicinity. It is unknown to what extent, if any, these minerals exist at commercially valuable levels in the

monument. A cinder quarry operation is located outside Sunset Crater Volcano, northwest of the visitor center. The haul road for this operation crosses the main park road (FR545) near US89.

Woodcutting, shooting/hunting, and off-road vehicle activities are evident throughout Forest Service areas adjacent to the monument. Occasionally, these activities spill over onto monument property and present illegal and incompatible use.

The location of the monument within this regional complex of public lands is one of the most important aspects determining its visitation pattern, as well as its resource management problems and programs.

Land management plans exist for some of the areas surrounding the monument. This general management plan will be compatible with the City Open Space/Greenway Plan, the County Regional Plan, the Forest Service Flagstaff Lake Mary Ecosystem Analysis (FLEA), the Forest Management Plan, and with the land and resource management plans of Babbitt Ranches, now called the Coconino Plateau Natural Reserve Lands. The Ranch has entered into an agreement with the Navajo and Hopi Tribes to manage their lands professionally with respect to the environment and resources conservation. The 1995 "Hopit Potskwaniat," Hopi Tribe Consolidated Strategic Plan, presents the goals of the Hopi Tribe to initiate sound planning for the development of tribal land and resources for the benefit of the Hopi People. The plan specifically addresses preservation of the Hopi way of life and the protection of sacred places and subsistence gathering areas.

There is no public transportation to any of the three Flagstaff Area monuments. Sightseeing bus tours are operated by

Nava-Hopi Tours, Grayline Tours, and smaller commercial companies throughout the year.

US89, a major north-south route through Arizona and Utah, and I-40 provide access to the parks from Flagstaff, which is served by Amtrak rail service, bus service, commercial airlines, and private vehicles via I-40 and I-17.

Park

The western two-thirds of Wupatki's south boundary is bordered by the Coconino National Forest. The eastern one-third is predominately privately owned land. State-owned lands border the west boundary. The Coconino Plateau Natural Reserve Lands (CPNRL), formerly known as Babbitt Ranches, and a checkerboard of state-owned sections exist along the north boundary. The east boundary of the monument is bordered by the Navajo Reservation. The east and west sides of the monument are defined by the Little Colorado River and US89, respectively.

Park neighbors include residents of Alpine Ranchos, a community located south of the monument. Although several miles distant, the residents identify with the monument, often stopping at the visitor center to request assistance from law enforcement rangers, to report crimes, and so on. Many are dependent upon NPS for road access to and from Flagstaff. Small businesses, such as Hank's and Sinagua Trading Post, located along US89 on the north and south boundaries of the park, also identify with the monument. In many instances, towing services provided by these small businesses are solicited by stranded visitors.

Similarly, many Navajo Reservation residents pass through the monument and depend on monument resources to serve a variety of needs, including maintenance of their main travel route.

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Reservation communities and Alpine Ranchos have expressed some concerns over any plans to terminate roads in the park, particularly as to effects on their quality of life, increased commuting time, and diminished access to conveniences such as gas, phone, mail, and groceries.

The park has trained and commissioned law enforcement rangers and employees certified in emergency medical response. The park is usually the initial contact in an emergency. Off-hours response is, however, minimal. Cooperative law enforcement is performed through written agreements with the Coconino National Forest and the Coconino County Sheriff's Office. All commissioned park rangers are special deputies of the County Sheriff's Office.

Cooperative agreements in firefighting, law enforcement, and facility maintenance often result in NPS personnel responding to incidents on USFS lands to the south. Hiking, hunting, woodcutting, climbing, mountain biking, horseback riding, and shooting activities within the area sometimes result in physical intrusion onto the monument.

The NPS money generation model is a formula used to estimate the benefits attributed to the local economy resulting from the number of visitors to National Park System areas. The estimates of those contributions to the greater Flagstaff economy from Wupatki National Monument include tax revenue of \$331,108 and a total spending revenue of \$6,221,653 (based on the latest calculations from 1996).

Ten affiliated tribes have identified traditional relationships and/or cultural properties within park boundaries and have concerns about public access to sites; some groups need access to restricted use areas for plant gathering and traditional activities. Consultation with these tribes is routine and ongoing.

The area is of great interest to various agencies involved in research, including the U.S. Geological Survey, Northern Arizona University, and others who, although they do not own or administer any lands, will have an interest in management decisions affecting the resources of the area.

OPERATIONAL EFFICIENCY

Operational efficiency refers to adequacy of the staffing levels and the quality and effectiveness of the infrastructure used in the operation of the park in order to adequately protect and preserve vital park resources and provide for an effective visitor experience. Also identified through the scoping process were concerns about employee and visitor health and safety and management of collections and other resources.

Roads and Trails

Access to Wupatki is gained primarily via US89 and FR545. Because of the four-lane, high-speed nature of US89, visitors and employees are exposed to dangerous situations when entering and exiting the park via the north entrance. Traffic is controlled by a single stop sign on the FR545 side of the intersection.

FR545 is a simple two-way, asphalt-paved roadway, which forms a loop between Wupatki and Sunset Crater Volcano National Monuments. The overall condition of FR545 is fair to poor, with large sections of thermal, longitudinal, transverse, and block cracking. In many locations, the shoulders are too narrow and are raveling. The road currently does not meet NPS standards. The segment of road between Doney Mountain picnic area and just beyond Lomaki is considered hazardous, and numerous accidents have occurred there. Most accidents are the result of excessive

speed and the failure to negotiate the road's S-shaped curves.

The NPS currently has the primary responsibility for the maintenance of FR545; however, funding deficits significantly limit the nature and frequency of maintenance activities. Additional responsibilities include plowing the roadway during the winter months. FR545 presents some hazards to both visitors and employees. Accidents, although infrequent, are sometimes serious. Shoulder drop-offs could contribute to the severity of vehicle accidents. The distance from medical response other than NPS exacerbates this issue, although local care providers are generally responsive to NPS needs.

The use of these roads is not regulated. The inability to physically close any of the roads in the park, especially at night, makes protection of park resources difficult. This situation has resulted in an increase in monetary and staffing demands (road maintenance; housing to accommodate resident law enforcement, and maintenance staff; 24-hour emergency response, etc.).

It takes 50 minutes to one hour to drive from Wupatki to the City of Flagstaff, which represents a significant commute for staff members who are required to conduct business in the other Flagstaff Area parks or at headquarters. Obviously this situation is the same for Flagstaff Area staff members who work in the other parks or headquarters and need to conduct business at Wupatki. This commute can be even more difficult in inclement weather. Wildlife can also pose a risk to commuter traffic.

Visitor Use

Visitor use in the park is focused at the Wupatki Visitor Center, four of the park's primary archeological sites (Wupatki Pueblo, Wukoki, Citadel/Nalakihi, Lomaki/Box Canyon), and the picnic/view point area located at Doney Mountain on USFS land. Visitors are exposed to uneven terrain on some of the trails leading to the various interpreted areas. Poisonous insects and reptiles are common, although negative interactions with them are infrequent.

Generally, high summer temperatures pose the most significant threat to visitors. In addition, typical afternoon thunderstorms in the summer months expose visitors to a high rate of lightning strikes and the potential for having to deal with flood conditions. Winter storms can pose significant problems for visitors, including blowing and drifting snow, icy and snow-packed roads, blowing freezing temperatures, and extreme wind chill.

Facilities

There are two separate housing and maintenance facilities. In some cases, these facilities, parking areas, and the park road were built almost on top of archeological sites and are intrusions on the viewshed and cultural landscape. Park facilities near the visitor center include a small maintenance facility, and the park's primary residential area. One historic and two Mission 66 residences and a four-unit apartment complex are immediately adjacent to the visitor center.

The visitor center also serves as offices for park interpretive and law enforcement staff and contains space for curatorial collections and a small museum. This facility is considered inadequate and obsolete and in serious need of upgrading and remodeling. The lack of

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fire and climate control, and the existence of outdated utilities and features, has placed collections and exhibits at risk and has created an inhospitable work environment.

A secondary residential and maintenance complex is located at New Heiser, approximately two miles south of the visitor center on the east side of FR545. The complex includes one wood frame and two modular residences, four condemned trailers, a fire cache, and a maintenance storage yard that contains gas and diesel pumps. Access to these facilities is provided via a short paved road off FR545. A moderately sized sewage evaporation pond is across from these facilities to the east, in view of all residential and maintenance facilities.

A partially abandoned historic residential/maintenance complex is located across from New Heiser, on the west side of FR545. The surviving features include a Quonset hut and a spring/pump house. The Quonset hut continues to be used for storage purposes, although the facility evokes a number of health and safety concerns.

A letter of authorization provides for lifetime residence and grazing rights for a Navajo occupant within the monument boundary. This involves a residence, associated outbuildings, and a small herd of sheep.

Utilities

The Park Service owns and operates the water and wastewater (sewer) systems. Arizona Public Service provides electrical service.

The park's domestic water supply is provided by a NPS-owned well and two storage tanks, with combined capacity of approximately 100,000 gallons. Although the quality of the water meets current health standards, the water is thought to

have a high mineral concentration and is not exceptionally palatable.

Wastewater is managed by two surface lagoons. One is immediately in front of the visitor center across the entrance road and serves as the primary wastewater treatment facility for the administrative and visitor use facilities at Wupatki. It is in full view of the visitor center and seriously disrupts the viewshed and detracts from the significance of the cultural landscape. The second lagoon is in the New Heiser residential/maintenance area. Although out of site of the visiting public, it is immediately west of the employee housing area and presents both a visual intrusion and occasional odor problems. The two lagoons currently do not meet health and safety standards and require pumping on a regular basis.

U.S. West and AT&T provide telephone service, but the monument owns its own phone system. The park experiences frequent and prolonged electrical and telephone outages, particularly during the summer monsoon season. This significantly impacts the park's ability to conduct business on a day-to-day basis, to use the Internet, and to connect with the outside world via the computer, and it seriously impacts the staff's quality of life. Cell phone coverage in the park is extremely poor.

The park is connected to the other Flagstaff Area monuments and the headquarters office via radio. The repeater for the radio is located on O'Leary Peak adjacent to Sunset Crater Volcano and is subject to lightning damage.

The monument provides removal of solid waste to the county landfill.

Staffing

A central Headquarters, located in Flagstaff, provides administrative services

for the three monuments and is the office location for the superintendent and the division heads for administration, resource management, ranger activities and fee collection, and maintenance, and for the cooperating association (Southwest Parks and Monuments Association). The facility also serves as a visitor information center for the three Flagstaff monuments as well as for other parks and points of interest in northern Arizona.

Resources management activities are accomplished by headquarters-based staff. The developed front country pueblos are actively maintained, monitored, and patrolled by resources management and park law enforcement staff. Resources management staff conducts limited research; however, the majority of the research is conducted by various agencies and institutions and qualified individuals.

Visitor use and law enforcement staffing are concentrated at the visitor center, and visitor services are provided from that location. Owing to the necessity of running both an information and fee collection desk, it is often difficult for staff to provide law enforcement and resource protection coverage at desired levels. Three employees are required occupants in the park in order to provide minimal 24-hour maintenance, law enforcement, and other emergency response. Depending on annual funding levels, temporary staff are used to support basic visitor services.

Visitor services demonstrate reasonable operational efficiency, with the majority of activities focused at the visitor center. However, this limits NPS presence on the resource, where the majority of visitors spend their time.

Because of the remoteness of the road at Crack-in-Rock, law enforcement patrols are infrequent. Unauthorized entry to

the area does occur, but cases have been prosecuted successfully. Remote sensors provide 24-hour monitoring of some archeological resources.

There is minimal staff to provide the necessary janitorial services. One maintenance employee is a required occupant at Wupatki, and assistance is provided by maintenance staff from Sunset Crater Volcano on an as-needed basis.

Employee health and safety issues include potential exposure to hantavirus and other diseases caused by rodent infestations in government quarters and workspaces. Efforts to mitigate the presence of rodents are ongoing, but mice and other rodents often get into buildings. The existing visitor center has a marginally efficient evaporative cooling system. Visitor center workers are often exposed to indoor temperatures that exceed 90°F during the summer. During the winter months staff are exposed to potentially dangerous driving conditions, if they are required to conduct business at the other Flagstaff Area parks or headquarters during inclement weather.

The majority of museum collections (approximately 50,000 objects, including historic photographs, site files, archives, natural history specimens, and archeological, ethnographical, and historical items), for the Flagstaff Area national monuments have been relocated to Wupatki, due to limited storage space and protection at Walnut Canyon and Sunset Crater Volcano. The storage environment at Wupatki is also poor, although it does provide a more secure location for the bulk of the collection. All unprocessed collections, the rare book collection, the research library and computer support for the collections management program are housed at headquarters.

ENVIRONMENTAL CONSEQUENCES

METHODOLOGY

All alternatives were evaluated for their effects on the resources and values determined during the scoping process, and impact topics were developed. For each impact topic, impacts are defined in terms of context, intensity, duration, and timing. Direct, indirect, and cumulative effects are discussed in each impact topic. Definitions of intensity levels varied by impact topic, but, for all impact topics, the following definitions were applied.

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

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

Direct: An effect that is caused by an action and occurs in the same time and place.

Indirect: An effect that is caused by an action but is later in time or farther removed in distance, but is still reasonably foreseeable.

Short-term: An effect that within a short period of time (generally one or two years but no more than five years) would no longer be detectable as the resource returns to its predisturbance condition or appearance, generally fewer than 5 years.

Long-term: A change in a resource or its condition that does not return to predisturbance condition or appearance and for all practical purposes is considered permanent.

All alternatives were also evaluated based on external factors which, together

with the actions of each NPS alternative, could have Cumulative Effects. In order to determine Cumulative Effects, a cumulative scenario was developed. That scenario included the following actions:

On the CPNRL lands, there will be a natural reserve into which buffalo are being introduced.

Construction of housing at Gray Mountain could add more traffic to the Black Falls Crossing Road.

On Forest Service lands, there will be some reduction in roads. Monitoring of impacts will continue, and existing activities will continue unless monitoring shows problems.

Increased growth of Flagstaff could mean more visits/demand for use of parks. Flagstaff is marketing the parks as part of their plan to attract more visitors. There are also increased tribal requests for use of renewable/nonrenewable resources.

The Development of Roden Crater (near Alpine Ranchos) may increase traffic on FR545. Subdivision of lots in Alpine Ranchos may increase the population of the area.

US89 from Flagstaff to Wupatki's south boundary (and eventually north to Page) will be 4-lane.

Expansion of utility lines is proposed from Glen Canyon to the southwestern part of the Navajo reservation.

There is a possibility that old pumice mines could be reactivated.

Changes at Grand Canyon National Park could have implications for all three parks. The transportation plan restricts visitor use at the east entrance (visitors are no longer allowed to stop; they can only drive through). This could mean that

visitors arriving in Flagstaff after visiting Grand Canyon may have more time to spend at Wupatki/Sunset Crater. There may also be increased use by Grand Canyon visitors who want the drive-through experience they can no longer get at Grand Canyon. However, there may be a decrease in the number of visitors, but more demand for things to do by those who do come.

The monument anticipates more requests for individual business permits for various services (guides, horseback rides, etc.).

Our ability to manage wildlife may be influenced by Arizona Game and Fish Department objectives. There will be increased ecosystem research (long-term monitoring).

Past activities like grazing and pothunting continue to have effects.

LONG-TERM INTEGRITY OF ARCHEOLOGICAL RESOURCES

Methodology

The National Historic Preservation Act requires agencies to take into account the effects of their actions on properties listed, or eligible for listing, on the National Register of Historic Places. The process begins with an identification and evaluation of cultural resources for National Register eligibility, followed by an assessment of effect on those eligible resources, and concluding after a consultation process. If an action (undertaking) could change in any way the characteristics that qualify the resource for inclusion on the National

Archeological sites are continually deteriorating, due primarily to the effects of weather and gravity. Left alone, sites will inevitably degrade over time. Impacts from human visitation and use add to the natural processes of deterioration, and they can substantially accelerate the rate of site deterioration.

Register, it is considered to have an effect. No adverse effect means there could be an effect, but the effect would not be harmful to those characteristics that qualify the resource for inclusion on the National Register. Adverse effect means the effect could diminish the integrity of the characteristics that qualify the resource for the National Register.

In order to analyze the effects of the GMP alternatives on archeological resources, all available information on known archeological sites was compiled (Anderson 1990; NPS archeological site files), and map locations of archeological sites were compared with locations of proposed developments and proposed modifications to existing facilities.

Predictions about short- and long-term site impacts from visitation were based on previous studies of visitor impacts to archeological sites (Cinnamon n.d.; Coder et al. 1995a, 1995b; Downum et al. 1996; Fawcett 1993; Gale 1985; Green and LaBlanc 1979; Lightfoot and Francis 1978; Moore 1994; Nickens 1991; Nielsen 1991; U.S. General Accounting Office 1987; Wildesen 1982; Wood and Johnson 1978) and other nonrenewable resources in nearby parks (Roggenbuck et al. 1997), as well as on recent monitoring data from the Flagstaff Area National Monuments (Fairley 1998; Johnson 1999; O'Hara and Johnson 1997). Sociological studies comparing the deterrent effects of signs vs. ranger presence on sites were also considered in this analysis (Clark 1976; Johnson and Vande Kamp 1996; Johnson et al. 1994; Vande Kamp et al. 1994; Swearingen and Johnson 1994).

Generally speaking, it is not possible to stop the deterioration caused by natural elements. In contrast, it is possible to control the effects of human impacts through careful planning of activities and new developments, by educating visitors and park staff, and by limiting or

directing locations of human activity in and around archeological sites.

If we exclude impacts caused by deliberate vandalism or artifact collection, most impacts resulting from visitor use are relatively minor when considered on an individual basis. However, for the purposes of this plan, it is necessary to consider the cumulative effects caused by hundreds or thousands of visitors at a given location over the life of this plan. Thus, for example, while a single guided hike to an archeological site may have a negligible effect on site integrity, the cumulative impact of hundreds of hikers over 10-15 years at dozens of sites can be substantial. In the following section, impacts are analyzed for each alternative based on the numbers of sites that would be affected in conjunction with the cumulative effects of various types of activities over the life of the plan.

For the purposes of this analysis, levels of impact to archeological resources were defined as follows:

Negligible: The impact on archeological sites is at the lowest levels of detection, barely perceptible, and not measurable.

Minor: The impact on archeological sites is measurable or perceptible, but it is slight and localized within a relatively small area of a site or group of sites. The impact does not affect the character defining features of a National Register of Historic Places eligible or listed archeological site and would not have a permanent effect on the integrity of any archeological sites.

Moderate: The impact is measurable and perceptible. The impact changes one or more character defining feature(s) of an archeological resource but does not diminish the integrity of the resource to the extent that its National Register eligibility is jeopardized.

Major: The impact on archeological sites is substantial, noticeable, and permanent. The impact is severe or of exceptional benefit. For a National Register eligible or listed archeological sites, the impact changes a character defining feature(s) of an archeological resource, diminishing the integrity of the resource to the extent that it is no longer eligible for listing in the National Register.

Effects Of The No-Action Alternative: Existing Conditions

IMPACT ANALYSIS

The No-Action Alternative would involve no new trail developments, no new visitor contact facilities, no zoning of parkland, and no road realignments. FR545 would remain open to two-way traffic 24 hours per day, the north entrance to Wupatki would be unrestricted, and the Black Falls Crossing Road would remain open to local commuter traffic. Under this alternative (and all other alternatives), park boundaries would be expanded to the north, and resources located on Forest Service land to the south would be managed in accordance with decisions reached in the FLEA process. New interpretive wayside and museum exhibits would be installed in accordance with the Flagstaff Areas Comprehensive Interpretive Plan. The park would remain committed to improving accessibility for visitors with disabilities, and modifications of trails and other facilities to ensure safety for all visitors would continue. Under this and all other alternatives, a new maintenance and curatorial facility will be constructed in the New Heiser maintenance yard, and riparian habitat will be restored in the Old Heiser area. The current backcountry closure policy limiting visitor access beyond the front country areas to

ENVIRONMENTAL CONSEQUENCES

ranger-guided tours and requiring the issuance of permits for researchers and educational groups who have a special need to access backcountry areas will remain in effect.

The continuing use of existing visitor centers and trails would directly and indirectly affect archeological resources in the immediate vicinity of these existing facilities. Archeological resources adjacent to or easily accessible from public access areas would continue to be vulnerable to surface disturbance, inadvertent damage, soil compaction, and vandalism. A loss of the surface archeological materials, alteration of artifact distribution, and a reduction of contextual evidence would result. Some of these impacts could be mitigated through additional stabilization of site architecture (all front country sites have already been stabilized to some degree), rehabilitating social trails, and/or systematically collecting surface artifacts for long-term curation; however, over the long term, these management actions would detrimentally affect site integrity.

Impacts to archeological sites from inappropriate visitor activities (artifact collection, graffiti, etc.) would continue to be a major long-term problem, because visitors would continue to access most of the front country and some backcountry sites without receiving prior orientation at the visitor center. These adverse impacts would be offset somewhat by the fact that no sites would be adversely impacted by new construction, trail developments, or other new infrastructure improvements. Overall, however, the effects of the No-Action Alternative would be moderately adverse to the long-term integrity of the archeological resources.

Without visitor use zoning, the No-Action Alternative would continue to allow access to archeological sites throughout

the entire monument through weekly guided adventure activities. Under the No-Action Alternative, most of the 2,672 sites in the monument would potentially be subject to visitation impacts. However, in all likelihood, less than 25% of the total number of sites would be the focus of ranger-guided hikes. Impacts could include loss of artifacts, destabilization of walls, increased soil compaction and erosion, and increased social trailing and erosion. Some of these impacts could be mitigated through stabilizing site architecture, rehabilitating social trails, and/or systematically collecting surface artifacts; however, the long-term implications of these management actions would detrimentally affect site integrity. Although participation in guided hikes could result in greater public awareness of resource issues and impacts, the lack of increased National Park Service patrols in the backcountry areas of the monument would offset many benefits derived from offering guided hikes. Impacts from vandalism, such as graffiti and pothunting, could increase as the sites and means of access to them become better known to the public. Although most impacts from guided visitation would be minor and incremental, the long-term cumulative effects would have a moderate adverse effect on the integrity of backcountry archeological resources.

Potentially, an upgrading/updating of interpretive media could improve long-term integrity of archeological resources through better educating visitors about the significance, importance, and fragility of resources and how visitors can reduce their impacts to archeological sites.

Construction of the new maintenance facility and restoration of the Old Heiser spring will have no effect on archeological resources.

The No-Action Alternative would continue the current backcountry closure

in terms of unguided visitor activities. In theory the closure should have a major beneficial effect on archeological resources by substantially reducing impacts from unstructured visitation, such as collection of artifacts, destabilization of walls, soil compaction, social trailing, vandalism, and so on, thereby reducing the need for future impact mitigation. However, current staffing limits do not provide sufficient staff to actively patrol and enforce the closure, and the inability to close the park at night further hinders enforcement. Hence, impacts to backcountry resources are likely to continue under the No-Action Alternative. Resources in these areas would continue to be vulnerable to both inadvertent disturbance and deliberate and illicit disturbance in the form of digging and collecting of archeological materials.

Boundaries to the north of the monument will be expanded to include lands currently managed as part of the Coconino Plateau Natural Reserve. This expansion will incorporate many additional archeological resources that are integral to the park purpose. The inclusion of these resources will be at least moderately beneficial to maintaining their long-term integrity. The benefits may be major, depending on what decisions are reached concerning long-term landownership, maintenance of cattle grazing, controls on public access, and other decisions affecting future uses of these added lands.

In theory, boundary adjustments would have a beneficial effect on any archeological resources included within the proposed park additions by proactively protecting them from off-road vehicle damage and other impacts associated with camping, mining, grazing, and other multiple uses. These

impacts potentially include increased rates of erosion of archeological deposits from cattle trailing, road development, overgrazing, and off-road vehicles; increased rates of artifact breakage from cattle trampling and off-road vehicles; illegal artifact collection by woodcutters, recreationists, and other users; commercial pothunting; fire pits and other impacts associated with unrestricted camping on or near archeological sites (digging of sump pits, leveling tent sites, etc.); destabilization of standing architecture by cattle sheltering in the ruins; and destruction of archeological sites from mining activities. Park protection of these resources would be enhanced by including most of them in lands zoned for long-term preservation purposes.

The boundaries south of the monument would remain unchanged under the No-Action Alternative. Many archeological resources that are integral to the purpose and significance of Wupatki would remain outside the monument boundaries, where they would continue to be subject to impacts from multiple uses (mining, grazing, fuel wood harvesting, OHV impacts, etc.). The exclusion of these resources from the park would have a major adverse effect on their long-term and scientific integrity, as degradation due to multiple use activities would likely continue over the long term.

CUMULATIVE EFFECTS

Past management strategies have allowed visitor access to virtually all archeological sites in the monument. Past management strategies have also promoted "hardening" of the ruins through various stabilization treatments as the primary means of mitigating visitor impacts to archeological sites. Recently, the backcountry areas of Wupatki National Monument have been closed to unguided access because of

ENVIRONMENTAL CONSEQUENCES

concerns over vandalism and recreational impacts to archeological sites. Currently, visitors can visit seven heavily stabilized front country sites on their own, and many other sites can be visited on an intermittent basis via weekly ranger-guided tours. Although individual impacts from visitation would be mostly minor and incremental, the cumulative effects of this alternative on the long-term integrity of these archeological resources would be moderately adverse because a significant number of sites would gradually be degraded by continued visitor use, and stabilization of these sites in order to withstand continuing visitor impacts would eventually be necessary.

The continuing growth of Flagstaff and ongoing efforts by the Flagstaff Chamber of Commerce to promote visitation to the Flagstaff Area National Monuments will result in increased impacts to Wupatki's archeological resources. These impacts will primarily result from increased visitor use (e.g., incidental artifact collection, inadvertent destabilization of walls, social trailing, etc.), although impacts from vandalism and illegal excavations would likely increase as well. Continued growth in Flagstaff is also likely to result in significant development of private lands near the monument boundaries, which in turn is likely to result in increased unpermitted visitation to backcountry areas of the monument. Rural residential growth will also increase impacts to archeological resources on Forest Service lands that are integral to the Wupatki story and currently receive relatively little human use.

Within the Flagstaff region generally, construction of new roads, housing subdivisions, mines, and other developments will continue to cause destruction of individual archeological sites. As the population of Flagstaff grows, recreational demands on U.S.

Forest Service lands and resources will continue to increase, resulting in the potential for additional degradation of archeological sites. Proactive management of the Coconino Plateau Natural Reserve Lands north of the monument is likely to have a long-term major beneficial effect on archeological resources both within and outside the northern monument boundary by controlling public access and ensuring the continuation of a healthy grassland ecosystem. Maintenance of healthy grassland will help to preserve archeological resources by stabilizing soils, reducing erosion, and reducing the visibility of archeological remains.

Forest Service policies may have an adverse impact on the long-term integrity of archeological resources within and south of the monument. Although road closures on Forest Service lands adjacent to the park could have a long-term major beneficial effect on archeological resources outside the park boundaries, the road closures could inadvertently push use onto the monument, since many roads within the forest are planned for closure but very few roads immediately adjacent to or leading into the monument are being closed. The Forest Service has indicated that it might institute a recreational impact monitoring program on lands south of Wupatki National Monument; however, monitoring by itself will not mitigate the effects of recreational impacts on archeological resources. Currently, there are no plans to explicitly link monitoring results to specific management actions, so incremental degradation of archeological resources because of recreational and grazing impacts is likely to continue.

CONCLUSION

In comparison to other proposed alternatives, the No-Action Alternative would have the greatest adverse effect

on archeological resources because a large number of sites (up to 25%) would potentially be open to some form of visitation. Adverse impacts from visitation would be offset to some degree by positive benefits derived from visitors receiving education and an enhanced appreciation of the resources from participating in guided adventures. Even so, this alternative would potentially subject more archeological sites in the monument to regulated (ranger-guided) and unregulated visitation impacts, in comparison to any of the other alternatives being proposed. Over the long term, under current management practices, in conjunction with cumulative effects, there would be a moderate adverse effect on long-term integrity of archeological resources under the No-Action Alternative. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

This alternative would have long-term moderate adverse impacts on archeological resources. There would be an overall reduction of archeological integrity, but not to the extent that the resources would become ineligible for listing in the National Register of Historic Places.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Wupatki National Monument; (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 relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects Of Alternative 1: Limit Motorized Sightseeing And Focus On Extended Learning

IMPACT ANALYSIS

Impacts from installation of new waysides, boundary expansion to the north, upgrading of facilities to accommodate accessibility, construction of the maintenance facility at New Heiser, and restoration of Heiser Spring are the same as in the No-Action Alternative.

In Alternative 1, visitors would enter the park from the south via FR545 and travel to the Wupatki Visitor Center before encountering park resources. The north entrance to Wupatki would be closed, except for administrative uses. Closure of the north entrance would presumably enhance long-term/scientific integrity of archeological resources by reducing the number of visitors who interact with resources without receiving orientation at the visitor center.

FR545 would be closed to unguided public access west of the visitor center, and FR150 would be closed at the new park boundary. Closure of FR545 west of the visitor center would significantly reduce impacts to archeological sites from inappropriate visitor activities (artifact collection, graffiti, etc.), especially at the front country sites that currently receive most visitor impacts.

The entrance to the Wukoki Road would be realigned to take off from the visitor center. A portion of the road to Wukoki east of the Black Falls Crossing Road junction would be closed to vehicles and converted to a trail. The realignment of the road to Wukoki would have a minor beneficial effect on that particular site by ensuring that visitors receive orientation at the visitor center prior to encountering the resource. Conversion of a portion of

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the Wukoki Road to a pedestrian trail would not impact archeological resources directly, although there is a potential for moderate increased visitation impacts to sites that are visible from the pedestrian trail, because people moving at a slower pace would have more opportunity to recognize sites and wander off-trail to inspect them. Visitation impacts at Wukoki Pueblo itself would probably be reduced somewhat, owing to the lesser numbers of visitors who would be willing or able to walk to the site. Alternatively, vandalism impacts might increase at Wukoki as a result of the site receiving less visitation and more infrequent patrols. Overall, however, the effect of the realignment and trail conversion would be a minor benefit to the archeological resources.

Alternative 1 would eliminate guided adventure hikes in large areas of the monument and eliminate unguided visitation along FR545 west of the visitor center, as well as at most front country sites. Elimination of guided adventure hikes throughout most of the monument and elimination of unguided visitation at several front country sites would have a major beneficial effect on archeological resources by substantially reducing impacts such as collection of artifacts, destabilization of walls, soil compaction, social trailing, vandalism, etc. It would also reduce the need for future mitigation of impacts, provided that there is active patrolling and proactive management of the designated preservation zone.

Alternative 1 would promote access to Antelope Canyon and along the base of the Doney Cliffs through guided day hikes and overnight backpacking trips, and there would be expansion of access to areas surrounding Citadel and Lomaki through designation of a new Extended Learning Zone. Concentrating visitation in these new Guided Adventure and

Extended Learning Zones would potentially impact a large number of archeological sites (448), because these areas contain some of the highest site densities within the monument. Impacts could include loss of artifacts, destabilization of walls, increased soil compaction and erosion, and increased social trailing and erosion. Impacts could also include forms of vandalism, such as graffiti and pothunting, as the public learns where the sites are and how best to access to them. In combination, these various impacts would have a major adverse effect on the archeological resources. On the other hand, impacts from increased levels of visitation would be offset to some extent by greater public awareness of resource issues and impacts, gained through education received by participating in guided adventures, and because of an increased NPS presence in these areas of the monument. Within the extended learning areas, some loss of integrity to a portion of the 257 sites in this zone would also occur because of the need to stabilize sites and/or harden and expand trails to accommodate more intensive use of these areas. These impacts could be partially mitigated through systematic documentation, excavation, and long-term curation.

Alternative 1 involves construction of a new primitive campground, and development of new trails and waysides in a significantly expanded Extended Learning Zone around the Citadel-Lomaki area. There is also the potential for new primitive trails in the Guided Adventure Zone, especially around Crack-in-Rock Pueblo. Construction of new trails and campground facilities would impact or destroy a small number of archeological sites (6-10). Construction activities would affect the uppermost layers of earth as vehicles compact the soils and alter the horizontal and vertical distribution of buried archeological

remains. These activities would also destroy surface sites by damaging and destroying artifactual remains and their contextual environments.

New Heiser housing would be converted to an educational/meeting center. Conversion of the New Heiser housing would have a negligible effect on cultural resources, except possibly indirectly, by improving education of the public about resource issues and "Leave No Trace" ethics.

In addition to the north boundary expansion, which is common to all alternatives, the boundaries of the monument would be expanded by approximately 4,000 acres to the south. While this proposed boundary expansion is primarily for administrative purposes, it would include additional cultural resources that are integral to the story of Wupatki. The inclusion of these resources in the park would have a major long-term beneficial effect, by enhancing the long-term and scientific integrity of these resources by including them in lands being proactively managed for long-term preservation purposes and by removing them from areas subject to impacts from grazing and other multiple use impacts.

CUMULATIVE EFFECTS

Cumulative effects would be the same as for the No-Action Alternative, except for following differences: Implementation of Alternative 1 would limit unguided visitor access to two front country sites: Wukoki and Wupatki Pueblos. Visitors could access the remaining front country sites, Crack-in-Rock Pueblo, and up to 450 additional sites via guided tours. Visitation impacts and the need for preservation treatments would increase at Wupatki, Wukoki, and Crack-in-Rock Pueblos and in the Antelope-Doney Cliffs and Citadel-Lomaki area over the long term; however, impacts would be reduced at the remaining front country

sites, and visitation impacts to a majority of sites (80%) in the backcountry would be virtually eliminated. Cumulatively, the effects of Alternative 1 on long-term integrity of archeological resources would be moderately beneficial.

CONCLUSION

In comparison to existing conditions, Alternative 1 would have a beneficial effect on archeological resources because fewer sites would be open to visitation and most visitation would be restricted to guided tours. However, more visitors would be concentrated in specific areas, including Wupatki, Wukoki, the Antelope Canyon-Doney Cliffs area, and the Citadel-Lomaki area, leading to greater impacts to the sites in those areas. Adverse impacts from more concentrated visitation would be offset to some degree by positive benefits derived from visitors receiving more education and an enhanced appreciation of the resources from participating in guided adventures. Although the exact number of archeological resources that would be affected by this alternative is unknown (because specific locations for new facilities have not been decided), overall fewer resources would be impacted under Alternative 1 than under existing conditions, because large areas of the monument would be zoned for preservation purposes. The net effect would be moderately beneficial for the long-term integrity of most archeological resources in the monument. In addition to those mentioned, there would be other, less-severe effects as a result of implementing this alternative.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Wupatki National Monument; (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 relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects Of Alternative 2: Emphasize Motorized Sightseeing And Resource Protection Through On-Site Education

IMPACT ANALYSIS

Impacts from installation of new waysides, boundary expansion to the north, upgrading of facilities to accommodate accessibility, construction of the maintenance facility at New Heiser, and restoration of Heiser Spring are the same as for the No-Action Alternative. Existing facilities and housing would be retained.

Under Alternative 2, access on FR545 and to the five main interpretive areas in the park would be the same as under the No-Action Alternative, except that access to the interpretive sites would be gated at night. This would have a moderate beneficial effect on those resources.

The development of a visitor contact station at the north entrance would have a moderate beneficial impact on archeological sites by ensuring that visitors entering via the north entrance were fully informed about rules and regulations and educated about minimizing their impacts before they encounter the resource.

Under this alternative, initial visitor contacts would occur either at the north entrance station or at the front country sites, instead of at the visitor center (which would be closed). Rangers would be stationed at the front country sites during peak visitor use periods to answer visitor questions and provide short tours. The stationing of rangers at front country

sites would have moderate short- and long-term beneficial effects by discouraging visitors from conducting inappropriate activities on the sites (walking on walls, picking up artifacts, adding graffiti, etc.) and by significantly reducing vandalism. Closure of the visitor center would not have a noticeable effect on archeological resources, as any losses in education at the VC would be compensated by the increased presence of interpretive staff at the front country sites.

In Alternative 2, the Black Falls Crossing Road would be maintained for interpretive purposes. Also, visitors would be able to access Crack-in-Rock Pueblo and CPNR lands by guided motorized tours via use of an existing, 24-mile-long, currently unmaintained, two-track road that passes around Crack-in-Rock Pueblo and through the CPNR lands. Increased use of these road tours would be accompanied by the need for increased maintenance and the addition of several new viewpoints, new trails around Crack-in-Rock Pueblo, plus minimal support facilities such as backcountry toilets and picnic tables. An unknown but relatively small number of sites in proximity to the motorized routes would be impacted by road maintenance activities and construction of viewpoints. Construction of new trails and picnic facilities could also impact or destroy a small number of archeological sites. Construction and road maintenance activities would affect the uppermost layers of the earth, as vehicles compact the soils and alter the horizontal and vertical distribution of buried archeological remains. These activities would also destroy surface sites by damaging and destroying artifactual remains and their contextual environments.

Over the long term, incidental visitation impacts would cumulatively impact sites in proximity to these roads. The guided

motorized tours would have a moderate adverse impact on Crack-in-Rock Pueblo and neighboring pueblos by funneling large numbers of visitors into an area that currently receives fewer than 250 visits per year, resulting in increased impacts from visitation and increasing the need for more frequent and comprehensive stabilization treatments. Visitation can affect the long-term integrity of archeological resources through displacement and collection of artifacts, damage to petroglyphs, destabilization of standing walls, and increasing rates of erosion owing to soil trampling and social trailing. Stabilization treatments alter the original architectural fabric of the ruins.

On the other hand, impacts from increased levels of visitation may be offset to some extent by greater public awareness of resource issues and impacts gained through education received by participating in guided tours and because of an increased NPS presence in these areas of the monument. In summary, impacts to sites along the tour route would undoubtedly increase under this alternative, but impacts would be substantially reduced at the front country sites compared with existing conditions, and human impacts would be largely eliminated from other areas of the park. Overall, these changes in visitor use patterns would have a long-term major beneficial impact for the archeological resources.

Most backcountry areas of the monument, which currently can be accessed on an intermittent basis via weekly ranger guided hikes, would be closed to visitation. Ranger-guided "discovery hikes" would be eliminated. The closure of most of the backcountry and elimination of guided hikes in these areas would have a major long-term beneficial impact on the park's archeological resources by minimizing

visitation impacts and reducing the need for future stabilization treatments.

Impacts from boundaries expansions north and south of the monument would be the same as in Alternative 1, that is to say, a major benefit.

CUMULATIVE EFFECTS

Cumulative effects would be the same as in the No-Action Alternative, except for the following differences:

Implementation of Alternative 2 would continue the current policy of limiting unguided visitor access to the seven stabilized front country sites. Also in keeping with the current policy, visitors could access Crack-in-Rock Pueblo via guided tours only. However, unlike the current situation, which restricts visitor access to Crack-in-Rock to overnight backpacking trips eight weekends per year, visitors would be able to access Crack-in-Rock via guided one-day or half-day motorized trips throughout most of the year. The remaining sites in the monument would be closed to visitation.

Although visitation impacts and the need for preservation treatments would increase substantially at Crack-in-Rock Pueblo, visitation impacts would be reduced at the front country sites, because of the increased presence of NPS interpreters. In addition, a few sites in immediate proximity to the viewpoints along the Crack-in-Rock and Black Falls Crossing Roads could sustain damage from incidental visitation. Furthermore, sites adjacent to the Crack-in-Rock and Black Falls Crossing Roads could sustain damage from increased road maintenance activities. For the vast majority of archeological resources, however, visitation impacts and the need for stabilization treatments would be virtually eliminated. Cumulatively, the effects of Alternative 2 on the long-term integrity of archeological resources would be major and beneficial.

CONCLUSION

In comparison to existing conditions, Alternative 2 would have a major beneficial effect on archeological resources, because visitation would be largely restricted to stabilized front country sites and Crack-in-Rock Pueblo. In comparison to existing conditions, considerably fewer archeological resources would be impacted, because substantially less backcountry area would be open to visitation and the associated impacts from human use. Visitation impacts at Crack-in-Rock Pueblo would increase relative to existing conditions, and sites in close proximity to the Crack-in-Rock and Black Falls Crossing Roads could sustain damage from cyclic maintenance activities, but these adverse impacts would be offset to some degree by positive benefits derived from visitors receiving more education and an enhanced appreciation of the resources. The net effect would be a decrease in the degradation of sensitive archeological resources, and the overall effect would be a major benefit to the archeological sites in the monument. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Wupatki National Monument; (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 relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects Of Alternative 3 (Preferred): Preserve Sensitive Park Resources While Diversifying The Range Of Visitor Experiences

IMPACT ANALYSIS

Impacts from installation of new waysides, boundary expansion to the north, upgrading of facilities to accommodate accessibility, construction of the maintenance facility at New Heiser, and restoration of Heiser Spring would be the same as in the No-Action Alternative. Existing facilities and housing would be retained.

Under Alternative 3, access on FR545 and to the five main interpretive areas in the park would be the same as under the No-Action Alternative, except that access to the interpretive sites would be gated at night. This change would have a moderate beneficial effect on those resources.

Other changes proposed in Alternative 3 include realignment of the road to Wukoki and pulling back the parking area at Wukoki approximately 1/4 mile. The entrance to the Wukoki Road would be realigned to take off from the visitor center. The realignment of the road to Wukoki would have a minor beneficial effect on that particular site by ensuring that visitors receive orientation at the visitor center prior to encountering the resource. Realignment of the road and conversion of a portion of the Wukoki Road to a pedestrian trail would not impact archeological resources directly. However, there is a potential for increased visitation impacts (e.g., social trailing, illegal artifact collection, etc.) to two sites that are visible from the pedestrian trail. Visitation impacts at Wukoki Pueblo would probably be reduced somewhat, owing to the lesser numbers of visitors who would be willing

or able to walk 1/4 mile to the site. Alternatively, vandalism impacts might increase at Wukoki as a result of the site receiving less visitation and more infrequent patrols. Overall, however, the effect of the realignment and trail conversion would be a minor benefit to the archeological resources.

Under Alternative 3, the existing visitor center would be retained and a new visitor contact station would be constructed at the north entrance. Visitor contacts would occur at this station, at the front country sites, or at the existing visitor center. The development of a visitor contact station at the north entrance would have a moderate beneficial impact on archeological sites by ensuring that visitors entering via the north entrance were fully informed about rules and regulations and educated about minimizing their impacts before they encounter the resource.

Visitor experience opportunities at Wupatki would be significantly modified from existing conditions under this alternative. Visitors would still be able to visit the five main interpretive areas on their own, although access after dark would no longer be available, because these sites would be gated at night. Guided hikes to Crack-in-Rock Pueblo and other backcountry sites along the Doney Cliffs would continue to be offered, but guided hikes would be eliminated from other backcountry areas. For visitors wishing to get out of their cars and hike, a trail from Wupatki to Wukoki would be created and another shorter trail would be created near Lomaki. These changes would have a major beneficial effect on most archeological resources at Wupatki by concentrating visitor impacts at the hardened front country sites, the Doney Cliffs area, and Crack-in-Rock Pueblo.

Alternative 3 would promote visitor access along the base of the Doney Cliffs through guided adventure activities, and

there would be significant expansion of access to areas surrounding Citadel and Lomaki through designation of a new Extended Learning Zone. Concentrating visitation in these new Guided Adventure and Extended Learning Zones could potentially impact a large number of archeological sites (400+), because these areas contain some of the highest site densities within the monument. Impacts could include loss of artifacts, destabilization of walls, increased soil compaction and erosion, and increased social trailing and erosion. Impacts could also include forms of vandalism, such as graffiti and pothunting, as the public learns where the sites are and how to get to them. Within the extended learning areas, some loss of integrity to a portion of the 200+ sites in this zone would likely occur because of the need to stabilize sites and/or harden and expand trails to accommodate more intensive use of these areas. These moderately adverse impacts could be partially mitigated through excavation and long-term curation. On the other hand, impacts from increased levels of visitation may be offset to some extent by greater public awareness of resource issues and impacts gained through education received by participating in guided adventures and because of an increased NPS presence in these areas of the monument. In summary, impacts to sites in the Extended Learning and Guided Adventure Zones would probably increase under this alternative, but there would not be any significant change at the other front country sites compared with existing conditions, and human impacts would be largely eliminated from other areas of the park. Overall, these changes in visitor use patterns would have a long-term moderate beneficial impact for the archeological resources.

Impacts from boundaries expansions north of the monument would be the

same as in the No-Action Alternative, that is to say, a major benefit.

CUMULATIVE EFFECTS

Cumulative effects would be the same as under the No-Action Alternative, except for the following differences:

Implementation of Alternative 3 would continue the policy of allowing unguided visitor access to the five primary "front country" interpretive areas and would permit guided access to sites along the Doney Cliffs area and at Crack-in-Rock Pueblo. There would also be significant expansion of access to areas surrounding Citadel and Lomaki through designation of a new Extended Learning Zone. The remaining sites in the monument would be closed to visitation. Although visitation impacts at most front country sites would probably remain comparable to those realized under existing conditions, visitation impacts and the consequent need for preservation treatments would increase somewhat in the Doney Cliffs area, and impacts and the need for stabilization would increase substantially in the Lomaki-Citadel Extended Learning Zone and at Crack-in-Rock Pueblo. With the exception of a few sites in immediate proximity to the new trail connecting Wupatki and Wukoki Pueblos, which could sustain increased damage from incidental visitation, visitation impacts would be virtually eliminated from all other sites in the monument. These various changes in visitor use patterns will be moderately adverse to the long-term integrity of some archeological sites, although overall, the effect of these changes will be moderately beneficial when compared with those experienced under existing conditions.

CONCLUSION

In comparison to existing conditions, Alternative 3 would have a moderately beneficial effect on backcountry

archeological resources, because visitation would be restricted to stabilized front country sites, sites in the Lomaki-Citadel vicinity, the Doney Cliffs area, and Crack-in-Rock Pueblo. In comparison with existing conditions, considerably fewer archeological resources would be impacted by visitation. The net effect, relative to existing conditions, would be a decrease in the degradation of sensitive archeological resources throughout most of the monument. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Wupatki National Monument; (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 relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects Of Alternative 4: Emphasize Integrated Story Between The Parks And Minimize Development

IMPACT ANALYSIS

Impacts from installation of new waysides, boundary expansion to the north, upgrading of facilities to accommodate accessibility, construction of the maintenance facility at New Heiser, and restoration of Heiser Spring would be the same as in the No-Action Alternative.

In Alternative 4, visitors would enter the park from the south via FR545 and travel to the Wupatki Visitor Center before encountering park resources. FR545

would become one-way heading west beyond (west of) the visitor center, and FR150 would be closed at the new park boundary. The north entrance to Wupatki would be retained as an exit only. The park would be closed at night and gated at the visitor center. Closure of the park at night would benefit the long-term and scientific integrity of cultural resources by limiting after-hours access to sites in the park. Closure of the north entrance would presumably reduce impacts to archeological sites from inappropriate visitor activities (artifact collection, graffiti, etc.) and enhance long-term/scientific integrity of archeological resources by ensuring that visitors receive orientation at a visitor center before interacting with resources.

The entrance to the Wukoki Road would be realigned to take off from the visitor center. A portion of the road to Wukoki east of the Black Falls Crossing Road junction would be closed to vehicles and converted to a trail. The realignment of the road to Wukoki would have a minor beneficial effect on that particular site by ensuring that visitors receive orientation at the visitor center prior to encountering the resource. Conversion of a portion of the Wukoki Road to a pedestrian trail would not impact archeological resources directly, although there is a potential for moderate increased visitation impacts to sites that are visible from the pedestrian trail, because people moving at a slower pace would have more opportunity to recognize sites and wander off-trail to inspect them. Visitation impacts at Wukoki Pueblo itself would probably be reduced somewhat, owing to the lesser numbers of visitors who would be willing or able to walk to the site. Alternatively, vandalism impacts might increase at Wukoki as a result of the site receiving less visitation and more infrequent patrols. Overall, however, the effect of the realignment and trail conversion

would be a minor benefit to the archeological resources.

For visitors wishing to get out of their cars and hike, Alternative 4 would involve the development of a new primitive trail between Wupatki Pueblo and Wukoki. Three sites could be directly impacted by trail development; another 15 sites are adjacent to or within 50 meters of the proposed trail and would be subjected to increased visitation impacts over the long term. The loss of resources could be partially mitigated through documentation, excavation, and curation. These impacts could be moderately adverse.

Since the goal of this alternative is to retain and enhance a remote, undeveloped feeling in the Wupatki area, many existing developments would be removed from Wupatki and visitor services would be concentrated at Sunset Crater. The museum and administrative offices in the current visitor center would be relocated to Sunset Crater, and all but one historic residence would be removed. A portion of the current visitor center would function as a ranger station and bookstore outlet. These changes would have no direct effect on archeological resources.

Visitor experience opportunities would be modified from existing conditions under this alternative. Visitors would still be able to access the five primary interpretive areas on their own, although access after dark would no longer be available. Guided hikes to Crack-in-Rock Pueblo and other backcountry sites would no longer be offered; guided motorized tours to Crack-in-Rock would be made available instead. These changes would have a major beneficial effect on most archeological resources by concentrating visitor impacts on the previously "hardened" front country sites and at Crack-in-Rock Pueblo.

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Impacts to Crack-in-Rock and outlying sites in the Lomaki area would increase under this alternative, but there would not be any significant change at the other front country sites compared with existing conditions. Increased use of the road to Crack-in-Rock would be accompanied by the need for increased maintenance. An unknown but relatively small number of sites in proximity to the road could be impacted by road maintenance activities. Road maintenance activities would affect the uppermost layers of the earth as vehicles compact the soils and alter the horizontal and vertical distribution of buried archeological remains. These impacts would be moderately adverse.

Impacts from boundary expansions north and south of the monument would be the same as for Alternative 1, that is to say, a major benefit.

CUMULATIVE EFFECTS

Cumulative effects would be the same as those for the No-Action Alternative, except for the following differences: Unlike the current situation, where visitors' access to Crack-in-Rock is restricted to overnight backpacking trips eight weekends per year, visitors would be able to visit Crack-in-Rock via guided motorized trips multiple times throughout the year. The existing front country sites (Lomaki/Box Canyon, Citadel/Nalakihu, Wukoki, Wupatki Pueblo, and the Doney Mountain picnic area) would remain open for unguided visitation. The remaining sites in the monument would be closed to visitation. Although visitation impacts and the consequent need for preservation treatments would increase substantially at Crack-in-Rock Pueblo, visitation impacts at most of the front country sites would probably decrease somewhat, owing to closure of the north entrance and conversion of FR545 to a one-way road west of the visitor center. With the

exception of a few sites in immediate proximity to the new trail connecting Wupatki and Wukoki Pueblos, which might sustain increased damage from incidental visitation, visitation impacts would be virtually eliminated from all other sites in the monument. These various changes in visitor use patterns would have a major beneficial effect on the long-term integrity of most archeological sites in the monument.

CONCLUSION

In comparison to existing conditions, Alternative 4 would have a major beneficial effect for most archeological resources, because visitation would be restricted to stabilized front country sites and Crack-in-Rock Pueblo. The creation of a new trail to Wukoki would offset these benefits slightly. Impacts at Crack-in-Rock Pueblo would increase substantially relative to existing conditions, but the vast majority of sites in the monument would be protected from incremental degradation from long-term visitor use. The net effect would be a major decrease in the degradation of sensitive archeological resources throughout most of the monument. In addition to those mentioned, there would be other, less-severe effects as a result of implementing this alternative.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Wupatki National Monument; (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 relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Irreversible/Irretrievable Commitments Of Resources

As described under Unavoidable Adverse Impacts, the continuing use of existing visitor centers and trails would directly and indirectly affect archeological resources in the immediate vicinity. Archeological resources adjacent to, or easily accessible from, public access areas would continue to be vulnerable to surface disturbance, inadvertent damage, and vandalism. A loss of the surface archeological materials, alteration of artifact distribution, and a reduction of contextual evidence would result. Under the No-Action Alternative, impacts to archeological sites from inappropriate visitor activities (artifact collection, graffiti, etc.) would continue to be a major long-term problem, because visitors would continue to access most of the front country and some backcountry sites without receiving prior orientation at the visitor center. Because these are nonrenewable resources, this would be an irreversible/irretrievable loss of these resources. However, the most heavily impacted front country sites are already documented, so although the actual artifacts and contextual evidence are lost, information is retained through drawings, photographs, and reports. The effects of the No-Action Alternative would be moderately adverse to the long-term integrity of the archeological resources. In this alternative, as in all others, some form of data recovery (e.g., documentation, surface collection of artifacts, excavation) would be conducted at potentially impacted sites to reduce the amount of information lost.

Overall, fewer resources would be impacted under Alternative 1 than under existing conditions, because large areas of the monument would be zoned for long-term preservation purposes. However, more areas and sites would be open to guided hikes under Alternative 1

than in Alternatives 2, 3, or 4, and more visitation impacts would be concentrated in areas that currently receive limited use. However, when all effects are considered together, the overall effect of this alternative would be moderately beneficial for the archeological resources.

Under Alternative 2, considerably fewer archeological resources would be adversely impacted, because substantially less backcountry area would be open to visitation impacts. Visitation impacts at Crack-in-Rock Pueblo would increase relative to existing conditions, and sites in close proximity to the Crack-in-Rock and Black Falls Crossing Roads could sustain damage from cyclic maintenance activities, but these adverse impacts would be offset to some degree by positive benefits derived from visitors receiving more education and an enhanced appreciation of the resources from participating in guided motorized tours. The net effect would be a decrease in the degradation of sensitive archeological resources, and the overall effect would be a major benefit to the archeological sites in the monument.

In comparison with existing conditions, Alternative 3 would have a moderately beneficial effect on backcountry archeological resources because visitation would be restricted to stabilized front country sites, the Lomaki-Citadel and Doney Cliffs areas, and Crack-in-Rock Pueblo. In comparison with existing conditions, considerably fewer archeological resources would be impacted, because less land area would be open to visitation. The net effect, relative to existing conditions, would be a decrease in the degradation of sensitive archeological resources throughout most of the monument.

In comparison with existing conditions, Alternative 4 would have a major beneficial effect on backcountry archeological resources because visitation

would be restricted to stabilized front country sites and Crack-in-Rock Pueblo. The creation of a new trail to Wukoki would offset these benefits slightly. Impacts at Crack-in-Rock Pueblo would increase substantially relative to existing conditions, but the vast majority of sites in the monument would be protected from incremental degradation from long-term visitor use. The net effect would be a major decrease in the degradation of sensitive archeological resources throughout most of the monument.

Loss In Long-Term Availability Or Productivity Of The Resource To Achieve Short-Term Gain

Although under all action alternatives there would be short-term effects on archeological resources caused by construction activities, data recovery would be undertaken to minimize the long-term loss of the information.

Unavoidable Adverse Impacts

Under the No-Action Alternative, the continuing use of existing visitor centers and trails would directly and indirectly affect archeological resources in the immediate vicinity. Archeological resources adjacent to, or easily accessible from, public access areas would continue to be vulnerable to surface disturbance, inadvertent damage, surface artifact removal, soil compaction, and vandalism. A loss of the surface archeological materials, alteration of artifact distribution, and a reduction of contextual evidence would result. Impacts to archeological sites from inappropriate visitor activities (artifact collection, graffiti, etc.) would continue to be a major long-term problem, because visitors would continue to visit most of the front country and some backcountry sites without receiving prior



orientation at the visitor center. Overall, the effects of the No-Action Alternative would be moderately adverse to the long-term integrity of the archeological resources.

Under Alternative 1 fewer archeological sites would be open to visitation and most visitation would be restricted to guided tours. However, more visitors would be concentrated in specific areas, including Wupatki, Wukoki, the Antelope Canyon-Doney Cliffs area, and the Citadel-Lomaki area, leading to greater adverse effects to the sites in those areas. Although the exact number of archeological resources that would be affected by this alternative is unknown (because specific locations for new facilities have not been decided), overall fewer resources would be impacted in Alternative 1 than under existing conditions, because large areas of the monument would be zoned for preservation purposes. Any sites to be disturbed would have archeological surveys before disturbance, and data recovery programs would reduce the amount of information lost.

Under Alternative 2, considerably fewer archeological resources would be adversely affected, because substantially

less backcountry area would be open to visitation impacts. Visitation impacts at Crack-in-Rock Pueblo would increase relative to existing conditions, and sites in close proximity to the Crack-in-Rock and Black Falls Crossing Roads could sustain damage from cyclic maintenance activities. These adverse impacts would be offset to some degree by positive benefits derived from visitors receiving more education and an enhanced appreciation of the resources from participating in guided motorized tours. As before, data recovery would be used to reduce the amount of information lost.

In comparison with existing conditions, Alternative 3 would have a moderately beneficial effect on backcountry archeological resources because visitation would be restricted to stabilized front country sites, the Lomaki-Citadel and Doney Cliffs areas, and Crack-in-Rock Pueblo. Adverse effects as identified under the No-Action Alternative would continue at these sites.

In comparison with existing conditions, Alternative 4 would have a major beneficial effect on backcountry archeological resources because visitation would be restricted to stabilized front country sites and Crack-in-Rock Pueblo and adverse effects would be limited to those sites. The creation of a new trail to Wukoki would offset these benefits slightly. Impacts at Crack-in-Rock Pueblo would increase substantially relative to existing conditions, but the vast majority of sites in the monument would be protected from incremental degradation from long-term visitor use. As before, data recovery would be used to reduce the amount of information lost.

HISTORIC CHARACTER OF THE BUILT ENVIRONMENT

Methodology

The National Historic Preservation Act requires agencies to take into account the effects of their actions on properties listed or eligible for listing in the National Register of Historic Places. The assessment of impacts to the cultural resources followed a three-step process: (1) determining the area of potential effect of the proposed actions; (2) identifying the cultural resources within the area of potential effect that are either listed in or eligible for listing in the National Register of Historic Places (see Affected Environment); and (3) assessing the extent and type of impacts the proposed action may have upon cultural resources. An impact on a cultural resource occurs if an action has the potential of altering in any way the characteristics that qualify the resource for inclusion in the National Register. If a proposed action diminishes the integrity of such characteristics, it is considered to have an adverse effect. Impacts that may occur later than, or at a distance from the location of a proposed action are also potential impacts of the action, and are considered to be indirect impacts.

For the purposes of this analysis, the following will be used to describe impacts to the built environment and cultural landscapes at Wupatki National Monument:

Negligible: The impact is at the lowest levels of detection, barely perceptible, and not measurable.

Minor: The impact is slight, but detectable. The impact does not affect the character defining features of a National Register of Historic Places eligible or listed historic structure, cultural landscape, or historic district.

Moderate: The impact is readily apparent. For a National Register eligible or listed historic structure, cultural landscape, or historic district, the impact changes a character defining feature(s) of the resource but does not diminish the integrity of the resource to the extent that its National Register eligibility is jeopardized.

Major: The impact is severe or of exceptional benefit. For a National Register eligible or listed historic structure, cultural landscape, or historic district, the impact changes a character defining feature(s) of the resource, diminishing the integrity of the resource to the extent that it is no longer eligible for listing or listed on the National Register.

Effects Of The No-Action Alternative: Existing Conditions

IMPACT ANALYSIS

The CCC and Mission 66 visitor center would remain, as would the Mission 66 houses, apartment complex, and maintenance facility. The Mission 66 addition has a long-term moderate, adverse impact on the CCC visitor center. During Mission 66 construction the roof orientation of the rustic visitor center was altered to accommodate the addition, and interior modifications changed the configuration of the small space for offices and storage. Because the CCC visitor center has been modified extensively, it is likely not eligible for listing in the National Register. However, it has not yet been formally evaluated.

The boundaries of the monument would be expanded substantially to the north. The proposed boundary expansion would include prehistoric landscapes that have been dissected by artificial boundaries. The inclusion of these resources in the park would be a major benefit to their

long-term and scientific integrity by including them in lands being proactively managed for preservation purposes.

Installation of new wayside exhibits would have a minor visual impact on the cultural landscape. To mitigate the impact, signs would be constructed of material that is compatible with the historic setting and the natural surrounding. New museum exhibits would be constructed, but would not alter the distinguishing characteristics of the Mission 66 visitor center.

Facilities would be upgraded to accommodate and meet current accessibility standards. Making historic buildings and structures accessible to the mobility impaired could result in the loss of historic fabric or the introduction of new visual and nonhistoric elements, resulting in long-term minor adverse effects. For example, the doorways of buildings could require widening, and ramps or wheelchair lifts could be added to the exterior of buildings. The park would strive, however, to develop design solutions to accessibility requirements that minimize impacts to cultural resources.

A storage unit would be constructed at the New Heiser maintenance yard. The structure would replace the Quonset hut at the Old Heiser maintenance yard and would be built in a previously disturbed area and hidden from view behind a small mesita in the New Heiser maintenance yard and housing area. Construction of the storage facility would have a long-term minor impact on the New Heiser cultural landscape. The New Heiser housing area and maintenance yard was constructed in the 1980s, and several changes have occurred since that time. To mitigate the visual impact of the new storage facility, construction materials would be used that are compatible with the historic setting and natural surroundings. The new structure

would not alter the topography, spatial relationships, or circulation patterns of the cultural landscape. Removal of the Quonset hut at the Old Heiser maintenance yard would have a long-term minor impact on that landscape. Because many alterations have occurred at the Old Heiser maintenance yard over the years, integrity of the landscape is already somewhat diminished.

Heiser Spring would be rehabilitated to resemble its historic appearance. The spring water is currently being piped off-site. The spring has been used through time by early ranchers, Navajo families, and the NPS; consequently, the spring has been modified several times to accommodate a particular use. The Old Heiser maintenance yard and housing area will be evaluated in 2001 for eligibility to be listed in the National Register of Historic Places. If the landscape is eligible to be listed in the National Register, modifying the spring to its pre-NPS appearance would have a long-term minor to moderate impact on the Old Heiser maintenance yard landscape.

CUMULATIVE EFFECTS

The park boundaries represent the geographic area in which Cumulative Effects that affect the built environment and cultural landscapes at Wupatki National Monument were identified.

Past development has significantly altered the CCC built environment. However, only minor modifications have been made to the Mission 66 designed landscape. A small visitor center and ranger residence were constructed by the CCC in 1939-1940. At the Old Heiser maintenance yard, the original CCC housing site for the monument, several modifications have been made. A Quonset hut for maintenance equipment was constructed, CCC houses were removed and trailer houses moved on-

site in the 1960s and 1970s. Water from Heiser spring that once supplied the Old Heiser area has been piped off-site. The Quonset hut is slated for removal in 2001, and Heiser spring will be rehabilitated.

During the Mission 66 program a visitor center was constructed and attached to the existing CCC visitor center, completely obscuring the small structure. Two houses, an apartment complex, maintenance building, and sewer lagoons were also constructed as part of the Mission 66 program. A new entrance road and access to Wupatki, Wukoki, Citadel/Nalakihu, and Lomaki/Box Canyon Pueblos and the Doney Mountain picnic area were also redesigned. A few minor alterations have occurred to the Mission 66 designed landscape, including construction of the New Heiser housing area in the 1980s (two miles away from the visitor center and developed area) and parking lot modifications. Because the primary, original design elements of the Mission 66 designed landscape are still intact, the landscape is considered to be potentially National Register eligible (however this landscape has yet to be formally evaluated). Any future alterations of the designed landscape could bring the integrity of the landscape as a whole (especially design) down to the level where National Register eligibility would be questioned.

The CCC built environment has been modified extensively by the Mission 66 development. Because this landscape has not been evaluated, it is difficult to determine National Register eligibility.

CONCLUSION

This alternative would have minor to moderate impacts on the CCC and Mission 66 built environments.

Any future alterations to the Mission 66 landscape, in conjunction with the minor, Cumulative Effects of previous changes

and this alternative could result in moderate Cumulative Effects to the Mission 66 designed landscape.

Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Wupatki National Monument; (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 relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects Of Alternative 1: Limit Motorized Sightseeing And Focus On Extended Learning

IMPACT ANALYSIS

The boundaries of the monument would be expanded substantially to the north, and administrative adjustments would be made to the south of the existing monument. The proposed boundary expansion would include prehistoric landscapes that have been dissected by artificial boundaries. The inclusion of these resources in the park would be a major benefit to their long-term and scientific integrity, by including them in lands being proactively managed for preservation purposes.

The impacts from installation of waysides and exhibits, upgrading of facilities to accommodate accessibility, construction of the maintenance storage facility at New Heiser, and rehabilitation of Heiser Spring would be the same as under the No-Action Alternative.

FR545 between the Lomaki-Citadel area and US89 would be abandoned, and the pavement would be removed. A primitive road would be maintained along the

former route for administrative uses. FR545 between the Visitor Center and the Lomaki-Citadel area would be closed to traffic except for guided access. Closing FR545 between the Visitor Center and the Lomaki-Citadel area would alter the planned Mission 66 circulation pattern, resulting in a long-term moderate impact to the Mission 66 drive-through experience.

Realigning the Wukoki spur road would have a long-term moderate impact on the designed Mission 66 road to Wukoki by changing the planned circulation pattern, and would have a long-term moderate impact on the prehistoric cultural landscape by damaging or destroying landscape features. However, the road would be designed to avoid landscape features and would be constructed of materials that are compatible with the natural surrounding and historic setting.

A small primitive campground would be developed at the Old Heiser maintenance yard and housing area. Over time, various construction and development activities have diminished the integrity of the site to the extent that it may no longer be considered eligible for listing on the National Register of Historic Places. Although construction of a primitive campground in the original location of the first Wupatki housing development would alter or remove the few remaining features of the site, the additional construction would only result in a long-term minor to moderate impact on the former housing area due to extensive disturbance of the site in the past.

Implementing this alternative would result in the long-term moderate impact to the planned Mission 66 drive-through experience and minor impact at the Old Heiser maintenance yard and housing area. There would be an overall reduction of historic integrity in the

Mission 66 historic designed landscape, but not to the extent that the landscape would no longer be eligible to be listed in the National Register of Historic Places because (1) the primary, original design elements of the landscape would remain in tact (only a 1/4 mile of the Wukoki road would be realigned and the road between the visitor center and Citadel/Lomaki area, although closed to traffic, would remain for administrative access; (2) the realigned road segment would be designed to be visually compatible with its surroundings; and (3) all impacted historic structures and landscape elements associated with the planned Mission 66 drive-through experience would be documented to the standards of the Historic American Engineering Record prior to construction.

CUMULATIVE EFFECTS

Various alterations to the prehistoric landscape, primarily from the Mission 66 designed landscape, have occurred over the years. Few changes have altered the Mission 66 landscape. The CCC designed landscape included a small visitor center and ranger residence and housing area at the Old Heiser maintenance yard. The Mission 66 landscape included a road, trails, parking lots, a visitor center, housing area, maintenance yard and sewer lagoons. In the 1980s the New Heiser maintenance yard and housing area were developed. Because the primary design elements of the prehistoric landscape remains intact, the landscape is considered to be potentially National Register eligible. Because the primary, original design elements of the prehistoric landscape are still intact, the landscape is considered to be potentially National Register eligible (however this landscape has yet to be evaluated). Any future alterations of the designed landscape could bring the integrity of the landscape as a whole (especially design)

down to the level where National Register eligibility would be questioned.

Various alterations to the Old Heiser maintenance yard landscape and housing area have occurred over the years. At the Old Heiser maintenance yard trailer houses replaced CCC constructed houses in the 1960s and alterations were made to Heiser Spring that once supplied the housing area with water. Water from the spring is now piped off-site. During the late 1970s, trailers were removed, and the New Heiser housing area was developed across the road. Because the primary design elements of the Old Heiser maintenance yard and housing area are not intact the landscape is likely not eligible for inclusion in the National Register. However, the landscape has not yet been formally evaluated.

Impacts to the designed Mission 66 landscape would be the same as those identified under the No-Action Alternative.

CONCLUSIONS

This alternative would have a long-term moderate adverse impact on the prehistoric landscape, a minor impact on the Old Heiser maintenance yard and housing area, and a minor to moderate adverse impact on the designed Mission 66 landscape. There would be an overall reduction of integrity in the prehistoric and Mission 66 landscapes, but not to the extent that they would no longer be eligible for listing on the National Register of Historic Places.

Any future alterations to the prehistoric and Mission 66 landscapes, in conjunction with the moderate adverse, cumulative effects of previous changes and this alternative could result in moderate, adverse cumulative effects to the prehistoric and Mission 66 designed landscape.

Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Wupatki National Monument; (2) key to the natural or cultural integrity of the park or to the opportunities for enjoyment of the park; or (3) identified as a goal in relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects Of Alternative 2: Emphasize Motorized Sightseeing And Resource Protection Through On-Site Education

IMPACT ANALYSIS

Impacts from expanding the boundary would be the same as those described under Alternative 1.

Impacts from installation of waysides and exhibits, upgrade of facilities to accommodate accessibility, construction of the maintenance storage facility at New Heiser, and rehabilitation of Heiser Spring would be the same as those identified for the No-Action Alternative.

Construction of the new contact station would have a long-term moderate visual impact on the surrounding cultural landscape. The station and exhibit would be situated to reduce visual impact and would be constructed of materials that are compatible with the natural surrounding and historic setting.

Adaptively rehabilitating the visitor center building would neither significantly alter the present form or character of the structure's exterior nor adversely affect any significant character defining features of the structure's interior. If any materials were removed during rehabilitation, they would be

evaluated to determine their value to the park's museum collections and/or for their comparative use in future preservation work at the site. All rehabilitation work would be undertaken in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties (1995). Converting the visitor center to accommodate more sales space, offices, and storage would have a long-term, minor to moderate impact on the building.

Toilets, picnic tables, and shelters would be constructed near Crack-in-Rock Pueblo to accommodate four-wheel-drive tours. Construction of the shelter and toilets and installation of the picnic tables would have a long-term moderate visual impact on the prehistoric landscape, however, the facilities could be situated to reduce visual impact and would be constructed of material that is compatible with the historic setting and natural surroundings.

The Black Falls Crossing Road would be maintained in its current condition and opened to park visitors. New waysides would be installed to interpret Navajo history and provide information on the neighboring Navajo Reservation. Installation of new waysides would have a long-term minor visual impact on the cultural landscape. To partially mitigate the impact, signs would be constructed of material compatible with the historic setting and natural surroundings.

CUMULATIVE EFFECTS

Few alterations have been made at the west end of the monument since the design of FR545 in the late 1950s as part of the Mission 66 program. A fee kiosk was installed at the north entrance in the late 1980s but was removed in 1991. Because few alterations have occurred to the prehistoric landscape at the north entrance of the monument, the landscape is considered potentially

National Register eligible (however, this landscape has yet to be formally evaluated). Any future alterations of the prehistoric landscape beyond the scope of what is proposed in this alternative could bring the integrity of the landscape as a whole down to the level where National Register eligibility would be questioned.

Little has changed at Black Falls Crossing Road since the construction of the dam by the CCC in the late 1930s, the use of borrow material for FR545 in the late 1950s, and the demolition of Black Falls Trading Post by the NPS in the 1960s. Because the primary original design elements of the CCC designed landscape are still intact, the landscape is considered to be potentially National Register eligible (however, this landscape has yet to be formally evaluated). Only a few features and artifacts remain from the Black Falls Trading Post. Demolition of the post and maintenance activities related to maintaining the Black Falls Crossing Road have diminished the integrity of this landscape; consequently, it is likely not eligible for inclusion in the National Register. However, the landscape has not yet been formally evaluated.

Very few changes have occurred at the Crack-in-Rock Pueblo. Preservation treatment at the site was conducted in the 1960s, and tours (foot and vehicle) were initiated to the site in the 1970s and continue today. A rest room for use during overnight stays is located off the monument on CPNRL lands.

Because the primary, original design elements of the prehistoric landscape are still intact, the landscape is considered to be potentially eligible for inclusion in the National Register. However, this landscape has not yet been formally evaluated. Any future alterations of the prehistoric landscape beyond the scope of what is proposed in this alternative

could bring the integrity of the landscape as a whole down to the level where National Register eligibility would be questioned.

The Wupatki Visitor Center has had only minor modifications. A secondary wall was removed in the mid-1990s to ease the flow of traffic in the building, and the office configuration was slightly altered in the past to create a hall. Because primary, original design elements of the Mission 66 structure remain intact, the building is considered potentially National Register eligible (however, this building has not yet been formally evaluated). Any future alterations of this building beyond the scope of what is proposed in this alternative could bring the integrity of the structure as a whole (especially design, materials, and workmanship) down to the level where National Register eligibility would be questioned.

CONCLUSION

This alternative would have minor to moderate, adverse impact(s) on the visitor center and the Black Falls Crossing Road and would have a moderate adverse impact on the prehistoric cultural landscapes at the north entrance to the monument and at Crack-in-Rock Pueblo.

Future alterations to the prehistoric landscape, the visitor center, or the Black Falls Crossing Road, in conjunction with the minor and moderate adverse impacts of this alternative could result in moderate, adverse cumulative effects to the prehistoric landscape.

Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Wupatki National Monument; (2) key to the natural or cultural integrity of the park or to the opportunities for enjoyment of the park; or (3) identified

as a goal in relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects Of Alternative 3: (Preferred) Preserve Sensitive Park Resources While Diversifying The Range Of Visitor Experiences

IMPACT ANALYSIS

Impacts of expanding the boundary, installation of waysides and exhibits, upgrading of facilities to accommodate accessibility, construction of the maintenance storage facility at New Heiser, and rehabilitation of Heiser Spring would be the same as under the No-Action Alternative.

Realigning the Wukoki spur road would have a long-term moderate impact on the designed Mission 66 road to Wukoki by changing the historic circulation pattern and would have a long-term moderate impact on the prehistoric cultural landscape by damaging or destroying landscape features. However, the road would be designed to avoid as many landscape features as possible and would be constructed of materials that are compatible with the natural surrounding and historic setting.

Construction of the new contact station near the north entrance of US89 would have a long-term moderate visual impact on the surrounding cultural landscape. The station and exhibit would be situated to reduce visual impact and would be constructed of materials that are compatible with the natural surroundings and historic setting.

Construction of the grassland trail and the trail to Wukoki would have long-term moderate visual impacts on the prehistoric cultural landscape. The impacts could be mitigated by building

the trails to avoid landscape features and with materials compatible with the historic setting and natural surroundings.

CUMULATIVE EFFECTS

Various alterations to the prehistoric landscape, primarily from the Mission 66 designed landscape, have occurred over the years. Few changes have altered the Mission 66 landscape. The CCC designed landscape included a small visitor center and ranger residence and housing area at the Old Heiser maintenance yard. The Mission 66 landscape included a road, trails, parking lots, a visitor center, housing area, maintenance yard, and sewer lagoons. In the 1980s the New Heiser maintenance yard and housing area were developed. Because the primary design elements of both the prehistoric and historic Mission 66 designed landscapes remain intact, the landscapes are considered to be potentially National Register eligible.

Few alterations have been made at the west end of the monument since the design of FR545 in the late 1950s as part of the Mission 66 program. A fee kiosk was installed at the north entrance in the late 1980s but was removed in 1991. Because few alterations have occurred to the prehistoric landscape at the north entrance of the monument, the landscape is considered potentially National Register eligible (however, this landscape has yet to be formally evaluated). Any future alterations of the prehistoric landscape beyond the scope of what is proposed in this alternative could bring the integrity of the landscape as a whole down to the level where National Register eligibility would be questioned.

Impacts to the designed Mission 66 landscape would be the same as those identified for the No-Action Alternative.

CONCLUSION

This alternative would have long-term moderate adverse impacts on the prehistoric landscape and the Mission 66 landscape. There would be an overall reduction of historic integrity of both landscapes, but not to the extent that they would no longer be eligible to be listed on the National Register of Historic Places. Any future alteration to the prehistoric and Mission 66 landscapes, in conjunction with the moderate, adverse cumulative effects of previous changes and this alternative could result in moderate, adverse cumulative effects to both designed landscapes.

Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Wupatki National Monument; (2) key to the natural or cultural integrity of the park or to the opportunities for enjoyment of the park; or (3) identified as a goal in relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects Of Alternative 4: Emphasize Integrated Story Between The Parks And Minimize Development

IMPACT ANALYSIS

The impacts of the boundary expansion would be the same as those described in Alternative 1.

The impacts of installation of waysides and exhibits, upgrading of facilities to accommodate accessibility, construction of the maintenance storage facility at New Heiser, and rehabilitation of Heiser Spring would be the same as those identified for the No-Action Alternative.

Creating a one-way road from the Wupatki visitor center to the north entrance of Wupatki would result in a long-term moderate impact to the designed Mission 66 circulation pattern. Closing and rehabilitating the Black Falls Crossing Road would result in a long-term moderate impact to this traditional travel route. The corridor has been used for many years by Navajo residents, traders, and others as a route to Flagstaff. The road today serves as a primary access for Navajos.

The Mission 66 designed visitor center, houses, apartment complex and maintenance building would be removed, and the CCC visitor center and ranger residence would remain as the visitor contact station and residence. Removing the Mission 66 development would result in long-term major adverse impact to the planned Mission 66 experience and designed landscape.

Developing a primitive trail from the visitor center to Wukoki Pueblo would result in a long-term moderate impact on the prehistoric landscape. To mitigate some of the impact, the trail would be constructed to avoid landscape features.

CUMULATIVE EFFECTS

Minor alterations have occurred to the Mission 66 designed landscape, while CCC and Mission 66 development, including recent construction and other activities, have altered the prehistoric cultural landscape.

Few changes have occurred to the designed Mission 66 landscape; modifications include trail and trail drainage repairs, parking lot repairs, and landscaping in the housing area. Because the primary, original design elements of the Mission 66 designed landscape are still intact, the landscape is considered to be potentially National Register eligible (however, this landscape has yet to be evaluated). Any future alterations of the

designed landscape, in conjunction with the adverse, cumulative effects of past changes and this alternative, would bring the integrity of the landscape as a whole (especially design) down to the level where it is no longer National Register eligible. The long-term, major, adverse impacts and, most importantly, any potential impacts of future actions, could result in major, adverse cumulative effects to the Mission 66 designed landscape.

Because few alterations have occurred to the prehistoric landscape of the monument, the landscape is considered potentially National Register eligible (however, this landscape has yet to be formally evaluated). Any future alterations of the prehistoric landscape beyond the scope of what is proposed in this alternative could bring the integrity of the landscape as a whole down to the level where National Register eligibility would be questioned. Removing the Mission 66 designed landscape from the monument would be a long-term, major benefit to the prehistoric landscape. The Mission 66 landscape would be rehabilitated, and the monument would appear closer to what it did historically.

CONCLUSION

This alternative would have long-term moderate adverse impacts on the prehistoric and Mission 66 landscapes. There would be an overall reduction of historic integrity in the landscapes, but not to the extent that they would no longer be eligible to be listed in the National Register of Historic Places. Any future alterations of the landscapes, in conjunction with the adverse, cumulative effects of previous changes and the preferred alternative, could result in major, adverse cumulative effects to the prehistoric and Mission 66 landscapes.

Because there would be no major adverse impacts to a resource or value

whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Wupatki National Monument; (2) key to the natural or cultural integrity of the park or to the opportunities for enjoyment of the park; or (3) identified as a goal in relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Irreversible/Irretrievable Commitments Of Resources

There would be an irreversible/irretrievable commitment of resources under Alternative 4. All Mission 66 facilities would be removed from the park.

Loss In Long-Term Availability Or Productivity Of The Resource To Achieve Short-Term Gain

The continuing lack of a cultural landscape inventory would lead to long-term loss of the integrity of these resources.

Unavoidable Adverse Impacts

The No-Action Alternative would have minor to moderate impacts on the CCC and Mission 66 built environments. Construction of a maintenance storage facility at New Heiser would have a long-term moderate visual impact on the prehistoric landscape. Installation of wayside exhibits would have a long-term moderate visual impact on the Mission 66 and prehistoric landscapes. Upgrading facilities to meet accessibility standards would have a long-term minor impact on the Mission 66 facilities.

Alternative 1 would have a long-term moderate adverse impact on the prehistoric landscape, a minor impact on

the Old Heiser maintenance yard and housing area, and a minor to moderate adverse impact on the designed Mission 66 landscape. Realigning Wukoki road and closing FR545 past the visitor center would have a long-term moderate impact on the planned Mission 66 circulation pattern. Construction of a primitive campground at Old Heiser would have a long-term minor impact on the CCC landscape.

Alternative 2 would have minor to moderate, adverse impact(s) on the visitor center and the Black Falls Crossing Road and would have a moderate adverse impact on the prehistoric cultural landscapes at the north entrance to the monument and at Crack-in-Rock Pueblo. Construction of a new contact station at the north entrance of the monument would have long-term moderate visual impact on the surrounding prehistoric landscape. The addition of picnic tables and portable toilets in the area of Crack-in-Rock Pueblo would have long-term moderate visual impact.

Alternative 3 would have long-term moderate adverse impacts on the prehistoric landscape and the Mission 66 landscape. Construction of a contact station at the north entrance of the monument would have long-term moderate visual impacts on the surrounding prehistoric cultural landscape. Realigning the Wukoki road would have long-term moderate adverse impact on the designed Mission 66 circulation pattern. Construction of a grassland trail and a trail from the visitor center to Wukoki Pueblo would have long-term moderate visual impact on the Mission 66 and prehistoric cultural landscapes.

Alternative 4 would have long-term, moderate adverse impacts on the prehistoric and Mission 66 landscapes. Making FR545 a one-way road would have long-term, moderate adverse

impact on the designed Mission 66 circulation pattern. Removal of all Mission 66 development (infrastructure including the visitor center, houses, apartment complex, and maintenance facility) would have a long-term major adverse impact on that designed landscape.

LONG-TERM INTEGRITY OF ETHNOGRAPHIC RESOURCES

Methodology

Ethnographic resources are those cultural and natural resources to which park-associated communities ascribe cultural significance and that continue to play a role in a community's identity and way of life. Only members of the communities to whom the resources hold cultural value can determine ethnographic resources and potential impacts to them. After initial consultation meetings with representatives of several American Indian tribes having possible traditional associations with park lands and resources, the tribes determined that the Hopi, Zuni, and Navajo Tribes have the closest association with resources that could be affected by various management alternatives. The National Park Service entered into small contracts with each of these tribes to visit the parks and identify culturally significant resources that might be affected by various management alternatives. The Hopi and Navajo Tribes submitted information on ethnographic resources concerns to the National Park Service and participated in the GMP planning process during all stages of development. Because the ethnographic resources identified by the tribes are important in each tribe's history, and because the resources are interconnected with places and resources located throughout customary tribal lands, any impacts to ethnographic resources would be

regional in scope. In addition, because ethnographic resources are tied to communities' cultural identities, effects to the resources also have an effect on the communities to which they are tied in perpetuity. Therefore, the duration of impacts to ethnographic resources is forever. Although the tribes themselves did not identify the intensity of potential impacts to ethnographic resources, the National Park Service defines intensity as follows:

Negligible: The impact is at the lower levels of detection.

Minor: The impact is slight, but detectable.

Moderate: The impact is readily apparent.

Major: The impact is severely adverse or exceptionally beneficial.

Any adverse impacts to ethnographic resources would be readily apparent to the tribes to whom the resources hold cultural significance, and in most cases, because impacts to these resources affect cultural identity and ways of life, most adverse impacts would be considered severely adverse. Therefore, most impacts to ethnographic resources, whether beneficial or adverse, would be moderate to major.

Effects of the No-Action Alternative: Existing Conditions

IMPACT ANALYSIS

Under the No-Action Alternative, conditions would remain as they are at the present time, with the exception of the actions common to all alternatives. With the continuation of present conditions, unguided visitor access to archeological sites and petroglyphs would remain the same. Inability to control looting of or vandalism to archeological sites is an adverse impact to

the tribal values placed on these sites as ethnographic resources and traditional cultural properties.

Moderate to major adverse impact to ethnographic resources can result if visitation conflicts with ongoing ceremonial uses of these areas. Impacts can be caused by the presence of visitors during tribal conduct of ceremonial activities, by visitors collecting or disturbing offerings left at such places, and by direct damage to the resources themselves. Under the No-Action Alternative, specific measures would need to be implemented in consultation with affected tribes to mitigate the effects of tourism on the cultural values of these ethnographic resources.

Proposed boundary expansions under the No-Action Alternative and all alternatives would have a moderate to major beneficial impact on ethnographic resources, if the expansion or management partnerships for the proposed lands include increased protection for archeological resources and other culturally significant resources and landforms identified by the tribes involved in this planning effort.

Planning and design of new interpretive exhibits under the No-Action Alternative and all alternatives will have a moderate to major beneficial impact on the ways in which messages about tribal connections to park resources are presented to the public, especially American Indian children learning about their own histories, provided that the tribes are involved in the development of interpretive plans.

Restoration of the springs and surrounding habitat in the vicinity of Old Heiser will also have a beneficial impact on the ethnographic value of the springs.

The backcountry closures in effect under the No-Action Alternative could have a major to moderate beneficial impact on

ethnographic resources by protecting them from the effects of unlimited visitation.

CUMULATIVE EFFECTS

Prior to the establishment of monument boundaries, the lands encompassed by what is now Wupatki National Monument were part of the customary use areas or traditional lands of several American Indian tribes. These lands included ancestral dwellings or other sites, medicinal plants, prayer offering places, homes of deities, pilgrimage routes, or other places integral to tribal cultural identity and continuity.

With the establishment of federal land management boundaries, including Wupatki National Monument, the construction of fences and the implementation of land use regulations, over the years, traditional tribal uses and treatment of resources were precluded. Increased tourism interfered with ceremonial activities at certain places within monument lands. Elimination of residential and livestock grazing uses disrupted land use patterns. Stabilization of archeological sites and opening them to public visitation violated cultural values about the treatment of ancestral remains. Interpretive messages told stories of the past that differ from tribal knowledge of their own histories.

The cumulative effects of monument operations on ethnographic resources and the tribes associated with them in the past have been major and long term. Under this alternative, some impacts to ethnographic resources would continue into the future, such as the effects of stabilization and tourism, but some impacts, including those caused by backcountry closures and boundary expansions/cooperative management areas, would be improved by the development of long-term consulting relationships and agreements between

the NPS and the tribes. Cumulative effects would also be improved by the creation of updated interpretive stories that incorporate tribal versions of their own histories and connections to monument lands and resources.

CONCLUSION

The No-Action Alternative would continue to have moderate to major adverse effects on ethnographic resources to the extent that visitor access continues to have an adverse effect on archeological resources.

Some of the actions common to the No-Action Alternative and all alternatives, including proposed boundary expansions, updating of interpretive exhibits, restoration of the Old Heiser spring, and backcountry closures, have the potential to produce moderate to major beneficial impacts to ethnographic resources, provided these actions are implemented in consultation with the traditionally associated tribes.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Wupatki National Monument; (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 relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects Of Alternative 1: Limit Motorized Sightseeing And Focus On Extended Learning

IMPACT ANALYSIS

Overall, this alternative would have a beneficial effect on ethnographic resources by increasing the protection of

cultural resources in general and improving the quality of interpretive media and programs, many of which could include updating the messages about tribal histories and associations with the park. Changes to interpretive messages would have long-term beneficial effects by providing more updated information to park visitors and visiting tribal members that more accurately reflects knowledge of the park and park resources as known by the tribes themselves.

The tribes also endorse guided visits to remote sites such as Crack-in-Rock as a way of monitoring and inhibiting possible vandalism to cultural resources, including archeological sites and petroglyphs, thus reducing adverse effects to traditional cultural properties and other sites that hold cultural value for traditionally associated tribes.

Although roads would be closed to the general public, tribal access to ethnographic resources that might be affected by these closures would be facilitated. Closure of the road between Wupatki Pueblo and the north entrance could have a benefit to some ethnographic resources by preventing damage caused by too much visitation, as well as potential conflicts between tourism and ceremonial use. The nature of these effects will be determined during continued consultation with the associated tribes.

Installation of a primitive camping area would be designed so as to avoid adversely affecting any springs, thus eliminating impacts to these ethnographic sites.

The effects of boundary expansions and cooperative management areas, as well as backcountry closures, would be the same as in the No-Action Alternative.

CUMULATIVE EFFECTS

The cumulative effect of Alternative 1 would be enhanced preservation of ethnographic resources by providing better control of visitor access to archeological sites, petroglyphs, and ceremonial locations, thus decreasing the possibility of vandalism and protecting the tribal cultural values associated with them. Redesign of interpretive media could also have a long-term moderate to major beneficial effect on ethnographic resources by increasing tribal involvement in interpretive planning and promoting accurate interpretations of the tribal histories in which the ethnographic resources play a role. Road closures could have a long-term moderate to major beneficial effect on some ethnographic resources by limiting general visitation to them, while providing tribal access for purposes of traditional use. The cumulative effects of boundary expansions and cooperative management areas, as well as backcountry closures, would be the same as in the No-Action Alternative. The nature of these effects will be determined during continued consultation with the associated tribes. None of the potential impacts identified constitutes an impairment to ethnographic resources.

CONCLUSION

Overall, Alternative 1 would have long-term, beneficial effects on ethnographic resources by increasing their protection from the vandalism that could result from visitor access as well as by increasing visitor education through updated interpretive media and messages. In addition to those mentioned, there would be other, less-severe effects as a result of implementing this alternative.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill

specific purposes in the establishing legislation or proclamation for Wupatki National Monument; (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 relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects Of Alternative 2: Emphasize Motorized Sightseeing And Resource Protection Through On-Site Education

IMPACT ANALYSIS

Alternative 2 would have a long-term beneficial effect on ethnographic resources, because interpretive messages and educational opportunities would be updated to reflect the tribal histories, values, and associations with park lands and resources in which the ethnographic resources play a role. In addition, the increased on-site NPS presence proposed in this alternative would help protect archeological sites, petroglyphs, and other ethnographic resources by reducing the possibility of vandalism caused by uncontrolled visitor access. The increased road access offered by this alternative could also have a beneficial effect on ethnographic resources by facilitating tribal entry for appropriate cultural uses. The nature of these effects will be determined during continued consultation with the associated tribes.

The effects of boundary expansions and cooperative management areas, as well as backcountry closures, would be the same as under the No-Action Alternative.

CUMULATIVE EFFECTS

Overall, the cumulative effects to ethnographic resources would be the same as those identified for Alternative



1, with the possibility of a slightly improved impact to some ethnographic resources because traditional tribal users of these resources would have easier access as a result of fewer road closures. The cumulative effects of boundary expansions and cooperative management areas and backcountry closures would be the same as those described under the No-Action Alternative.

CONCLUSION

Alternative 2 would provide overall beneficial effects to ethnographic resources. None of the potential impacts identified constitutes and impairment to ethnographic resources. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Wupatki National Monument; (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 relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects Of Alternative 3 (Preferred): Preserve Sensitive Resources While Diversifying The Range Of Visitor Experiences

IMPACT ANALYSIS

Effects on ethnographic resources under Alternative 3 would be similar to those under Alternative 2. Interpretive messages and educational opportunities would be updated to reflect the tribal histories, values, and associations with park lands and resources in which the ethnographic resources play a role, resulting in a beneficial effect on them.

The increased on-site NPS presence proposed in this alternative would help protect archeological sites, petroglyphs, and other ethnographic resources by reducing the possibility of vandalism caused by uncontrolled visitor access. Potential adverse impacts to ethnographic resources by development of new self-guided trails could be avoided by developing the trails in consultation with associated tribes. Potential adverse effects to Crack-in-Rock Pueblo and in-use shrines near it could be avoided by consulting with associated tribes in the development of plans for overnight trips there.

The available road access offered by this alternative could also have a beneficial effect on ethnographic resources by facilitating tribal access for appropriate cultural uses. The nature of these effects will be determined during continued consultation with the associated tribes.

The effects of boundary expansions and cooperative management areas, as well as backcountry closures, would also be the same as those described for the No-Action Alternative.

CUMULATIVE EFFECTS

The cumulative effects of the improved educational opportunities, resource protection measures, and tribal access to ethnographic resources would be the same as those described under Alternative 2. Tribal consultation would be imperative to ensure that there are no adverse effects on ethnographic resources as a result of developing new self-guided trails and overnight trips to Crack-in-Rock. The cumulative effects of boundary expansions, cooperative management areas, and backcountry closures would be the same as under the No-Action Alternative.

CONCLUSION

The overall conclusion for this alternative is the same as for Alternative 2, with the caveats regarding self-guided trails and overnight trips to Crack-in-Rock Pueblo, as stated above. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Wupatki National Monument; (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 relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects Of Alternative 4: Emphasize Integrated Story Between The Parks And Minimize Development

IMPACT ANALYSIS

Alternative 4 would provide the most beneficial effects to ethnographic resources of all the Wupatki alternatives, primarily in its landscape orientation and its greatly increased emphasis on resource preservation and reduction of visitor impacts to resources. The connection of the Wupatki and Sunset Crater landscapes more accurately reflects tribal perceptions of ethnographic resources as interrelated components of an integrated, regional landscape. Closure of the park at night and elimination of off-trail backcountry hiking would provide the greatest protection to culturally sensitive archeological resources, and visitor impacts to public sites would be reduced. Expanded educational opportunities, developed in conjunction with associated tribes, would have a beneficial effect on the tribal cultural values associated with ethnographic resources throughout the entire landscape.

CUMULATIVE EFFECTS

Cumulative effects of enhanced resource protection and interpretation would be the same as described for Alternative 1, although there would be greater benefit to the tribes with the emphasis on an integrated, regional landscape.

CONCLUSION

Alternative 4 would provide a beneficial effect on tribal cultural values and would provide the greatest protection to ethnographic resources of all proposed alternatives. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Wupatki National Monument; (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 relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Irreversible/Irretrievable Commitments Of Resources

There would be no irreversible/irretrievable commitments of resources.

Loss In Long-Term Availability Or Productivity Of The Resource To Achieve Short-Term Gain

There would be no short-term gains resulting in long-term losses.

Unavoidable Adverse Impacts

The No-Action Alternative would have long-term adverse effects on ethnographic resources and the interpretation of native peoples' histories, which in turn would affect American Indian cultural values on a regional scale and at moderate to major levels of intensity. All action alternatives would reduce or eliminate these adverse effects.

LONG-TERM INTEGRITY OF NATURAL SYSTEMS AND PROCESSES

Methodology

Available information on the natural systems of Wupatki National Monument

and surrounding ecosystem was reviewed, including information on geology, soils, intermittent drainage systems, vegetation, and wildlife. Potential impacts to rare species/unique habitats and wetlands/floodplains (including riparian resources) within the monument are assessed in separate sections below. Physiographic maps of the monument were used to generally characterize the natural systems surrounding proposed visitor access and support facilities and the anticipated visitor uses and administrative activities within the various management zones. The potential impacts of each alternative on those systems were then evaluated, including pertinent issues identified during the scoping process. Predictions about short- and long-term impacts were based on past studies of land use and visitor impacts to the regional ecosystem, including some studies at the monument. Sociological studies comparing the deterrent effects of signs versus ranger presence on sites were also considered. The predicted intensity of impacts is articulated according to the following criteria:

Negligible: An action that would affect very few individuals of species populations, or affect the existing physical environment within Wupatki National Monument. The change would be so small or localized that it would have no measurable or perceptible consequence to the populations or natural system function.

Minor: An action that would affect a relatively small number of individuals of species populations, or affect the existing physical environment within Wupatki National Monument. The change would require considerable scientific effort to measure, be limited to relatively few individuals of the populations, be very localized in area, and have barely

perceptible consequences to the populations or natural system function.

Moderate: An action that would cause measurable effects on: (1) a relatively moderate number of individuals within a species population, (2) the existing dynamics between multiple species (e.g., predator-prey, herbivore-forage, vegetation structure-wildlife breeding habitat), (3) a relatively large habitat area or important habitat attributes, or (4) a large area of the natural physical environment within Wupatki National Monument. A species population, plant and animal communities, habitats, or natural system function might deviate from normal levels under existing conditions, but all species would remain indefinitely viable within the monument.

Major: An action that would have drastic consequences for species population numbers, dynamics between multiple species, habitat area or important habitat attributes, or the existing physical environment within Wupatki National Monument. The change would be readily apparent throughout the monument area. A species population, plant and animal communities, habitats, or natural system function would be permanently altered from normal levels under existing conditions, and species would likely be extirpated within the monument.

Effects Of The No-Action Alternative: Existing Conditions

IMPACT ANALYSIS

Under the No-Action Alternative, significant beneficial impacts would be realized by proposals to expand the area within Wupatki National Monument to a total of 55,600 acres through willing landowner (Coconino Plateau Natural Reserve Lands) donation of more than 20,000 acres. The NPS also proposes increased coordination of resource

management activities with the U.S. Forest Service on lands to the south of the monument. The proposed boundary expansion would increase the area within the monument by 60% and effectively double the area of grassland and riparian habitat. Coordinated management of U.S. Forest Service lands south of the monument could improve the condition of large watersheds, which drain through the monument, and reduce instances of poaching, woodcutting, off-road-vehicle use, and unauthorized access within the closed area of the monument. Both the boundary expansion and coordination with the U.S. Forest Service could lead to the removal or closure of some roads and removal of fence segments near the current monument boundary, which would decrease wildlife habitat fragmentation. These actions would have a long-term, moderate, beneficial impact to soils, vegetation, intermittent drainage systems, wildlife, sensitive species, unique habitats, wetlands/floodplains, riparian resources, and efforts to preserve the overall biodiversity within the monument.

Most of the area within Wupatki National Monument remains closed to public access to protect sensitive resources. Access is permitted for certain special uses, such as research and educational activities. There is scattered evidence of occasional unauthorized hiking within the closed area, which will likely continue because the existing staffing level is too low to ensure frequent patrols. The impacts of special and unauthorized uses within the backcountry are negligible. This ensures natural systems and processes are sustained with relatively few long-term adverse environmental impacts, except for those that are attributable to the impacts of historic livestock grazing within the monument, to adjacent land uses, and to regional watershed, airshed, and ecosystem degradation.

Most adverse impacts to natural systems within Wupatki National Monument are attributed to former ranching activity, game hunting, and predator control. Under the No-Action Alternative, the soils, intermittent drainages, vegetation, wildlife, sensitive species, unique habitats, wetlands/floodplains, and riparian resources should continue to recover from historic livestock grazing impacts. Regional Navajo sheepherding dates to the period of Spanish settlement of the Southwestern United States. Under a "life estate" agreement between the NPS and a Navajo resident, a small flock of sheep would be permitted to continue grazing a small area on the east side of the monument. Cattle grazing was discontinued in the monument during the late 1980s. Occasionally, a cow from a neighboring ranch strays into the monument until the owner removes it.

The impacts of historic grazing have not been specifically studied at Wupatki and are difficult to assess. Ecologists theorize that regional grazing pressure caused or contributed to a wide range of adverse impacts to natural systems and processes within the Southwestern United States, including: loss of grassland cover; reduction or extirpation of grassland-dependent species; accelerated erosion and gulying of drainage systems; extirpation or extinction of predators; and loss of cottonwood-willow riparian vegetation, which has had significant adverse impacts to both migratory and breeding birds. The impacts may be more severe at lower elevations, where there is a documented increase in desert vegetation and noxious plants. At higher elevations, grazing is believed to have partially contributed (along with range-fire suppression) to increased juniper establishment and encroachment into grasslands. Grazing also favors the establishment of nonnative species, including annual brome grasses, and tamarisk within riparian areas. Despite

ENVIRONMENTAL CONSEQUENCES

these documented regional impacts, grasslands at Wupatki are still dominated by native perennial bunchgrasses and are believed to be in good condition. As time passes, the relatively pristine grassland within the monument should only increase in ecological importance and scientific value.

Approximately 1,630 acres within the expanded monument area (less than 3%) are currently impacted by visitor-use and support infrastructure. Development of new public access and use facilities would not occur, and related adverse impacts to geology, soils, intermittent drainage systems, vegetation, and wildlife would be entirely avoided. A range of impacts associated with the existing road system and motor vehicle access would continue. FR545 is used by everyone who tours the park. Most visitation occurs between the months of April and October, and between the hours of 10 AM and sunset. Local residents use the road year-round at any time of the day or night. Motor noise from passing vehicles would frequently disturb wildlife. FR545 generally bisects the grassland habitat within the western half of the monument and interferes considerably with large animal movement. The results of a recent wildlife mortality study along FR545 indicate that vehicle traffic causes frequent incidental injury and death to amphibians, reptiles, and small mammals (Persons 2001). Routine road maintenance activities, including roadside vegetation management, are limited to FR545 and paved parking lots. Existing roads locally impede storm water flows through the natural drainage system. At a few locations along FR545, storm water is impounded on the upslope side and "jetting" erosion occurs on the downslope side of culverts, causing very local erosion and vegetation changes. The unpaved Black Falls Crossing Road must be regraded occasionally, which has local effects on

roadside drainage, soils, vegetation, and wildlife. The river bottom is locally impacted from maintaining the Black Falls Crossing Road. In the past, nonnative plants have dispersed into the monument along road corridors, and populations have become locally established in areas disturbed by maintenance activities. Under the No-Action Alternative, continued use and maintenance of existing access roads would have negligible impacts to geology, soils, vegetation, and intermittent drainage systems. Existing roads and motor vehicle traffic would continue to cause minor to moderate impacts to wildlife.

There are numerous abandoned roads and construction material quarries within the monument. Most of these are within the backcountry closure area and remain as scars on the landscape today. Under the No-Action Alternative, the NPS would inventory disturbed lands and select impacted sites for restoration, including reshaping surface contours, promoting natural soil development, restoring local drainage patterns, reestablishing native vegetation, and controlling nonnative plant infestations. Many of the older and more remote roads and sites would be left to continue recovering under natural ecological processes. This would have long-term, minor, beneficial impacts upon natural systems and processes within the monument.

Under the No-Action Alternative, a management-ignited fire program would be used to manage juniper woodland and grassland vegetation in the western half of Wupatki. This would thin unwanted juniper encroachment into the grassland, stimulate herbaceous cover and biodiversity, and improve habitat conditions for Pronghorn and other grassland-dependent animals. Fires would likely generate smoke and haze from the combustion of natural

vegetation. Burning would only occur when prevailing winds and climatic conditions favor the efficient rise and dispersal of smoke away from human habitation or sensitive plant and animal habitats. Prior to implementing a management-ignited fire program, the NPS would prepare a separate Fire Management Plan and accompanying environmental assessment and would ensure public scoping, comment, and review of potential impacts.

Under the No-Action Alternative, the NPS would monitor for nonnative plant or animal invasion and attempt to control these species when warranted. Nonnative plant invasiveness would be assessed in different habitats, and infested areas would be mapped. This information would then be used to prioritize areas for treatment. Success in controlling an invasive species would be predicated upon early detection of infestations before they grow out of control, or upon the availability of ecologically sound and affordable technology. Within the monument, nonnative plant infestations, predominantly Russian thistle (*Salsola* spp.) and a few other small annual plant species are generally confined to road corridors and in proximity to developed areas. The grassland of Wupatki remains in relatively pristine condition, but annual brome grasses have been observed. Camelthorn (*Alhagi maurorum*) has also invaded an estimated 20 acres of intermittent drainages within Wupatki. Feasible control technologies are not readily available for small annual invasive plants, but the NPS would follow established policy of prohibiting ground disturbing activities without prior assessment and mitigation of the potential impacts from invasive plants. Camelthorn can potentially be controlled with persistent efforts to remove plants and control root systems with herbicides. Despite these efforts, existing invasive, nonnative species would likely continue

to have long-term, minor to moderate adverse impacts on soils, intermittent drainages, vegetation, wildlife, wetlands/floodplains, and riparian resources.

Most visitor-use impacts to natural systems are primarily concentrated along existing roads, parking lots, visitor center, trails, four archaeological interpretive areas, and the Doney Mountain picnic area. Impacts are expected to be localized to within 1/8 mile of these areas and include trampling of vegetation, compaction of soils, development of social trails, minor alterations in drainage patterns, noise, and disturbance to wildlife. Local populations of nonnative plants, including Russian thistle (*Salsola kali*) are persisting in disturbed areas and along trail corridors. Occasional guided day hikes and vehicle trips into the closed backcountry area are led by NPS staff. Up to eight overnight guided backpacking trips are made per year to the Crack-in-Rock Pueblo. Dispersed hiking is encouraged instead of hiking on a developed trail. Some noise and disturbance to wildlife likely occurs. Along most of the hiking route, impacts to soils, intermittent drainages, and vegetation are not evident and are considered negligible. In certain areas along the route, hikers are narrowly confined within rugged terrain, and short trail segments are evident. Around the Crack-in-Rock area, unplanned trails are evident between the interpreted archaeological sites. Localized vegetation trampling, soil compaction, and accelerated erosion are occurring. Local patches of nonnative Russian thistle (*Salsola kali*) are evident. Under the No-Action Alternative, long-term, minor adverse impacts from visitor use would continue around interpretive areas, support facilities, and the hiking route to Crack-in-Rock Pueblo.

ENVIRONMENTAL CONSEQUENCES

NPS administration and operation of Wupatki National Monument currently requires facilities that are concentrated in two areas-around the visitor center and at New Heiser. Each area has a maintenance shop, employee residences, water supply, wastewater disposal system, and utilities. Offices and storage space are at the visitor center. There is a gasoline depot with modern, aboveground storage tanks at New Heiser. Most impacts to geology, soils, intermittent drainages, vegetation, and wildlife are confined to these facilities and the existing road system. Vegetation is managed around developed areas, including routine trimming and mowing where needed along roadsides for traffic safety. Some nonnative species have been planted by employees around their residences, but none of these are believed to be naturalizing and escaping into the surrounding environment. The impacts from park operations on natural systems are generally the same as for visitor access and use (described above), with the exception of vegetation management, which is also considered minor.

CUMULATIVE EFFECTS

The geographic area used in the consideration of Cumulative Effects includes the western portion of the Little Colorado River watershed and is bounded on the south by the Mogollon Plateau and Clear Creek, the Little Colorado River and Painted Desert on the east, and the San Francisco Peaks and Coconino Plateau on the west.

Under the No-Action Alternative, the cumulative effects on natural systems and processes of continuing public visitation to and NPS administration of Wupatki National Monument are difficult to estimate. The primary adverse cumulative effects resulting from NPS management would likely be a result of failure to manage increased visitation

and road traffic and poorly planned development in support of NPS operations. Over time, these circumstances would be expected to increase adverse impacts to soils, intermittent drainages, vegetation, and wildlife. Although carrying capacity for visitor access and use have not been established, a threshold could be reached where the adverse impacts to natural systems and processes, especially for wildlife, exceed those stated in the above analysis.

The proximity and availability of Wupatki to the rapidly growing town of Flagstaff might enhance local citizens' "quality of life," and influence regional population growth. The continued management of Wupatki, therefore, could contribute slightly to housing development and habitat fragmentation around Flagstaff, which is impacting regional air and water quality, geology, soils, vegetation, wildlife, and riparian resources. However, given the diversity of public lands and recreational opportunities surrounding Flagstaff, the existence of Wupatki as a recreational area is likely not one of the prominent reasons for regional development. In this regard, the No-Action Alternative would likely result in negligible cumulative adverse impacts to regional natural systems and processes.

Conversely, the existence of the monument as a protected area where natural systems and processes are sustained could contribute significantly to the conservation of regional natural systems and biodiversity. As time passes, Wupatki should have increasing scientific value as a relatively undisturbed ecosystem from which to assess regional land use impacts. In this regard, the No-Action Alternative could result in beneficial cumulative effects to regional natural systems.

CONCLUSION

The existing management of Wupatki National Monument has resulted in few long-term adverse impacts to natural systems and processes. The soils, intermittent drainage systems, vegetation, and wildlife of Wupatki are generally stable, and inherent biodiversity is relatively intact. Historic ranching activity may have had the greatest adverse impacts to natural systems and processes, but conditions should continue to improve under NPS management. Under the No-Action Alternative, the NPS would manage for the continued recovery of natural systems from historic land uses, control nonnative species when feasible, and restore disturbed areas and other natural processes, such as fire, to the ecosystem. The proposed boundary expansion would increase the area of the monument by 60% and have long-term beneficial impacts, especially to wildlife. Development of new public access and use facilities would not occur, and related impacts to natural systems would be avoided. FR545 acts as a movement barrier to wildlife and as a dispersal corridor for invasive plant species. Visitor and local commuter traffic along FR545 and Black Falls Crossing Road contributes to increased mortality rates of wildlife. Impacts from visitor-use and NPS operations are highly concentrated within a very small area of the park and include long-term, negligible to minor adverse impacts to soils, vegetation, intermittent drainages, and wildlife within these areas. Continuing occasional backcountry use likely has a negligible impact to natural systems and processes. Current management of the monument ensures that natural systems and processes would be sustained with relatively few long-term adverse environmental impacts, except for those that are attributable to historic livestock grazing within the monument and to

regional watershed, airshed, and ecosystem degradation. The presence of Wupatki as a recreational area might contribute to community growth around Flagstaff and cumulative effects to regional natural systems, but these impacts are believed to be negligible and considerably offset by the value of the monument as a long-term resource conservation area. In addition to these impacts, there would be other, less severe impacts as a result of implementing this alternative.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Wupatki National Monument; (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 relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects Of Alternative 1: Limit Motorized Sightseeing And Focus On Extended Learning

IMPACT ANALYSIS

Under Alternative 1, the impacts from the proposed boundary expansion, increased coordination with the U.S. Forest Service, restoration of natural systems from historic land-use impacts, fire management, and efforts to control non-active species would likely be the same as those identified for the No-Action Alternative.

Visitor access and impacts to the eastern half of the monument and the visitor center, Wupatki Pueblo, and Wukoki Pueblo would be the same as under the No-Action Alternative.

ENVIRONMENTAL CONSEQUENCES

Impacts from NPS operation and maintenance of the existing visitor center, employee housing, offices, shops, parking lots, and utilities would remain highly concentrated at the same locations and would be the same as those identified for the No-Action Alternative.

The impacts from use and maintenance of the Crack-in-Rock Road and Black Falls Crossing Road would be the same as under the No-Action Alternative.

The existing closed backcountry area would be formally recognized as a Resource Protection Zone, and unauthorized access would be prohibited. Impacts to the Resource Preservation Zone would be the same as under the No-Action Alternative.

Under Alternative 1, Wupatki National Monument would be increased to approximately 59,400 acres. More than 20,000 acres would be acquired through willing landowner donation. In addition, approximately 4,000 acres would be acquired through administrative transfer of U.S. Forest Service lands along the monument's southern boundary, including FR545 and FR150 access from the Coconino National Forest to the western half of the monument. The land acquisition would be required for NPS to implement the proposed road system changes, but would also allow the closure of FR150 and management of unauthorized access to the western half of the monument. This would allow NPS to address concerns about continued FR150 access to the southern monument boundary and incidental poaching, woodcutting, off-road-vehicle use, and unauthorized recreational access within the backcountry closure area of the monument. The proposed northern and southern boundary expansions would allow removal of fence segments near the current monument boundary, which would significantly decrease fragmentation of the native grassland

and improve wildlife habitat conditions. These actions would have a long-term, moderate, beneficial impact to soils, vegetation, intermittent drainage systems, and wildlife within the monument.

Most of the area within the monument would remain undeveloped and closed to public access, to protect sensitive cultural resources. Visitor access would be significantly modified. Much of the paved road system and private vehicle access would be eliminated. The monument would be closed at night. Visitor access via guided tours within the Extended Learning Zone and Guided Adventure Zone would be increased over that available under the No-Action Alternative. The NPS would attempt to manage visitor impacts through enhanced orientation before resources are encountered. Existing visitor-use and administrative buildings, support facilities, and utilities would be retained. A small campground would be added within the existing developed area for limited use for educational activities. The overall infrastructure and visitor access area would occupy less than 5% of the total landscape within the enlarged monument boundary.

Traffic and motor noise would persist along FR545 between the east entrance and the visitor center area, but access would generally be restricted to daylight hours. Approximately 9 miles of FR545 (approximately 45% of the existing paved road) between the visitor center and the Citadel-Lomaki area would be closed to traffic except for guided vehicle access. Vehicle use would be considerably reduced along this segment of FR545, including virtually no nighttime traffic, reducing incidental noise disturbance, injury, and death to amphibians, reptiles, and small mammals. Approximately 4 miles of FR545 between the Citadel-Lomaki area and the existing western

boundary at US89 would be abandoned (approximately 20% of the existing paved road within the monument). The pavement would be removed and a primitive administrative road would be maintained along the former route. Vehicle traffic to the western boundary of the monument, including most of the grassland area, would be nearly eliminated. Road maintenance would be needed less frequently, resulting in less roadside disturbance. The proposed changes in use and maintenance of FR545 would reduce existing grassland habitat fragmentation and potential for nonnative plant dispersal and would significantly reduce wildlife disturbance, movement interference, and mortality within the western half of the monument. The overall impacts of the proposed road changes would be negligible to locally beneficial for soils, intermittent drainage patterns, and vegetation. Although adverse impacts to wildlife populations within the western portion of the monument would be significantly reduced, overall impacts to wildlife populations within the monument from roads and traffic would remain long term and minor.

The Wukoki spur road would be realigned to meet FR545 north of the visitor center. The road would be shortened by at least 1/4 mile, a new parking area would be built farther from the site, and the access trail would be lengthened accordingly. The road realignment would require the construction of approximately 1/4 mile of new road and parking lot, which would impact an estimated 45,000 square feet of native vegetation and wildlife habitat. This would be offset by the abandonment and restoration of a slightly longer reach of the former access road, and the resulting beneficial impacts from closing the road at night. Increasing the length of the Wukoki trail would increase off-trail impacts along the

proposed trail corridor, including localized vegetation trampling, soil compaction, unplanned trail development, drainage pattern interference, wildlife disturbance, and nonnative plant establishment. These impacts would be somewhat offset by the shortened road to Wukoki Pueblo, which would reduce traffic noise and road maintenance and associated adverse impacts to small animal populations and roadside vegetation.

Proposed changes in road access would ensure that visitors receive adequate orientation to sensitive resources before encountering them. Guided adventure hikes would be confined to the Extended Learning Zone and Guided Adventure Zone. Two of the existing four archaeological interpretive areas plus the Doney Mountain picnic area would be accessible only via guided tours. The proposed change to guided access to Citadel-Lomaki area could reduce the potential impacts from large numbers of unmanaged visitors. However, the proposed larger Extended Learning Zone would add to existing impacts from learning activities, potentially resulting in new trail segments between popular archaeological features and increased soil compaction, vegetation trampling, localized erosion, spread of nonnative plants, and noise and disturbance to wildlife. The enlarged Extended Learning Zone around the Citadel-Lomaki area would lie within the geographic center of the native grassland within Wupatki and would have a minor to moderate overall adverse effect on the habitat fragmentation of the grassland, depending upon the timing and number of guided tours and the number of visitors per tour.

Under Alternative 1, both the number of tours and visitors would likely increase within the Guided Adventure Zone. The desert environment within the proposed

zone is sensitive to repeated disturbance, and increased use could worsen soils, drainage, vegetation, and wildlife conditions within the zone, particularly around Crack-in-Rock Pueblo and other popular cultural sites. The actual impacts are difficult to quantify and would depend upon the timing, frequency, and size of visitor groups.

The conversion of an existing residence at New Heiser to an education center would have a negligible effect on natural systems and processes. The new campground and Extended Learning Zone around Heiser Spring would introduce limited overnight visitor use to the monument. Because Heiser Spring has already been developed for NPS use and the area surrounding it is heavily impacted, building the campground would result in negligible to minor adverse impacts to soils, vegetation, wildlife habitat, and intermittent drainage patterns. However, the campground and Extended Learning Zone together would interfere with efforts to restore riparian habitat and a water source for wildlife at the spring. The campground and sustained visitor use within the Extended Learning Zone would result in localized secondary impacts beyond the historically developed area, such as new social trails, vegetation trampling, soil compaction, local drainage pattern alteration, noise and wildlife disturbance, and spread of nonnative plants. The actual amount of disturbance is difficult to quantify and would depend upon the timing, frequency, and size of visitor groups. The proposed campground and learning zone around Heiser Spring would likely cause minor to moderate adverse impacts to natural systems within the monument. The impacts to sensitive species/unique habitats and to wetlands/riparian habitats would be more severe and are discussed in the appropriate sections below.

CUMULATIVE EFFECTS

The cumulative effects on natural systems and processes of continuing public visitation to and NPS administration of Wupatki National Monument are difficult to estimate and primarily depend on visitation levels. The impacts to the regional ecosystem would likely be similar to those expected under the No-Action Alternative. The primary difference would likely result from the significant change to visitor access and circulation in the western half of the monument. The combined campground and Extended Learning Zone around Heiser Spring would interfere with NPS efforts to restore riparian habitat and a water source for wildlife at the spring. The proposed restriction on vehicle access could increase the long-term integrity of the grassland ecosystem, but the proposed enlarged visitor access zone around the Citadel-Lomaki area might offset this benefit. More restricted driving access might also result in reduced incidental visitation and associated impacts.

CONCLUSION

Alternative 1 would have an overall long-term, moderate beneficial impact on the natural systems and processes of Wupatki National Monument. This would primarily be attributed to the key actions to expand the boundary by 60%, close the monument to through traffic, abandon and restore some of the existing entrance road, and manage visitor access to the western half of the monument. The NPS would manage for the continued recovery of natural systems from historic land uses, control nonnative species when feasible, and restore disturbed areas and other natural processes, such as fire, to the ecosystem. Inherent biodiversity would remain relatively intact.

The overall infrastructure and visitor access area would occupy less than 5% of the total landscape within the enlarged monument area. The construction of major new public access and support facilities would not occur, and related impacts to natural systems would be avoided. The Wukoki Pueblo access road and trail would be locally rerouted, but impacts would be mitigated through restoration of the old access road and parking lot.

Alternative 1 proposes an increase in extended learning activities around the existing archeological interpretive areas and new educational accommodations at the abandoned employee residence area near Heiser Spring. In addition, occasional backcountry use would be formalized within the Guided Adventure Zone. Accordingly, the area receiving visitor use would nearly double. This could result in long-term, negligible to minor adverse impacts to soils, vegetation, and intermittent drainages within both the Extended Learning Zone and the Guided Adventure Zone. Increased human presence within the Extended Learning Zone and the Guided Adventure Zone could have long-term, minor to moderate adverse impacts to wildlife. The actual level of impacts is difficult to predict and would depend upon the timing, frequency, and group size of guided activities.

The presence of Wupatki as a recreational area might contribute to community growth around Flagstaff, and thus to cumulative effects upon regional natural systems, but these impacts are believed to be negligible and considerably offset by the value of the monument as a long-term resource conservation area. In addition to these impacts, there would be other, less severe impacts as a result of implementing this alternative.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Wupatki National Monument; (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 relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects Of Alternative 2: Emphasize Motorized Sightseeing And Resource Protection Through On-Site Education

IMPACT ANALYSIS

Under Alternative 2, the impacts from the proposed boundary expansion, increased coordination with the U.S. Forest Service, restoration of natural systems from historic land use impacts, fire management, and efforts to control nonnative species would likely be the same as those identified for the No-Action Alternative.

Under Alternative 2, FR545 would remain open to 24-hour, 2-way traffic. Driving access to the interpretive archeological areas would remain unchanged, and the impacts of the paved road system on natural systems and processes would likely be the same as those expected under the No-Action Alternative.

The impacts of visitor use at the four existing archeological interpretive areas and the Doney Mountain picnic area would likely be the same as under the No-Action Alternative.

The existing backcountry closure area would be formally recognized as a Resource Protection Zone. Unauthorized access would be prohibited, and impacts

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to the Resource Preservation Zone would be the same as those identified for the No-Action Alternative.

The NPS would retain existing housing, maintenance shops, and utilities for the same purposes, and the impacts from these operations would be the same as under the No-Action Alternative.

NPS visitor service operations in the existing visitor center would cease, except for continued use of the existing parking lot to access the Wupatki Pueblo. The building would be retained for use by the cooperating association bookstore and/or be converted to offices and research/storage space. This change in facility function would likely result in the same impacts to natural systems as identified under the No-Action Alternative.

Under Alternative 2, Wupatki National Monument would be increased to approximately 59,400 acres. More than 20,000 acres would be acquired through willing landowner donation. In addition, approximately 4,000 acres would be acquired through administrative transfer of U.S. Forest Service lands along the monument's southern boundary, including FR545 and FR150 access from the Coconino National Forest to the western half of the monument. The land acquisition would be required for the NPS to close FR150 and manage unauthorized access to the western half of the monument. This would allow NPS to address concerns about continued FR150 access to the southern monument boundary and incidental poaching, woodcutting, off-road-vehicle use, and unauthorized recreational access within the closed area of the monument. The proposed northern and southern boundary expansions would allow the removal of fence segments near the current monument boundary, which would significantly decrease fragmentation of the native grassland

and improve wildlife habitat conditions. These actions would have a long-term, moderate, beneficial impact to soils, vegetation, intermittent drainage systems, and wildlife within the monument.

The estimated overall infrastructure and visitor access area would be less than 2% of the total landscape within the enlarged monument boundary, largely as a result of eliminating the Guided Adventure Zone and reducing the Extended Learning Zone. NPS operations would change considerably. A new visitor orientation station and exhibit would be built at the north entrance from US89. The development of new facilities would result in the removal of as much as 3 acres of vegetation, and long-term disturbance within this area to soils, wildlife habitat, and intermittent drainage system. Increased adverse impacts to most wildlife from traffic at the new facility would likely be negligible, because the numbers and timing of traffic is expected to be the same as in the No-Action Alternative, and because animals in the vicinity are already habituated to heavy highway traffic noise on US89. The proposed new facility would serve to ensure that visitors are fully oriented about appropriate behavior before they encounter sensitive resources within the monument. This would most likely offset many of the local impacts of constructing the facility.

Park staff that were previously dedicated to the visitor center operation would instead be stationed at the four archeological interpretive areas and the Doney Mountain picnic area to provide on-site interpretation. These areas would likely need minimal support facilities (e.g., backcountry toilets, shelters, picnic tables), which would require the removal of small areas of vegetation and long-term local disturbance to soils, wildlife habitat, and intermittent drainage.

However, it is likely that the sites needed for ancillary facilities are already experiencing similar impacts from visitor use, and the resulting overall impact would be considered negligible.

Under Alternative 2, a 24-mile scenic loop of existing primitive roads would be used for one-way, escorted four-wheel-drive and/or mountain bike tours across the Crack-in-Rock area and northern expansion lands. The loop would be maintained in primitive condition and gated at FR545. Viewpoints and sites of historic interest would be visited much more frequently than at present, and the scenic loop corridor would likely need minimal support facilities (e.g., backcountry toilets, picnic shelters). The actual level of impacts to natural systems and processes is difficult to predict and would depend on the timing, frequency, and group size of guided activities. Road maintenance, especially at drainage crossings, would be needed more frequently, resulting in increased roadside disturbance and associated localized impacts to roadside vegetation and drainage patterns. The proposed change in visitor use would significantly increase road-related impacts within the grassland area, including habitat fragmentation, noise, and human disturbance to wildlife, animal movement interference, and road mortality. Increased use of the scenic loop for guided tours would also increase the potential for nonnative plant dispersal along the road corridor. The proposed road changes under Alternative 2 would result in long-term, negligible to locally minor impacts to soils, intermittent drainage patterns, and vegetation. However, there would be more pronounced, long-term, moderate adverse impacts within the grassland ecosystem and wildlife populations in the western portion of the monument.

The Black Falls Crossing Road would be maintained in its current condition and opened to park visitors. The increased vehicle traffic would result in increased noise and wildlife disturbance, animal movement interference, and road mortality within the eastern half of the monument. New impacts to soils, vegetation, and wildlife habitat might result along the road corridor as more visitors stop to explore the area on foot. Overall, the continued maintenance of the Black Falls Crossing Road would have negligible impacts to soils, vegetation, and intermittent drainage systems, but the change in the use of the road would cause long-term, minor adverse impacts to wildlife.

Visitor services would be provided either at the new north entrance station or at the existing front country sites, instead of at the current visitor center. The on-site presence of NPS staff within the Extended Learning Zone would have a long-term, minor beneficial impact by promoting appropriate visitor behavior. The current practice of occasional guided visitor tours to sites in the backcountry would be eliminated. This would result in long-term, minor beneficial impacts to natural resources by confining visitor impacts to the Extended Learning Zone.

Crack-in-Rock Pueblo would only be visited on short, guided hikes during the scenic driving or mountain bike tours. The actual level of impacts is difficult to predict and would depend on the timing, frequency, and group size. Increased visitor numbers would increase localized soil compaction, vegetation trampling, unplanned trail establishment between popular archaeological sites, accelerated erosion and disruption of intermittent drainage systems, increased noise and disturbance to wildlife, and increased nonnative plant cover. Under Alternative 2, the proposed guided access to Crack-in-Rock Pueblo during driving tours along

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the primitive scenic loop would result in long-term, minor adverse impacts to natural systems and processes within the monument.

CUMULATIVE EFFECTS

The cumulative effects of continuing public visitation to and NPS administration of Wupatki National Monument on natural systems and processes are difficult to estimate. The impacts to the regional ecosystem are likely to be similar to those expected under the No-Action Alternative. Impacts within the Extended Learning Zone are likely similar to those identified for the No-Action Alternative. The primary difference would likely result from the significant change to visitor access and circulation in the monument. Establishing a scenic primitive loop for driving tours through the Crack-in-Rock area and expansion lands could decrease the long-term integrity of the grassland ecosystem, particularly with respect to conserving wildlife populations within the western half of the monument. The cumulative effects primarily depend on the visitation levels and the timing and frequency of group tours along the loop. Proposed visitor use of the Black Falls Crossing Road might also result in increased cumulative effects along the road corridor through the eastern side of the monument.

CONCLUSION

Alternative 2 would have an overall long-term, minor beneficial impact on the natural systems and processes of Wupatki National Monument. This could primarily be attributed to the key actions to expand the boundary by 60% and restrict visitor access to the Extended Learning Zone and guided backcountry tours. The NPS would manage for the continued recovery of natural systems from historic land uses, control nonnative species when feasible, and restore disturbed

areas and other natural processes, such as fire, to the ecosystem. Inherent biodiversity would remain relatively intact.

Under Alternative 2, the overall infrastructure and visitor access area would occupy less than 2% of the total landscape within the enlarged monument area. Visitor services would be mostly confined to a new orientation station at the north entrance to the monument and small Extended Learning Zones around the existing archeological interpretive areas. The impacts from proposed changes to visitor access would result in negligible impacts within the Extended Learning Zone, and long-term, minor beneficial impacts to areas that receive occasional visitor use under existing conditions. New support facilities would be constructed at the north entrance and the Extended Learning Zone, but related adverse impacts to natural systems would be very localized, minor, and offset because the new facilities would promote appropriate visitor behavior.

Under Alternative 2, a 24-mile primitive scenic loop would be established through the Crack-in-Rock and northern expansion lands. In addition, visitor use would be allowed along the Black Falls Crossing Road. The actual level of impacts of these actions is difficult to predict and would depend on the timing of road traffic and the size of guided groups. The proposed road changes under Alternative 2 would likely result in long-term, negligible to locally minor impacts to soils, intermittent drainage patterns, vegetation, and increased noise and disturbance to wildlife. In addition, there would be more pronounced, long-term, moderate adverse impacts within the grassland ecosystem and wildlife populations in the western portion of the monument.

The presence of Wupatki as a recreational area might contribute to community growth around Flagstaff, and thus to cumulative effects on regional natural systems, but these impacts are believed to be negligible and would be considerably offset by the value of the monument as a long-term resource conservation area. In addition to these impacts, there would be other, less severe impacts as a result of implementing this alternative.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Wupatki National Monument; (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 relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects Of Alternative 3 (Preferred): Preserve Sensitive Park Resources While Diversifying The Range Of Visitor Experiences

IMPACT ANALYSIS

Under Alternative 3, the impacts from the proposed boundary expansion, increased coordination with the U.S. Forest Service, restoration of natural systems from historic land use impacts, fire management, and efforts to control nonnative species would likely be the same as those identified for the No-Action Alternative.

FR545 would remain open to 24-hour, 2-way traffic. Vehicle access to the interpretive archeological areas would remain unchanged, and the impacts of the paved road system upon natural

systems and processes would likely be the same as under the No-Action Alternative.

The impacts from continued administrative use and maintenance of the Black Falls Crossing Road and the Crack-in-Rock Road would be the same as under the No-Action Alternative.

Impacts from NPS operation and maintenance of the existing visitor center, employee housing, offices, shops, parking lots, and utilities would remain highly concentrated at the same locations, and would be the same as under the No-Action Alternative.

The existing backcountry closure area would be formally recognized as a Resource Protection Zone. Unauthorized access would be prohibited, and impacts to the Resource Preservation Zone would be the same as under the No-Action Alternative.

Under Alternative 3, Wupatki National Monument would be increased to approximately 55,400 acres. Visitor access would be slightly modified from the No-Action Alternative, primarily by the formal designation of the Extended Learning, Guided Adventure, and Resource Preservation Zones. The existing visitor center would remain open, and a new visitor contact station would be constructed at the north entrance. Visitor services and access would primarily be concentrated at the new entrance station, existing visitor center, or extended learning areas. The parking lots near the extended learning areas would be closed at night. Two new trails would be established-one into the grasslands near Lomaki, and a second linking Wupatki and Wukoki Pueblos. The overall infrastructure and visitor access area would occupy less than 4% of the total landscape within the enlarged monument boundary.

The Wukoki spur road would be realigned to meet FR545 north of the

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visitor center. The road would be shortened by at least 1/4 mile, a new parking area would be built farther from the site, and the access trail would be lengthened accordingly. The road realignment would require the construction of approximately 1/4 mile of new road and parking lot, which would impact an estimated 45,000 square feet of native vegetation and wildlife habitat. This would be offset by the abandonment and restoration of a slightly longer reach of the former access road and the resulting beneficial impacts from being able to close the road at night. Increasing access via a second pedestrian trail would increase off-trail impacts along the proposed trail corridor, including localized vegetation trampling, soils compaction, unplanned trail development, drainage pattern interference, wildlife disturbance, and nonnative plant establishment. These impacts would be somewhat offset by the reduced use of motor vehicles, which would reduce noise and road maintenance, and associated adverse impacts to small animal populations and roadside vegetation.

Within the proposed boundary expansion area to the north, an existing ranch road that approaches the Crack-in-Rock Pueblo area from the western mesa above the Doney Anticline would be maintained in its existing condition for administrative purposes. The impacts from occasional administrative use would be expected to be less than those resulting from ranch operations and would be considered negligible.

A new visitor contact station and wayside orientation exhibit would be constructed near the north entrance from US89. The development of new facilities would result in the removal of as much as 3 acres of vegetation and long-term disturbance within this area to soils, wildlife habitat, and intermittent

drainage system. Increased adverse impacts to most wildlife at the new facility would likely be the same as expected under the No-Action Alternative, because the numbers and timing of traffic would be the same, the grassland is already highly fragmented here by US89, and wildlife in the vicinity is already habituated to heavy highway traffic noise. The proposed new facility would serve to ensure that visitors are fully oriented about appropriate behavior before they encounter sensitive resources within the monument. This would most likely offset many of the local impacts of constructing the facility.

Visitor access around the existing archeological interpretive sites would be increased within the proposed Extended Learning Zone, including a substantial increase at the Lomaki-Citadel area. The larger Extended Learning Zone would add to existing impacts from visitor use activities, potentially resulting in new trail segments between popular archaeological features and increased soil compaction, vegetation trampling, localized erosion, spread of nonnative plants, and noise and disturbance to wildlife. The proposed change in visitor access within the Extended Learning Zone would result in negligible to long-term, minor adverse impacts to soils, intermittent drainage patterns, and vegetation. The enlarged Extended Learning Zone around the Citadel-Lomaki area would lie within the geographic center of the native grassland within Wupatki. Depending on the level of visitor use, the proposed change in visitor access around the Citadel-Lomaki area would increase the level of grassland habitat fragmentation and frequency of human disturbance of grassland-dependent wildlife. This would result in long-term, minor to moderate adverse impacts on the integrity of the grassland system.

Occasional guided hikes would continue into a Guided Adventure Zone, including overnight trips to Crack-in-Rock Pueblo. The number of tours would likely increase within this area, potentially resulting in new trail segments between popular archeological features and increased soil compaction, vegetation trampling, localized erosion, spread of nonnative plants, and noise and disturbance to wildlife. The desert environment along the base of the Doney Anticline is sensitive to repeated disturbance, and increased use could worsen soils, drainage, vegetation, and wildlife conditions, particularly around Crack-in-Rock Pueblo and other popular cultural sites. Depending on the level of visitor use, the proposed change in visitor access within the Guided Adventure Zone would likely result in long-term, minor adverse impacts upon natural systems and processes within the monument.

A 1/2-mile-long trail would be established into the grassland ecosystem. This would add to impacts from current visitor use activities, potentially resulting in new trail segments between popular archeological features and increased soil compaction, vegetation trampling, localized erosion, spread of nonnative plants, and noise and disturbance to wildlife. The proposed trail would result in negligible to long-term, minor adverse impacts to soils, intermittent drainage patterns, and vegetation. However, the trail area would increase human presence within the geographic center of the native grassland within Wupatki. Depending upon the level of visitor use, the trail would have a long-term, minor to moderate adverse effect on the integrity of the native grassland at Wupatki.

A second new trail would be established between Wukoki and Wupatki Pueblos. The trail would be approximately 2 miles long within the eastern half of Wupatki.

1 1/2 miles of the trail would traverse the Deadman Wash drainage through an area dominated by sandstone and shale bedrock and open Colorado Plateau desert vegetation. The trail would add to existing impacts from visitor use activities, potentially resulting in new unplanned trail segments between popular features and increased soil compaction, vegetation trampling, localized erosion, spread of nonnative plants, and noise and disturbance to wildlife. The proposed trail would result in negligible to long-term, minor adverse impacts to soils, intermittent drainage patterns, vegetation, and wildlife.

CUMULATIVE EFFECTS

The cumulative effects of continuing public visitation to and NPS administration of Wupatki National Monument on natural systems and processes are difficult to estimate. The impacts to the regional ecosystem would likely be similar to those identified for the No-Action Alternative. The cumulative effects on the natural systems and processes within the monument would primarily depend on visitation numbers and the timing and frequency of visits within the Extended Learning Zone, Guided Adventure Zone, and trail system. Alternative 3 proposes changes that would allow visitor access to a larger area within the Extended Learning Zone and a potential increase in visitor numbers within the Guided Adventure Zone. In addition, two new trails are proposed—a grassland trail near Lomaki Pueblo, and a second between the Wupatki and Wukoki Pueblos. The increased area of visitor access would likely result in increased localized impacts to natural processes, including potential moderate adverse impacts to native grassland in the western half of Wupatki.

CONCLUSION

Alternative 3 would have an overall long-term, moderate beneficial impact on the natural systems and processes of Wupatki National Monument. This would primarily be attributed to the key actions to expand the boundary by 60% and formally restricting visitor access to the Extended Learning Zone, Guided Adventure Zone, and trail system. The NPS would manage for the continued recovery of natural systems from historic land uses, control nonnative species when feasible, and restore disturbed areas and other natural processes, such as fire, to the ecosystem. Inherent biodiversity would remain relatively intact.

The overall infrastructure and visitor access area would occupy less than 5% of the total landscape within the enlarged monument area. Except for a relatively small visitor orientation station at the north entrance to Wupatki, construction of major new public access and support facilities would not occur, and related impacts to natural systems would be avoided. The Wukoki Pueblo access road and trail would be locally rerouted, but impacts would be mitigated through restoration of the old access road and parking lot.

Alternative 3 proposes an increase in extended learning activities around the existing archeological interpretive areas, an increase in occasional backcountry within the Guided Adventure Zone, and two new trails. Accordingly, the area receiving visitor use would increase by approximately 50%. Depending on the level of visitation, this could result in localized, long-term, negligible to minor adverse impacts to soils, vegetation, intermittent drainages, and wildlife within the Extended Learning Zone, Guided Adventure Zone, and along both new trails. Increased human presence in a larger area around the Citadel and

Lomaki Pueblos and along the new grassland trail would have long-term, minor to moderate adverse impacts to native grassland integrity and wildlife in the western half of Wupatki.

The presence of Wupatki as a recreational area might contribute to community growth around Flagstaff, and thus to cumulative effects on regional natural systems, but these impacts are believed to be negligible and would be considerably offset by the value of the monument as a long-term resource conservation area. In addition to these impacts, there would be other, less severe impacts as a result of implementing this alternative.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Wupatki National Monument; (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 relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects Of Alternative 4: Emphasize Integrated Story Between The Parks And Minimize Development

IMPACT ANALYSIS

Under Alternative 4, the impacts from the proposed boundary expansion, increased coordination with the U.S. Forest Service, restoration of natural systems from historic land-use impacts, fire management, and efforts to control nonnative species would be the same as for the No-Action Alternative.

The impacts of paved road access, 24-hour, 2-way traffic, and motor noise

between the eastern entrance and the visitor center would be the same as with the No-Action Alternative.

The impacts of visitor-use at the four existing archaeological interpretive areas and the Doney Mountain picnic area would be the same as for the No-Action Alternative.

The impacts from continued administrative use and maintenance of the Crack-in-Rock Road would be the same as under the No-Action Alternative.

The existing backcountry closure area would be formally recognized as a Resource Protection Zone. Unauthorized access would be prohibited, and impacts to the Resource Preservation Zone would be the same as those identified for the No-Action Alternative.

Under Alternative 4, Wupatki National Monument would be increased to an estimated 59,680 acres. More than 20,000 acres would be acquired through willing landowner donation. In addition, approximately 4,000 acres would be acquired through administrative transfer of U.S. Forest Service lands along the monument's southern boundary, including FR545 and FR150 access from the Coconino National Forest to the western half of the monument. The land acquisition would be required for the NPS to implement the proposed road system changes, but would also allow the closure of FR150 and management of unauthorized access to the western half of the monument. This would allow NPS to address concerns about continued FR150 access to the southern monument boundary and incidental poaching, woodcutting, off-road-vehicle use, and unauthorized recreational access within the closed area of the monument. The proposed northern and southern boundary expansions would allow the removal of fence segments near the current monument boundary, which

would significantly decrease fragmentation of the native grassland and improve wildlife habitat conditions. These actions would have a long-term, moderate, beneficial impact to soils, vegetation, intermittent drainage systems, and wildlife within the monument.

Most of the monument would remain undeveloped and closed to the public to protect sensitive cultural resources. Visitor access and NPS support facilities would be significantly modified. The overall infrastructure and visitor access area would be effectively reduced to less than 2% of the total landscape within the enlarged monument area.

Visitors would enter Wupatki only via FR545 at the existing south entrance (from Sunset Crater Volcano National Monument). Approximately 13 miles of FR545 (65% of the existing paved road) would be converted to one-way traffic westward from the Wupatki visitor center to an exit at the north boundary at US89. The one-way section would be gated at night, virtually eliminating nighttime traffic within the western half of the monument. Most small wildlife species within the monument are predominantly active at night, including amphibians, reptiles, rodents, and other small mammals. The proposed changes in use of FR545 would reduce existing grassland habitat fragmentation and significantly reduce wildlife disturbance, movement interference, and mortality within the western half of the monument. This would result in a long-term, moderate beneficial impact to wildlife and the integrity of the grassland ecosystem within the monument. The overall impacts of the proposed road changes would be negligible for soils, intermittent drainage patterns, and vegetation.

Within the proposed boundary expansion area to the north, an existing ranch road

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that approaches the Crack-in-Rock Pueblo area from the western mesa above the Doney Anticline would be maintained in its existing condition for administrative purposes. The impacts from occasional administrative use are expected to be less than those resulting from ranch operations and are considered negligible.

The Black Falls Crossing Road would be closed and restored to natural vegetation and wildlife habitat conditions. The road closure would eliminate much of the traffic noise and wildlife disturbance, movement interference, and mortality within the eastern half of the monument. The road closure would eliminate the need for road maintenance and local impacts to soils, vegetation, intermittent drainages, and the potential for nonnative plant dispersal along the road corridor. The road closure would result in long-term, minor beneficial impacts to soils, intermittent drainage systems, vegetation, and wildlife within the monument.

The Wukoki spur road would be realigned to meet FR545 north of the visitor center. The road would be shortened by at least 1/4 mile, a new parking area would be built farther from the site, and the access trail would be lengthened accordingly. The road realignment would require the construction of approximately 1/4 mile of new road and parking lot, which would impact an estimated 45,000 square feet of native vegetation and wildlife habitat. This would be offset by the abandonment and restoration of a slightly longer reach of the former access road, and the resulting beneficial impacts from being able to close the road at night. Increasing access via a pedestrian trail would increase off-trail impacts along the proposed trail corridor, including localized vegetation trampling, soils compaction, unplanned trail development, drainage pattern

interference, wildlife disturbance, and nonnative plant establishment. These impacts would be somewhat offset by the reduced use of motor vehicles, which would reduce noise and road maintenance, and associated adverse impacts to small animal populations and roadside vegetation.

One historic structure and the historic portion of the visitor center would be retained as a residence and ranger station. The remainder of the visitor center and most of the existing housing, maintenance, and administrative facilities at Wupatki would be removed and the areas would be restored to natural vegetation and wildlife habitat conditions. Removal of the structures would result in some short-term, minor adverse impacts to soils and vegetation, but would eventually result in long-term, minor beneficial impacts to natural system and processes.

Existing NPS presence likely deters resource violations, such as illegal woodcutting, poaching, off-road travel, and unauthorized access to the closed area. The reduction in NPS personnel stationed at Wupatki would also add to the time required to respond to reported resource violations. This would have a long-term, minor adverse impact to natural systems and processes.

Crack-in-Rock Pueblo would be visited only on short, guided hikes during guided driving tours. The actual level of impacts is difficult to predict and would depend on the timing, frequency, and group size. Increased visitor numbers would increase localized soil compaction, vegetation trampling, unplanned trail establishment between popular archeological sites, accelerated erosion and disruption of intermittent drainage systems, increased noise and disturbance to wildlife, and increased nonnative plant cover. The proposed guided access to Crack-in-Rock Pueblo would likely

result in long-term, minor adverse impacts to natural systems and processes within the monument.

A new trail would be established between Wukoki and Wupatki Pueblos. The trail would be approximately 2 miles long within the eastern half of Wupatki. 1 1/2 miles of the trail would traverse the Deadman Wash drainage through an area dominated by sandstone and shale bedrock and open Colorado Plateau desert vegetation. The trail would add to existing impacts from visitor use activities, potentially resulting in new unplanned trail segments between popular features and increased soil compaction, vegetation trampling, localized erosion, spread of nonnative plants, and noise and disturbance to wildlife. The proposed trail would result in negligible to long-term, minor adverse impacts to natural systems and processes within the monument.

CUMULATIVE EFFECTS

Under Alternative 4, the cumulative effects of continuing public visitation and NPS administration at Wupatki National Monument on natural systems and processes are difficult to estimate and primarily depend on visitation levels. The impacts to the regional ecosystem would likely be similar to those expected under the No-Action Alternative. The primary difference would likely result from the significant change to visitor access and circulation in the western half of the monument. Both casual daytime and all nighttime traffic through Wupatki would be eliminated. The proposed restriction on vehicle access within the western half of the monument would increase the long-term integrity of the grassland ecosystem. The closure of the Black Falls Crossing Road would also eliminate most road-related adverse impacts to the eastern half of the monument. Reduced NPS personnel presence might offset this benefit. More restricted driving access

might also result in reduced incidental visitation and associated impacts.

CONCLUSION

Alternative 4 would have an overall long-term, moderate beneficial impact on the natural systems and processes of Wupatki National Monument, especially with regard to maintaining the integrity of the natural grassland within the western half of the monument. This would primarily be attributed to the key actions to expand the boundary by 60%, close the monument to casual daytime and all nighttime through traffic, abandon the Black Falls Crossing Road and restore natural conditions within the disturbed area, remove most NPS buildings and restore natural conditions within the disturbed area, restrict visitor access to the existing archeological interpretive areas, and eliminate occasional visitor use impacts along the Crack-in-Rock hiking route. The NPS would manage for the continued recovery of natural systems from historic land uses, control nonnative species when feasible, and restore disturbed areas and other natural processes, such as fire, to the ecosystem. Inherent biodiversity would remain relatively intact.

The overall infrastructure and visitor access area would occupy less than 2% of the total landscape within the enlarged monument area. The construction of major new public access and support facilities would not occur, and related impacts to natural systems would be avoided. The Wukoki Pueblo access road and trail would be locally rerouted, but impacts would be mitigated through restoration of the old access road and parking lot. The proposed new trail between Wupatki and Wukoki Pueblos would result in long-term, negligible to minor adverse impacts to soils, intermittent drainage patterns, vegetation, and wildlife.

The presence of Wupatki as a recreational area might contribute to community growth around Flagstaff, and thus to cumulative effects upon regional natural systems, but these impacts are believed to be negligible and would be considerably offset by the value of the monument as a long-term resource conservation area. In addition to these impacts, there would be other, less severe impacts as a result of implementing this alternative.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Wupatki National Monument; (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 relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Irreversible/Irretrievable Commitments Of Resources

Under the various alternatives, localized areas of vegetation and wildlife habitat would be permanently removed to build trails, campsites, and/or new visitor facilities. Accommodating increased visitation levels would increase the amount of human disturbance to wildlife populations and could permanently disrupt certain species population numbers within the monument.

Loss In Long-Term Availability Or Productivity Of The Resource To Achieve Short-Term Gain

Various long-term local disturbances to natural systems and processes would be incurred under the alternatives in order to expand visitor access infrastructure,

visitor support facilities, and/or NPS administrative facilities. Proposed removal of facilities would have short-term impacts to soils, vegetation, intermittent drainage systems, and wildlife habitat, after which long-term natural ecological function would be restored within the formerly disturbed areas. Under Alternatives 1, 3, and 4, visitors would be provided access to more of Wupatki National Monument, resulting in potential long-term local disturbance and loss of soils and vegetation and disruption of wildlife populations. Under Alternative 2, the integrity of the grassland ecosystem and key wildlife habitat would be degraded in order to provide visitors more convenient driving access.

Unavoidable Adverse Impacts

Historical land use and occasional visitor use have occurred within the backcountry area for many years and have had unknown impacts to natural systems and processes. Under all the alternatives, the road system would interfere to varying degrees with the local movement or migration of many animal species and result in the incidental injury or mortality of mammals, birds, reptiles, and amphibians. Construction activities under all of the action alternatives would locally disturb soils, drainage patterns, vegetation, and wildlife habitat and potentially increase the area dominated by nonnative, invasive plant species. Visitor-use around the proposed interpretive areas would likely result in local unplanned trail segments between popular features and increased soil compaction, vegetation trampling, disruption of intermittent drainage systems and erosion, spread of nonnative plants, and noise and disturbance to wildlife. Alternative 2 would nearly double the amount of road access within the western half of the monument,

fragmenting the grassland ecosystem and disrupting key wildlife habitat.

THREATENED, ENDANGERED, AND SENSITIVE SPECIES

Methodology

This section is intended to augment the impact analysis for natural systems and processes, above, by analyzing specific impacts of the proposed management alternatives upon federally listed threatened and endangered species and other "species of concern." The Arizona Heritage Database (Arizona Game and Fish Department 2001) was consulted via the Internet to generate a list of threatened and endangered species, and "species of concern" for Coconino County, Arizona. This list was compared with the inventory of natural resources within Wupatki completed by Bateman (1976, 1979), which remains the best available documentation of the monument's flora and fauna. A survey for special status plants at Wupatki was recently completed (Huisinga et al. 2000). In addition, unique or rare habitats were identified within the monument through the scoping process and available scientific literature. The locations of proposed visitor access, activities, and support facilities for the various alternatives were compared to known sensitive species distribution records and habitat types in order to assess potential impacts. The actual status and distribution for several of the identified species is not well known, and predictions about impacts were based on available research describing a given species biology, ecology, and recent monitoring data from the region surrounding Wupatki. The results of past studies of visitor- and land-use impacts to regional ecosystems were also utilized where similar impacts would be anticipated. The predicted intensity of

adverse impacts is articulated according to the following criteria:

Negligible: An action that would not affect any individuals of a sensitive species or their habitat within Wupatki National Monument.

Minor: An action that would affect a few individuals of sensitive species or have very localized impacts upon their habitat within Wupatki National Monument. The change would require considerable scientific effort to measure and have barely perceptible consequences to the species or habitat function.

Moderate: An action that would cause measurable effects on: (1) a relatively moderate number of individuals within a sensitive species population, (2) the existing dynamics between multiple species (e.g., predator-prey, herbivore-forage, vegetation structure-wildlife breeding habitat), or (3) a relatively large habitat area or important habitat attributes within Wupatki National Monument. A sensitive species population or habitat might deviate from normal levels under existing conditions, but would remain indefinitely viable within the monument.

Major: An action that would have drastic and permanent consequences for a sensitive species population, dynamics between multiple species, or almost all available critical or unique habitat area within Wupatki National Monument. A sensitive species population or its habitat would be permanently altered from normal levels under existing conditions, and the species would be at risk of extirpation from the monument.

Effects of the No-Action Alternative: Existing Conditions

IMPACT ANALYSIS

Currently, no federally listed threatened or endangered plant or animal species are known to occur in Wupatki National Monument.

There are five plant "species of concern" for which there are historic or recent records within Wupatki-Errazurizia rotunda, *Pediocactus simpsonii*, *Phacelia serrata*, *Phacelia welshii*, and *Psoralea thompsoniae* var. *whitingii*. *Errazurizia rotunda* was historically documented on sandstone outcrops in the eastern portion of the monument. *Pediocactus simpsonii* was historically documented within grassland and open juniper woodland habitat in the western portion of the monument. *Phacelia serrata* is endemic to the deep cinder soils in the San Francisco Volcanic Field and occurs at the margin of the regional volcanic deposits along the southern boundary of Wupatki. *Phacelia welshii* was historically documented on red shale outcrops within the eastern half of the monument. *Psoralea thompsoniae* var. *whitingii* is locally abundant in one area near the Little Colorado River in the eastern half of the monument.

Another three species of concern are not known from Wupatki, but have been documented in similar habitats within northwestern Arizona, including: *Cymopterus megacephalus*, *Pediocactus peeblesianus* var. *fickeiseniae*, and *Puccinella parishii*. *Cymopterus megacephalus* is endemic to the Little Colorado River basin on shale outcrops of the Moenkopi Formation and on gravel terraces along the Little Colorado River. *Pediocactus peeblesianus* var. *fickeiseniae* occurs on limestone benches and in Colorado Plateau grassland and shrub-

steppe vegetation. *Puccinella parishii* grows in saline wetlands around seeps, springs, and intermittent streams.

In addition to the "species of concern," three plant species at Wupatki-*Amsonia peeblesii*, *Phragmites communis*, and *Poliomintha incana*-are considered to be increasingly threatened by over-collection for traditional uses by American Indians. *Amsonia peeblesii* is endemic to the Little Colorado River basin. There are localized populations in a variety of habitats within Wupatki. *Poliomintha incana* is widespread and common in sandy desert habitats throughout the Southwestern United States. The species is locally abundant within Wupatki. *Phragmites communis* occurs at only one location in the monument and could easily be eliminated by over-collection.

Under the No-Action Alternative, the proposed boundary expansion would increase the area within Wupatki National Monument by 60%. The existing visitor access and NPS support infrastructure occupies less than 3% of the total landscape within the enlarged monument area. Currently, there are no proposed developments that would result in vegetation or ground disturbance near sensitive species habitats. Developing and maintaining roads and trails creates site disturbances that favor the establishment of and serve as rapid dispersal corridors for invasive, nonnative plants. Invasive plants are extremely competitive for available resources and may replace native plants and thereby disrupt natural plant population dynamics. Site-specific surveys are required prior to any ground- or vegetation-disturbing activity to ensure that sensitive species are not impacted.

Existing roads, archeological interpretive areas, and NPS support facilities are located in proximity to known locations and/or known habitats for many of the

sensitive plants. Current visitor activity near developed areas likely results in localized off-trail vegetation trampling. Most of the monument remains closed to general visitor access in order to protect sensitive cultural features. The backcountry closure also effectively protects most sensitive plant habitats from disturbance. Occasional, dispersed hiking within the closed area occurs during guided hikes, resource monitoring studies, scientific research, educational activities, other special uses, and unauthorized hiking. The demand for traditionally used species may be increasing, resulting in increased threats of plants being collected within the monument, especially where access is convenient.

Vegetation within the monument was impacted by livestock grazing for more than a century until 1989 and will continue to recover from former ranching activities. Continued field studies are needed to routinely assess the distribution and status of sensitive species and to ensure they are not impacted by current visitor use, NPS operations, or traditional-use activities. Under the No-Action Alternative, occasional incidental trampling of vegetation during off-trail activities would continue to occur. For these reasons, the No-Action Alternative would likely have long-term, negligible to minor adverse impacts on plant "species of concern."

Three animal "species of concern" are known to occur within the monument, including Wupatki pocket mouse (*Perognathus amplus cineris*), spotted bat (*Euderma maculatum*), and Townsend's big-eared bat (*Corynorhinus townsendii*). An additional two bird "species of concern," the ferruginous hawk (*Buteo regalis*) and burrowing owl (*Athene cunicularia* ssp. *hypugaea*) are known from similar habitats near the monument. Although not formally listed

as "species of concern," pronghorn antelope (*Antilocapra americana*) and golden eagle (*Aquila chrysaetos*) populations within Wupatki were identified as environmental issues during the public and agency scoping process.

The Wupatki pocket mouse is documented in areas with cinder cover along the margin of the San Francisco Volcanic Field near the southern boundary of the monument. Very little is known about the distribution or status of the subspecies, but it is presumed that it would be impacted by development and land use activities in similar ways as other small wildlife. At Wupatki, this includes noise disturbance and documented mortality of a few individuals per year along the entrance road (Persons 2001). However, the species is likely prolific as similar rodent species are, and the loss of a few animals per year to vehicle traffic on the entrance road likely has no long-term adverse consequence for the population. The species is predominantly nocturnal, so impacts from existing daytime visitor use are likely negligible.

Spotted bats and Townsend's big-eared bat occur in the cave-like karst features and fractured rock faces within the central portion of the monument. Most available habitat is within the closed backcountry area, but some karst features are near popular visitor use areas, where they have been impacted from prior NPS attempts to block entrances as a public safety precaution. None of the features were completely sealed, so bats are still able to use them. The NPS is currently planning to restore the historically impacted entrances. Most karst habitats are located within the closed area. Bats are predominantly nocturnal, so impacts from existing daytime visitor-use around the archaeological interpretive areas are likely negligible. However, occasional unauthorized entry into karst features

ENVIRONMENTAL CONSEQUENCES

likely occurs, resulting in short-term, minor impacts to sensitive bat species. There is one documented death of Townsend's big-eared bat along the entrance road (Persons 2001).

The ferruginous hawk is known to inhabit and breed in open grassland and shrub-steppe habitats surrounding Wupatki. It is not known to occur within the monument, but favorable habitat conditions exist. Field surveys are needed to assess the distribution and status of this species. Ferruginous hawks are solitary animals and are likely disturbed by facility development and visitor use activities. The existing access road and traffic through Wupatki might cause noise disturbance and very rare injury or mortality. Current levels of visitor use, particularly within the Lomaki area, might disturb with the species within the monument.

The burrowing owl inhabits prairie dog towns. Although some burrowing mammal communities occur within the monument, the presence of burrowing owls has not been confirmed. Field surveys are needed to assess the distribution and status of this species. Burrowing owls have uncommon behavior in that they may be active by day. They are much less disturbed by human presence than other animal species of concern. Existing visitor use areas are not in proximity to any extensive burrowing mammal communities, and current visitor use probably has a negligible impact on the species. The species is likely impacted by facility development in similar ways as other grassland-dependent wildlife are. The existing access road and traffic through Wupatki might cause noise disturbance and very rare injury or mortality.

A small pronghorn antelope herd exists at Wupatki and has declined along with the regional population during the last

few decades (Bright and Van Riper III 2000). Under presettlement conditions, pronghorn ranged well beyond the boundary of the monument, but the species is increasingly affected by regional habitat fragmentation through road development and range fencing. Pronghorn primarily range throughout most of the grassland within the western half of Wupatki. The species seasonally uses desert shrub habitat in the eastern half of the monument and will move through open juniper woodland areas in search of water. The boundary fence confined the herd within Wupatki during heavy snows in the mid-1970s and was blamed for a number of pronghorn deaths. Perennial water sources are scarce, and the animals must move back and forth to water on adjacent lands. Grassland habitat is also being lost as juniper woodland takes over in the absence of fire. The NPS is cooperating with the Arizona Game and Fish Department, Arizona Department of Transportation, neighboring ranch owners, and the U.S. Forest Service to improve the condition for the local herd. Recent boundary fence modifications should allow the animals to move between neighboring lands. The proposed boundary expansion would almost double the available grassland habitat within the monument and could add reliable surface water sources. Interior fences would be promptly removed within the expanded monument area. Existing visitor access roads within the monument are relatively narrow and not fenced and probably do not interfere significantly with local movements. However, pronghorn are likely disturbed by traffic noise, and animals are infrequently killed by automobiles. Pronghorn perceive humans as predators and are very sensitive to human presence, even at relatively long distances. Current visitor use is not centered within grassland habitat, but

use of the Citadel-Lomaki area likely results in some disturbance to pronghorn. The NPS is developing a fire management plan for Wupatki with the primary objective of managing woodland encroachment into the grassland. Under the No-Action Alternative, the existing access road and ongoing juniper woodland expansion would have long-term, moderate adverse impacts. The boundary fence and visitor use would have long-term, minor adverse impacts.

Golden eagles have historically nested within Wupatki, though no nesting pairs were discovered during recent surveys (Britten 1999, Drost 2000). The best nesting habitat, as evidenced by old nests, is in the Citadel Sink, Doney Mountain, and Doney Monocline areas. Golden eagles are known to be sensitive to human presence, but less sensitive to moving automobiles. If disturbed by sudden, loud noise or rapid movements, adult birds may fail to use a nest site or temporarily abandon their eggs or chicks, exposing them to undue cold temperatures and/or predators. Some biologists recommend establishing between a 1/4- and 2-mile diameter buffer zone around nests. Existing access road traffic and visitor use, especially at the Citadel Pueblo, may interfere with breeding eagles. Accordingly, the NPS recently decided to close the Citadel Pueblo to visitors during the breeding season. Because biologists suspect there is only one viable golden eagle breeding territory within Wupatki, continued human disturbance of nesting sites likely results in long-term, moderate to major impacts within the monument.

In addition to sensitive species, a number of unique or rare habitats were identified within the monument through the scoping process and by using available scientific literature. These include grasslands, karst features, the cinder alluvial fan east of Woodhouse

Mesa, Antelope Canyon in the Doney Monocline, and riparian areas. Impacts to riparian areas are analyzed separately in the Wetlands, Floodplains, and Riparian Habitat section below. The proposed acquisition of more than 20,000 acres to the north of the monument would nearly double the available grassland habitat within the monument. The expansion would also allow the eventual removal of grazing livestock from the newly added area, closure of primitive roads, and removal of interior fences (including the segment along the current monument boundary). These actions would significantly enhance the long-term integrity of the native grassland ecosystem, reduce habitat fragmentation, and have long-term, moderate, beneficial impacts to grassland-dependent species within the monument.

The cave-like karst features within the monument provide habitat for sensitive bat species and may also provide unique habitat for other rare species, especially invertebrates. Preliminary surveys and biological inventory efforts have just begun. Cave environments are easily disrupted by human presence, and karst features within the monument are closed to visitors. However, occasional unauthorized visitation likely occurs, which could impact the fauna and affect temperature, airflow, and humidity. The introduction of trash, lint, skin dander, mold, or microbes has been shown to have significant cumulative effects on cave resources. Under the No-Action Alternative, occasional unauthorized access would likely continue to occur, resulting in long-term, minor impacts to karst resources.

The alluvial fan of vegetated cinder dunes to the east of Woodhouse Mesa was identified by Bateman (1976) as a unique habitat. The cinder dune fan harbors two sensitive plant species-

Phacelia serrata and Amsonia peblesiana. The Wupatki pocket mouse also occurs here. Most of this habitat lies within the backcountry closure area. The cinder dune fan is bisected by the eastern entrance road. The New Heiser employee housing and maintenance shops are also found within this habitat. Currently, no new visitor access or NPS support facilities are proposed within the cinder dunes. Under the No-Action Alternative, continued NPS operations and occasional backcountry hiking would likely result in long-term, negligible to minor impacts to this unique habitat.

The Doney Monocline, including Antelope Canyon, was also identified by Bateman (1976) as unique habitat. The massive, limestone faces of the monocline harbor several plant species not found elsewhere (e.g., Echinocactus polycephalus, Petrophytum caespitosum) and contribute to the overall biodiversity within the monument. The area also includes cliff faces, which provide suitable habitat for bats and nesting habitat for golden eagles and other raptors. Most of the monocline lies within the closed backcountry area. However, the established hiking route to Crack-in-Rock Pueblo follows along the base of the Doney Monocline and near the mouth of Antelope Canyon. Dispersed hiking is encouraged instead of hiking on a developed trail, but hikers are narrowly confined by rugged terrain in certain reaches, and short trail segments are evident. Some visitor use impacts are locally evident around the Crack-in-Rock area, including unplanned trails, localized vegetation trampling, soil compaction, accelerated erosion, and patches of nonnative Russian thistle (*Salsola kali*). Although these impacts are very localized, they illustrate how sensitive the desert environment can be to low levels of human activity. Under the No-Action Alternative, continued occasional guided use along the Crack-in-

Rock hiking route would likely result in long-term, negligible to minor impacts to this unique habitat.

CUMULATIVE EFFECTS

The geographic area used in the consideration of cumulative effects includes the western portion of the Little Colorado River watershed and is bounded on the south by the Mogollon Plateau and Clear Creek, the Little Colorado River and Painted Desert on the east, and the San Francisco Peaks and Coconino Plateau on the west.

The cumulative effects of continuing public visitation to and NPS administration of Wupatki National Monument on threatened, endangered, and sensitive species are difficult to estimate. Many of these species are experiencing long-term declines as a result of regional development impacts over which the NPS has very little control. Others are sensitive because they have very small or specific habitats that could be completely impacted by small management decisions. At Wupatki, the NPS cooperates when a regional species management framework is needed to sustain a widespread species. The narrowly distributed species are well protected within Wupatki by the backcountry closure. The primary adverse cumulative effects would likely result from increased visitation and road traffic, especially for sensitive wildlife species.

Cattle grazing in the geographic area is widespread and has been ongoing for more than a hundred years. This has caused a general degradation in grasslands in the area and has had a moderate impact on several sensitive plant species, by reducing species diversity, introducing exotic species, and trampling. Grazing was stopped in the monument in 1989, and the grasslands, and likely some rare plant populations, are still recovering. The exclusion of

livestock from the monument would have a long-term, minor to moderate beneficial impact on sensitive plant species within the region. The impacts would be similar for plant species that are increasingly threatened by over-collection for American Indian traditional uses.

Current visitor use at the Citadel site and parking area likely has a moderate impact to golden eagles that might use the Citadel sink as a nesting area. A significant increase in visitor use during the breeding season would likely have major adverse cumulative effects to this breeding pair. The cumulative impact to the regional golden eagle population would likely be long term, minor, and adverse.

CONCLUSION

No threatened or endangered species are known to occur within Wupatki National Monument. Vegetation and wildlife habitat within the monument will continue to recover from former ranching activities. There are 11 sensitive plant and 7 sensitive animal species that are either known to occur within Wupatki or within similar habitats nearby the monument. Continued field studies are needed to routinely assess the distribution and status of sensitive species and to ensure that they are not impacted by current visitor use, NPS operations, and traditional use activities.

The backcountry closure also effectively protects most sensitive plant habitats from disturbance. Existing roads, archeological interpretive areas, and NPS support facilities are located in proximity to known locations and/or known habitats of sensitive plants. Current visitor activity near developed areas likely results in localized off-trail vegetation trampling. The demand for traditionally used species may be increasing, resulting in increased threats of plants being

collected within the monument, especially where access is convenient. Under the No-Action Alternative, occasional incidental trampling of vegetation during off-trail activities likely have long-term, negligible to minor adverse impacts on plant "species of concern."

Current visitor use and NPS operations at Wupatki likely have long-term, negligible to minor adverse impacts to the Wupatki pocket mouse, Townsend's big-eared bat, and spotted bat.

A small pronghorn antelope herd exists at Wupatki, and it has declined along with the regional population during the last few decades. The NPS is cooperating with other agencies and landowners to improve conditions, including modifying fences to allow animals to move between surrounding lands. The proposed boundary expansion would almost double grassland habitat. Pronghorn are likely disturbed by traffic noise along the access road. Current visitor use is not centered within grassland habitat, but use of the Citadel-Lomaki area likely results in some disturbance. The NPS is developing a fire management plan with the primary objective of improving grassland habitat. Under the No-Action Alternative, the existing access road and ongoing juniper woodland expansion have long-term, moderate adverse impacts. The boundary fence and visitor use have long-term, minor adverse impacts.

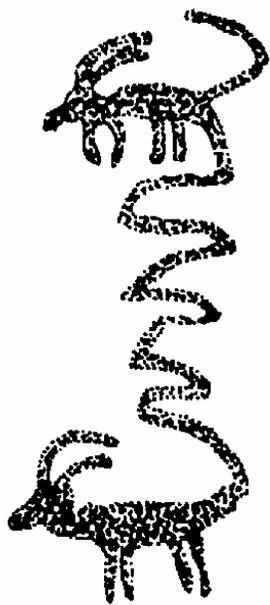
Golden eagles have historically nested within Wupatki. Access road traffic and visitor use, especially at the Citadel Pueblo, may interfere with breeding eagles. Accordingly, the NPS recently decided to close the Citadel Pueblo to visitors during the breeding season. Because biologists suspect there is only one viable golden eagle breeding territory within Wupatki, continued human disturbance of nesting sites likely

results in long-term, moderate to major impacts within the monument.

A number of unique habitats exist within the monument, including grasslands, karst features, the cinder alluvial fan east of Woodhouse Mesa, Antelope Canyon in the Doney Monocline, and riparian areas. Impacts to riparian areas are analyzed separately in the Wetlands, Floodplains, and Riparian Habitat section below. Most of the unique habitats are located within the closed backcountry area, which protects them from most impacts. The proposed boundary expansion would nearly double grassland habitat and have long-term, moderate, beneficial impacts to grassland-dependent species. Existing visitor use and NPS operations have minor impacts upon karst features and negligible to minor impacts upon the cinder alluvial fan and the Doney Monocline.

In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Wupatki National Monument; (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 relevant National Park Service planning documents, there would be no impairment of the park's resources or values.



Effects Of Alternative 1: Limit Motorized Sightseeing And Focus On Extended Learning

IMPACT ANALYSIS

The existing closed backcountry area would be formally recognized as a Resource Preservation Zone, and unauthorized access would be prohibited. Visitor-use and NPS operations impacts to sensitive species and unique habitats within the Resource Preservation Zone would be the same as under the No-Action Alternative.

The impacts from the proposed boundary expansion on grasslands and NPS cooperative efforts to manage pronghorn would likely be the same as those identified for the No-Action Alternative.

The impacts upon sensitive species and unique habitats from use and maintenance of FR545 between the east entrance and the visitor center/Wupatki area, the Crack-in-Rock Road, and Black Falls Crossing Road would be the same as under the No-Action Alternative

The impacts upon sensitive species and unique habitats from visitor activities at the visitor center and Wupatki Pueblo would be the same as under the No-Action Alternative.

Impacts upon sensitive species and unique habitats from NPS operation and maintenance of the existing visitor center, employee housing, offices, shops, parking lots, and utilities would remain highly concentrated at the same locations and would be the same as those identified for the No-Action Alternative.

The proposed changes in the road system would eliminate most traffic through the western half of the monument. This would have long-term, moderate beneficial impacts to pronghorn within

the monument by significantly reducing grassland habitat fragmentation, traffic noise, mortality, movement interference, and human disturbance along the park road.

The new campground near Heiser Spring would be developed within an abandoned employee housing area. The spring and housing area has been heavily impacted by historic ranching and NPS use, and building the campground would avoid direct impacts to sensitive plant and animal populations or habitat. However, establishing the campground and increasing visitor use within an Extended Learning Zone around Heiser Spring would deter NPS efforts to restore the spring as a source of water for wildlife, including pronghorn. The spring is one of only two perennial surface water sources within the monument. Limited overnight visitor use around the campground and sustained visitor use within the Extended Learning Zone would result in localized secondary impacts beyond the historically developed area, including noise and disturbance to pronghorn. The actual amount of disturbance is difficult to quantify and would depend on the timing, frequency, and size of visitor groups. The proposed campground and learning zone around Heiser Spring would likely cause long-term, moderate adverse impacts to the pronghorn population within the monument. The impacts to wetlands/riparian habitats are discussed in the appropriate section below.

Under Alternative 1, the proposed realignment of the Wukoki access road and extension of the access trail would likely disturb known populations of *Amsonia peeblesii* and *Poliomintha incana*. The realignment also could potentially disturb *Phacelia welshii* and *Cymopterus megacephalus*. Surveys would be conducted prior to planning

the realignment route, and populations of sensitive plants would be avoided if discovered. Habitat for the Wupatki pocket mouse could also be impacted, but this would be offset by the restoration of the old access route. Extending the access trail would likely result in increased off-trail vegetation trampling within the Wukoki area, disturbance to known populations of *Amsonia peeblesii*, and would have the potential to disturb *Phacelia welshii* and *Cymopterus megacephalus*. These actions would likely have negligible to long-term, minor adverse impacts to sensitive plants, and short-term, minor adverse impacts to the Wupatki pocket mouse.

Under Alternative 1, the proposed large Extended Learning Zone around the Citadel-Lomaki area would increase human presence and disturbance to grassland habitat and several sensitive species. Off-trail hiking within this area could result in increased trampling of sensitive plants, including *Amsonia peeblesii*, *Pediocactus simpsonii*, and/or *Pediocactus peeblesianus* var. *fickeiseniae*. Increased visitor activity in this area might disrupt golden eagle nesting, which could have both short- and long-term moderate to major impacts to the only viable breeding territory within the monument. These impacts could largely be avoided by continued closure of the Citadel Pueblo area during the nesting season (February through June). The expanded visitor-use area also includes significant karst features and habitat for both the spotted bat and Townsend's big-eared bat. Off-trail roaming within the area could increase impacts to these unique habitats and bat populations. If visitor numbers, visitation access patterns, and the timing of guided visits is appropriately managed by the NPS, this alternative would result in long-term negligible to minor impacts to most sensitive species and unique habitats.

An increase in the level of dispersed hiking within the proposed Guided Adventure Zone, especially around Crack-in-Rock Pueblo, would result in increased impacts to sensitive plant species. *Amsonia peeblesii*, *Errazurizia rotunda*, *Cymopterus megacephalus*, *Phacelia welshii*, and/or *Pediocactus peeblesianus* var. *fickeiseniae* could be adversely impacted by increased off-trail hiking and vegetation trampling. The Doney Monocline, along the west side of the Guided Adventure Zone, provides unique habitat for a number of plant species, bats, and nesting sites for raptors. Unmanaged visitors could easily stray onto the lower slopes of the monocline or into Antelope Canyon out of curiosity, and nesting raptors could be disturbed by visitor-use during breeding season. Bats are largely nocturnal, and daytime visitor-use within the Guided Adventure Zone would likely not disturb them. Depending on NPS management of visitor numbers, visitation access patterns, and the timing of guided visits, this alternative could result in long-term negligible to minor impacts to sensitive species and unique habitats.

CUMULATIVE EFFECTS

The cumulative effects of Alternative 1 are likely to be similar to those identified for the No-Action Alternative for most sensitive species and unique habitats within the monument. This alternative would have pronounced beneficial impacts to the integrity of grasslands and pronghorn because of the proposed road system and visitor access changes within the western half of the monument. However, this effect might be somewhat offset by the combined new campground and Extended Learning Zone around Heiser Spring, which would deter NPS efforts to restore the spring as a source of water for pronghorn.

CONCLUSION

Alternative 1 would cause no adverse impacts to threatened and endangered species at Wupatki National Monument. Most of the monument would remain closed to general visitor access, and the impacts for many sensitive species and unique habitats would likely be similar to those identified for the No-Action Alternative. The proposed changes in the road system would eliminate most traffic through the western half of the monument, which would have long-term, moderate beneficial impacts to pronghorn. Development of a campground and establishing an Extended Learning Zone around Heiser Spring would deter NPS efforts to restore the spring as a source of drinking water for wildlife, which would have a long-term, moderate adverse impact to pronghorn within the monument. Minor impacts could result from local realignment of the Wukoki Pueblo access road and extension of the trail. The larger Extended Learning Zone around the Citadel-Lomaki area would increase human presence and disturbance to grassland habitat, karst features, and several sensitive species. An increase in the level of dispersed hiking with the proposed Guided Adventure Zone, especially around Crack-in-Rock Pueblo, would result in increased impacts to habitat for several sensitive plant species. If visitor numbers, access patterns, and the timing of guided visits are appropriately managed by the NPS, this alternative would result in long-term negligible to minor impacts to most sensitive species and unique habitats.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Wupatki National Monument; (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 relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects Of Alternative 2: Emphasize Motorized Sightseeing And Resource Protection Through On-Site Education

IMPACT ANALYSIS

Under Alternative 2, the existing backcountry closure area would be formally recognized as a Resource Preservation Zone, and unauthorized access would be prohibited. Visitor use and NPS operations impacts to sensitive species and unique habitats within the Resource Preservation Zone would be the same as those identified for the No-Action Alternative.

The impacts from the proposed boundary expansion on grasslands and NPS cooperative efforts to manage pronghorn would likely be the same as under the No-Action Alternative.

FR545 would remain open to 24-hour, 2-way traffic. Vehicle access to the interpretive archeological areas would remain unchanged, and the impacts of the paved road system upon sensitive animal species would likely be the same as identified for the No-Action Alternative.

The impacts of visitor use on sensitive plant and animal populations near the four existing archaeological interpretive areas and the Doney Mountain picnic area would likely be the same as those identified for the No-Action Alternative.

The NPS would retain existing housing, maintenance shops, and utilities for the same purposes, and the impacts from

these operations would be the same as under the No-Action Alternative.

NPS visitor service operations in the existing visitor center would cease, except for continued use of the existing parking lot to access the Wupatki Pueblo. The building would be retained for use by the cooperating association bookstore and/or be converted to offices and research/storage space. This change in facility function would likely have the same impacts to sensitive plant and animal populations as under the No-Action Alternative.

Under Alternative 2, a 24-mile scenic loop of existing primitive roads would be used for one-way, escorted four-wheel-drive and/or mountain bike tours across the Crack-in-Rock area and northern expansion lands. The Crack-in-Rock Pueblo and new viewpoints and sites of historic interest would be visited much more frequently than they are at present. The proposed development of scenic viewpoints, support facilities, and increased visitor use along the scenic loop would promote local off-trail hiking, which could have minor adverse impacts to sensitive plant populations, including *Amsonia peeblesii*, *Pediocactus simpsonii*, and/or *Pediocactus peeblesianus* var. *fickeiseniae*. Field surveys for sensitive plant species would be required to avoid the plants when siting visitor use areas and support facility locations in order to mitigate potential impacts.

The proposed change in visitor access would significantly increase road-related impacts and habitat fragmentation within the grassland area. Increased vehicle use, traffic noise, and human presence along the new scenic loop corridor would likely disturb the pronghorn population and interfere with movement throughout both the grassland and Doney Monocline areas. Anticipated disturbances include more frequent human-induced flight response,

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which physically stresses the animals, disrupts foraging, disrupts breeding behavior, and causes adults to temporarily abandon fawns, which results in increased coyote predation on fawns. A proposed scenic viewpoint from the top of the Doney Monocline could impact golden eagle nest sites and have moderate to major impacts during golden eagle breeding season. This impact could be mitigated by carefully selecting the scenic viewpoint location or avoiding use of the site during golden eagle breeding season. The actual level of impacts to sensitive animal species from the proposed new road corridor would depend on the timing, frequency, and group size of guided activities, but could result in long-term, minor to moderate impacts to pronghorn, and the potential for long-term, moderate or short-term, major adverse impacts to golden eagles.

Under Alternative 2, Crack-in-Rock Pueblo would only be visited on short, guided hikes during the scenic driving or mountain bike tours. This would eliminate existing impacts from dispersed hiking access along the base of the Doney Monocline, including the potential trampling of *Amsonia peeblesii*, *Errazurizia rotunda*, *Cymopterus megacephalus*, *Phacelia welshii*, and/or *Pediocactus peeblesianus* var. *fickeiseniae*. This would reduce potential human disturbance to pronghorn and golden eagle near the hiking corridor.

The proposed construction of a new visitor orientation station at the north entrance near US89 could have negligible to long-term, minor impact to sensitive plant species, including *Pediocactus simpsonii*, and/or *Pediocactus peeblesianus* var. *fickeiseniae*. Preliminary surveys for these plants would be required in order to determine if they would be impacted by the new contact station. A local area of habitat

for the Wupatki pocket mouse and pronghorn would be destroyed. Off-trail visitor use near the new facility would result in local vegetation trampling and potential impacts to sensitive plants. Radiotelemetry tracking of pronghorn has shown that they often congregate along the US89 right-of-way fence, and their movement and foraging patterns would be disrupted by increased human presence. The new visitor orientation station would have long-term, moderate adverse impacts to pronghorn antelope.

The Black Falls Crossing Road would be maintained in its current condition and opened to park visitors. Visitors would likely stop to explore the roadside area on foot, potentially trampling sensitive plants adjacent to the road corridor. Increased traffic could increase road mortality and have long-term, minor adverse impacts to the Wupatki pocket mouse.

The current practice of occasional guided visitor "discovery hikes" within the closed backcountry area would be eliminated, which would result in long-term, minor beneficial impacts to numerous sensitive plants and animals, by confining visitor impacts to the Extended Learning Zone and road corridors.

CUMULATIVE EFFECTS

The cumulative effects of Alternative 2 are likely to be similar to those identified under the No-Action Alternative for most sensitive species and unique habitats within the monument. The alternative would have pronounced adverse impacts to the integrity of grasslands and pronghorn because of the proposed road system and visitor access changes within the western half of the monument.

CONCLUSION

Alternative 2 would cause no adverse impacts to threatened and endangered

species at Wupatki National Monument. Most of the monument would remain closed to general visitor access, and the impacts for many sensitive species and unique habitats would likely be similar to those identified under the No-Action Alternative.

Alternative 2 would significantly increase the road system and vehicle access within the monument, which would have long-term, moderate adverse impacts to pronghorn and increase disturbance to sensitive plant habitats. The proposed construction of a new visitor orientation station at the north entrance near US89 would permanently impact a local area of habitat for the Wupatki pocket mouse and pronghorn. Pronghorn often congregate along the US89 right-of-way fence, and their movement and foraging patterns would be moderately disrupted by increased human presence.

The proposed Extended Learning Zone around the Citadel-Lomaki area would increase human presence and potential disturbance to grassland habitat, karst features, several sensitive plant species, Townsend's big-eared bat, spotted bat, pronghorn, and golden eagle. The Black Falls Crossing Road would be opened to park visitors, resulting in increased road mortality of Wupatki pocket mouse and trampling of rare plant habitats adjacent to the road corridor. The elimination of occasional guided visitor "discovery hikes" and dispersed hiking access to Crack-in-Rock Pueblo would benefit a large area of sensitive plant habitat. If visitor numbers, access patterns, and the timing of guided visits are appropriately managed by the NPS, this alternative would result in long-term negligible to minor impacts to most sensitive species and unique habitats, except perhaps for pronghorn.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill

specific purposes in the establishing legislation or proclamation for Wupatki National Monument; (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 relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects Of Alternative 3 (Preferred): Preserve Sensitive Park Resources While Diversifying The Range Of Visitor Experiences

IMPACT ANALYSIS

Under Alternative 3, the existing backcountry closure area would be formally recognized as a Resource Preservation Zone, and unauthorized access would be prohibited. Visitor use and NPS operations impacts to sensitive species and unique habitats within the Resource Preservation Zone would be the same as those identified for the No-Action Alternative.

The impacts from the proposed boundary expansion on grasslands and NPS cooperative efforts to manage pronghorn would likely be the same as under the No-Action Alternative. An existing primitive ranch road, within the boundary expansion, that approaches the Crack-in-Rock Pueblo area from the western mesa above the Doney Monocline would be maintained in its existing condition for administrative purposes. The impacts from occasional administrative use are expected to be less than those resulting from ranch operations and are considered negligible.

FR545 would remain open to 24-hour, 2-way traffic. Vehicle access to the interpretive archeological areas would remain unchanged, and the impacts of

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the paved road system upon sensitive animal species would likely be the same as identified under the No-Action Alternative.

The impacts of visitor use on sensitive plant and animal populations near the four existing archeological interpretive areas and the Doney Mountain picnic area would likely be the same as those identified for the No-Action Alternative.

The impacts on sensitive species and unique habitats from continued administrative use and maintenance of the Black Falls Crossing Road and the Crack-in-Rock Road would be the same as under the No-Action Alternative.

The NPS would retain existing housing, maintenance shops, and utilities for the same purposes, and the impacts from these operations would be the same as under the No-Action Alternative.

The proposed construction of a new visitor orientation station at the north entrance near US89 could have negligible to long-term, minor impact to sensitive plant species, including *Pediocactus simpsonii*, and/or *Pediocactus peeblesianus* var. *fickeiseniae*.

Preliminary surveys for these species would be required in order to determine if they would be impacted by the new contact station. A local area of habitat for the Wupatki pocket mouse and pronghorn would be destroyed. Off-trail visitor use near the new facility would result in local vegetation trampling and potential impacts to sensitive plants. Radiotelemetry tracking of pronghorn has shown that they often congregate along the US89 right-of-way fence, and their movement and foraging patterns would be disrupted by increased human presence. The new visitor orientation station would have long-term, moderate adverse impacts to pronghorn antelope.

Under Alternative 3, the proposed realignment of the Wukoki access road

and extension of the access trail could disturb known populations of *Amsonia peeblesii* and *Poliomintha incana*. The realignment also could potentially disturb *Phacelia welshii* and *Cymopterus megacephalus*. Surveys would be conducted prior to planning the realignment route, and populations of sensitive plants would be avoided if discovered. Habitat for the Wupatki pocket mouse could also be impacted, but this would be offset by the restoration of the old access route. Extending the access trail would likely result in increased off-trail vegetation trampling within the Wukoki area and disturbance to known populations of *Amsonia peeblesii* and would have the potential to disturb *Phacelia welshii* and *Cymopterus megacephalus*. These actions would likely have negligible to long-term, minor adverse impacts to sensitive plants, and short-term, minor adverse impacts to the Wupatki pocket mouse.

Under Alternative 3, the learning zone around the Citadel-Lomaki area would be larger than the current visitor use area. The larger area of visitor activity could disturb grassland habitat and result in incidental trampling of *Amsonia peeblesii*, *Pediocactus simpsonii*, and/or *Pediocactus peeblesianus* var. *fickeiseniae*. Increased visitor activity in this area might continue to disrupt golden eagle nesting, which could have both short- and long-term moderate to major impacts to the only viable breeding territory within the monument. These impacts could largely be avoided by continued closure of the Citadel Pueblo area during the nesting season (February through June). The expanded visitor use area is near karst features and habitat for both the spotted bat and Townsend's big-eared bat. Off-trail roaming within the area could increase impacts to these unique habitats and bat populations. These potential visitor use impacts could be offset by increased on-

site NPS staff presence and enhanced visitor guidance. This alternative would likely result in long-term negligible to minor impacts to most sensitive species and unique habitats.

An increase in the level of dispersed hiking within the proposed Guided Adventure Zone, especially around Crack-in-Rock Pueblo, would result in increased impacts to sensitive plant habitats. *Amsonia peeblesii*, *Errazurizia rotunda*, *Cymopterus megacephalus*, *Phacelia welshii*, and/or *Pediocactus peeblesianus* var. *fickeiseniae* could be adversely impacted by increased off-trail hiking and vegetation trampling. The Doney Monocline, along the west side of the Guided Adventure Zone, provides unique habitat for a number of plant species and bats, and provides nesting sites for raptors. Without guidance, visitors could easily stray onto the lower slopes of the monocline or into Antelope Canyon out of curiosity, and nesting raptors could be disturbed by visitor use during breeding season. Bats are largely nocturnal, and daytime visitor use within the Guided Adventure Zone would likely not disturb them. Depending upon NPS management of visitor numbers, visitation access patterns, and the timing of guided visits, this alternative could result in long-term negligible to minor impacts to sensitive species and unique habitats.

A 1/2-mile trail would be established into the grassland ecosystem near Lomaki. The trail would be established by linking existing unplanned trails in the area, which would negate most adverse impacts to sensitive plants. Some off-trail use and vegetation trampling is anticipated, which would result in negligible to minor impacts to sensitive plant species. Increased human presence within the area could result in increased disturbance and have minor to moderate adverse impacts upon the pronghorn herd within Wupatki.

A second new trail would be established between Wupatki and Wukoki Pueblos. The proposed trail route is in proximity to known populations of *Amsonia peeblesii* and *Poliomintha incana*, and suitable habitat for *Phacelia welshii* and *Cymopterus megacephalus*. Impacts would be minimized by establishing the trail along the bottom of Deadman Wash and an abandoned roadbed. The area would be surveyed for the existence of sensitive plant and animal species prior to trail designation. Some off-trail use and vegetation trampling is anticipated, which would result in negligible to minor impacts to sensitive plant species.

CUMULATIVE EFFECTS

The cumulative effects of Alternative 3 are likely to be similar to those identified for the No-Action Alternative for most sensitive species and unique habitats within the monument. The alternative would provide for an increased area of visitor use around the Citadel-Lomaki area, a new trail into the grassland area, and a new orientation facility at the north entrance to the monument. These proposed actions together would slightly increase cumulative adverse impacts to the integrity of grasslands and pronghorn. The alternative would also provide for higher visitor use levels within the Guided Adventure Zone and two new trails. These proposed actions together would increase the level of off-trail access and incidental vegetation trampling within suitable habitats for several sensitive plant species.

CONCLUSION

Alternative 3 would cause no adverse impacts to threatened and endangered species at Wupatki National Monument. Most of the monument would remain closed to general visitor access, and the impacts for many sensitive species and unique habitats would likely be similar to

those identified under the No-Action Alternative.

The proposed construction of a new visitor orientation station at the north entrance near US89 would permanently impact a local area of habitat for the Wupatki pocket mouse and pronghorn. Pronghorn often congregate along the US89 right-of-way fence, and their movement and foraging patterns would be moderately disrupted by increased human presence. The proposed learning zone around the Citadel-Lomaki area would increase human presence and potential disturbance to grassland habitat, karst features, several sensitive plant species, Townsend's big-eared bat, spotted bat, pronghorn, and golden eagle. The a new orientation facility combined with increased visitor access within the western half of the monument would slightly increase cumulative adverse impacts to the integrity of grasslands and have long-term, minor to moderate adverse impacts on the pronghorn herd within Wupatki.

Minor impacts could result from local realignment of the Wukoki Pueblo access road and extension of the trail. An increase in the level of dispersed hiking with the proposed Guided Adventure Zone, and the establishment of two new trails would increase off-trail vegetation trampling and have negligible to long-term, minor impacts to suitable habitat for several sensitive plant species.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Wupatki National Monument; (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 relevant National Park Service planning documents, there would be no

impairment of the park's resources or values.

Effects Of Alternative 4: Emphasize Integrated Story Between The Parks And Minimize Development

IMPACT ANALYSIS

Under Alternative 4, the existing backcountry closure area would be formally recognized as a Resource Preservation Zone, and unauthorized access would be prohibited. Visitor use and NPS operations impacts to sensitive species and unique habitats within the Resource Preservation Zone would be the same as under the No-Action Alternative.

The impacts from the proposed boundary expansion on grasslands and NPS cooperative efforts to manage pronghorn would likely be the same as under the No-Action Alternative. An existing primitive ranch road within the boundary expansion that approaches the Crack-in-Rock Pueblo area from the western mesa above the Doney Monocline would be maintained in existing condition for administrative purposes. The impacts from occasional administrative use are expected to be less than those resulting from ranch operations and are considered negligible.

The incidental impacts of visitor use at the four existing archaeological interpretive areas and the Doney Mountain picnic area to surrounding sensitive plant species and their habitats, karst features, Townsend's big-eared bat, spotted bat, golden eagle, and pronghorn would be the same as under the No-Action Alternative.

Under Alternative 4, approximately 13 miles of FR545 would be converted to one-way traffic westward from the visitor center to an exit at the north boundary at US89. The one-way section would be

gated at night, virtually eliminating nighttime traffic and casual visitor use within the western half of the monument. The proposed changes to FR545 access would reduce existing grassland habitat fragmentation and have a long-term, moderate beneficial impact to the pronghorn herd in Wupatki.

The Black Falls Crossing Road would be closed and restored to natural vegetation and wildlife habitat conditions. This would provide a negligible increase in suitable habitat for a number of sensitive plant species known to occur within the eastern half of the monument. Abandonment of the road would eliminate potential off-road driving and incidental hiking impacts to sensitive plants adjacent to the road corridor. The elimination of vehicle use would decrease road mortality and have long-term, minor beneficial impacts to the Wupatki pocket mouse.

The removal of most of the visitor center, most housing, and all maintenance and administrative facilities at Wupatki would provide a negligible increase in suitable habitat for a number of sensitive plant species known to occur within the eastern half of the monument. The resulting reduction in NPS personnel stationed at Wupatki would delay responses to reported resource violations, which could result in long-term, minor adverse impacts to sensitive species and unique habitats.

Under Alternative 4, the proposed realignment of the Wukoki access road and extension of the access trail could disturb known populations of *Amsonia peeblesii* and *Poliomintha incana*. The realignment also could potentially disturb *Phacelia welshii* and *Cymopterus megacephalus*. Surveys would be conducted prior to planning the realignment route, and populations of sensitive plants would be avoided if

discovered. Habitat for the Wupatki pocket mouse could also be impacted, but this would be offset by the restoration of the old access route. Extending the access trail would likely result in increased off-trail vegetation trampling within the Wukoki area, disturbance to known populations of *Amsonia peeblesii*, the potential to disturb *Phacelia welshii* and *Cymopterus megacephalus*. These actions would likely have negligible to long-term, minor adverse impacts to sensitive plants, and short-term, minor adverse impacts to the Wupatki pocket mouse.

The Crack-in-Rock Pueblo would only be visited on short, guided hikes during scenic driving tours. This would eliminate existing impacts from dispersed hiking access along the base of the Doney Monocline, including the potential trampling of *Amsonia peeblesii*, *Errazurizia rotunda*, *Cymopterus megacephalus*, *Phacelia welshii*, and/or *Pediocactus peeblesianus* var. *fickeiseniae*. This would also reduce potential human disturbance to pronghorn and golden eagles near the hiking corridor.

A new trail would be established between Wukoki and Wupatki Pueblos. The proposed trail is within proximity to known populations of *Amsonia peeblesii* and *Poliomintha incana* and suitable habitat for *Phacelia welshii* and *Cymopterus megacephalus*. Impacts would be minimized by establishing the trail along the bottom of Deadman Wash and an abandoned roadbed. The area would be surveyed for the existence of sensitive plant and animal species prior to trail designation. Some off-trail use and vegetation trampling is anticipated, which would result in negligible to minor adverse impacts to sensitive plant species.

CUMULATIVE EFFECTS

The cumulative effects of Alternative 4 are likely to be similar to those identified for the No-Action Alternative for most sensitive species and unique habitats within the monument. The alternative would have pronounced beneficial impacts to the integrity of grasslands and pronghorn because of the proposed road system and visitor access changes within the western half of the monument. The reduction in NPS personnel stationed at Wupatki would delay responses to reported resource violations, which could result in increased adverse impacts to sensitive species and unique habitats.

CONCLUSION

Alternative 4 would cause no adverse impacts to threatened and endangered species at Wupatki National Monument. Most of the monument would remain closed to general visitor access, and the impacts for many sensitive species and unique habitats would likely be similar to those identified under the No-Action Alternative. The proposed changes in the road system would eliminate nighttime traffic through the western half of the monument, which would have long-term, moderate beneficial impacts to pronghorn. Minor impacts could result from local realignment of the Wukoki Pueblo access road and extension of the trail. Abandonment of the Black Falls Crossing Road would eliminate potential off-road driving and incidental hiking impacts to sensitive plants adjacent to the road corridor. Eliminating vehicle use would decrease road mortality and have long-term, minor beneficial impacts to the Wupatki pocket mouse. Eliminating occasional guided visitor "discovery hikes" and dispersed hiking access to Crack-in-Rock Pueblo would benefit a large area of sensitive plant habitat.

The removal of most of the visitor center, most housing, and all maintenance and

administrative facilities at Wupatki would provide a negligible increase in suitable habitat for a number of sensitive plant species known to occur within the eastern half of the monument. The resulting reduction in NPS personnel stationed at Wupatki would delay responses to reported resource violations, which could result in long-term, minor adverse impacts to sensitive species and unique habitats.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Wupatki National Monument; (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 relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Irreversible/Irretrievable Commitments Of Resources

There would be no irreversible or irretrievable commitments of threatened or endangered species. Under the various alternatives, localized areas of sensitive plant and animal habitat would be permanently removed to build trails, campsites, and/or new visitor facilities. Accommodating increased visitation levels would increase the amount of human disturbance to pronghorn and golden eagles, which could potentially disrupt their population numbers within the monument.

Loss In Long-Term Availability Or Productivity Of The Resource To Achieve Short-Term Gain

Under Alternatives 1, 3, and 4, visitors would be provided access to more of

Wupatki National Monument, resulting in potential long-term local disturbance of sensitive plant habitats and disruption of sensitive wildlife populations, particularly pronghorn and golden eagles. Under Alternative 2, the integrity of the pronghorn herd and its primary grassland habitat within Wupatki would be degraded in order to provide visitors more convenient driving access.

Unavoidable Adverse Impacts

Historical land use and occasional visitor use have occurred within the backcountry area for many years and have had unknown impacts to sensitive species and their respective habitats. Under all the alternatives, the road system would interfere to varying degrees with the local movement or migration of sensitive animal species and would rarely result in incidental injury or mortality.

Construction activities under all of the action alternatives would locally disturb sensitive plant and animal species habitats and potentially increase the area dominated by nonnative, invasive plant species. Visitor use around the proposed interpretive areas would likely result in local vegetation trampling and impacts to rare plants and increased disturbance to sensitive wildlife species, particularly pronghorn and golden eagles.

Alternative 2 would nearly double the amount of road access within the western half of the monument, fragmenting the grassland ecosystem and disrupting the pronghorn herd.

WETLANDS, FLOODPLAINS, AND RIPARIAN HABITAT

Methodology

Available information on water resources for Wupatki was reviewed. This included information on the perennial springs in the monument, primarily from the

investigations of Christensen (1982), Cinnamon (1984), and McCormack (1989). Little information is available on the hydrology and water quality for the reach of the Little Colorado River or the intermittent drainages through the monument. The potential impacts of each alternative on wetlands, floodplains, and riparian areas were evaluated by comparing their locations to proposed visitor access and support facilities, and to the anticipated visitor uses and administrative activities within the various management zones. Predictions about short- and long-term impacts were based on past studies of land use and visitor impacts to similar watersheds within the regional ecosystem. The predicted intensity of adverse impacts is articulated according to the following criteria:

Negligible: An action that would cause no change in an existing wetland area or function, in the ability of a floodplain to convey floodwaters, or to riparian vegetation and wildlife communities.

Minor: An action that would cause no change in wetland or floodplain area and function. The action would affect a few individuals of plant or wildlife species within an existing wetland or riparian area within the monument. The change would require considerable scientific effort to measure and have barely perceptible consequences to wetland or riparian habitat function.

Moderate: An action that would change an existing wetland area or floodplain function, but the impact could be mitigated by the creation of artificial wetlands or modification of proposed facilities in floodplains. The action would have a measurable effect on plant or wildlife species within an existing wetland or riparian area, but all species would remain indefinitely viable within the monument.

Major: An action that would have drastic and permanent consequences for an existing wetland area or floodplain function that could not be mitigated. Wetland and riparian species dynamics would be upset, and species would be at risk of extirpation from the monument.

Effects Of The No-Action Alternative: Existing Conditions

IMPACT ANALYSIS

Wetland, floodplain, and riparian resources at Wupatki are restricted to the Little Colorado River banks and two perennial springs-Peshlaki Spring and Heiser Spring. Approximately 1 1/2 to 2 miles of the Little Colorado River flow along the monument's eastern boundary. The river serves as the boundary between the monument and the Navajo Reservation. Under the No-Action Alternative, the proposed boundary expansion would more than double the area of river floodplain, including a few remnant cottonwood groves. Because of the highly unpredictable climate within the watershed, flows are intermittent and highly variable. The stream may cease flowing for 3 months at a time during an average year. The river watershed is dominated by gypsiferous sedimentary rock formations, and livestock ranching is the predominant land use. Although water quality data is not available for the Wupatki reach, flows are high in sediment and suspended solids and water quality are expected to be very saline and poor. Wetlands that meet U.S. Fish and Wildlife Service jurisdictional criteria under Section 404 of the Clean Water Act are probably restricted to the scoured cobble and stone riverbed, which is almost devoid of vegetation and likely does not support many fish or waterfowl.

The Little Colorado River floodplain is dominated by nonnative tamarisk thickets. Local Navajo residents continue to graze livestock on both banks upstream and downstream from the monument. The NPS is prevented from fencing the sizeable riparian area within the monument because intense flooding would soon destroy any fence structures near the riverbed. A few areas where large tributary washes meet the Little Colorado River, such as Deadman Wash, may be far enough removed from flooding that they can be effectively fenced and restored to native riparian vegetation. Currently, the only human development within the floodplain at Wupatki is the Black Falls Crossing. Local Navajo residents cross the river at this location year-round, except during high water. Continual use and maintenance has caused ruts, erosion, and gradual widening of the crossing, which locally influences hydrology and sediment movement for less than 100 feet downstream within the river channel. The Black Falls Dam lies approximately 1/8 mile upstream from the crossing (Westheimer 1988). The dam silted in several years ago and now holds only a small amount of water. The riverbed crossing and dam have locally altered this reach of the Little Colorado River floodplain.

Under the No-Action Alternative, the reach of the Little Colorado River within Wupatki National Monument would remain within the backcountry area that is closed to general visitor access. There would be no visitor use or NPS operations impacts to wetlands, floodplains, or riparian resources along the river. The continued use of the Black Falls Crossing would likely have negligible to minor adverse impacts to existing wetlands, floodplains, and riparian habitat along the river. Continued livestock grazing along the Little Colorado River would likely have long-term, minor adverse

impacts to existing wetlands, floodplains, and riparian resources within the monument. The NPS is considering tamarisk removal and native riparian vegetation restoration above the 100-year floodplain at large tributary confluences, such as Deadman Wash. If successful, this action could have long-term, moderate beneficial impacts to riparian vegetation and wildlife, particularly birds, within the monument.

There are three natural springs within Wupatki National Monument: Peshlaki, Heiser, and Wupatki. All of them were used prehistorically and heavily modified historically by Navajo occupants, ranchers, and/or the NPS. The springs are likely the most severely impacted natural resources within the monument. Spring flows issue from a local, perched aquifer within the interbedded sandstone and shale of the Moenkopi Formation. Water flow at all three is believed to have steadily diminished during the 20th century-Wupatki Spring ceased flowing during the 1950s (possibly as a result of NPS efforts to stimulate its flow). The actual reasons for this are not known, but it is likely a combined result of long-term weather and vegetation change within the recharge area. The aquifer is recharged within the area of heavily fractured surface basalts from Woodhouse Mesa southward of the monument boundary at least five miles to the Strawberry Crater area. Most of the recharge area is managed by the U.S. Forest Service. The NPS is participating in the local planning process for the Coconino National Forest to address concerns that land use and vegetation condition within the recharge area may adversely affect spring flows.

Heiser Spring has documented reliable flow and reported good quality water. Two spring-boxes are installed in the spring, and water is piped approximately 1 1/4 miles away to a Navajo property

inholding for domestic livestock use. No surface water is available to wildlife at the spring site. Except for a stressed willow and cottonwood tree, there is no riparian vegetation. The NPS is planning to eventually restore Heiser Spring, including removing containment and diversion structures, restoring original contours, and planting riparian vegetation.

Peshlaki Spring is the only remaining perennial spring with available surface water for wildlife within the monument. The spring has little to no measurable surface flow and water quality is usually described as good. There is a historic spring-box and animal trough system. Otherwise, surface water is typically available only if a shallow basin is dug and maintained. A few cottonwood trees grow around the base of the spring. In the soil saturation zone above the spring, *Phragmites communis* grows over approximately 750 square feet. This is the only obligate wetland plant species recorded within Wupatki. Although extremely limited in area, Peshlaki Spring may meet jurisdictional wetland criteria.

Five major intermittent drainage systems traverse the eastern half of the monument-Citadel Wash, Antelope Wash, Doney Mountain Wash, Deadman Wash, and Kana-a Wash. Except for their respective confluences with the Little Colorado River, none would be considered riparian habitat. The dry washes are subject to infrequent, but intense flash flooding. Except for a few primitive road crossings, there are no NPS facilities within the intermittent drainage floodplains. Continued NPS management under the No-Action Alternative would have negligible impacts to intermittent drainage floodplains.

There are a few human-made earthen stock tank impoundments within the monument, which are left over from former ranching operations. These

continue to function as sources of drinking water for wildlife and seasonally harbor some aquatic insects and common amphibian species. Several abandoned gravel and cinder quarries also seasonally hold water, which is used by wildlife, including pronghorn. The NPS is planning to selectively restore natural conditions at some of the abandoned materials quarries, which would have negligible impacts to wetlands, floodplains, and riparian resources within the monument.

CUMULATIVE EFFECTS

The geographic area used in the consideration of cumulative effects includes the western portion of the Little Colorado River watershed and is bounded on the south by the Mogollon Plateau and Clear Creek, the Little Colorado River and Painted Desert on the east, and the San Francisco Peaks and Coconino Plateau on the west.

The primary wetland, floodplain, and riparian area in Wupatki National Monument is the Little Colorado River. Cumulative effects to the river are largely the result of land management within the river watershed, which the NPS has little ability to control. More than a century of heavy livestock grazing within the watershed and manipulation of the river system by impoundments has severely affected the hydrology, water quality, aquatic fauna, and riparian vegetation along the entire river. NPS management along the river is hampered by local Navajo livestock grazing—there is no feasible method to prevent livestock from reaching riparian areas within the monument without encroaching upon sovereign tribal reservation lands on the opposite bank. This results in cumulative long-term moderate adverse impacts to riparian vegetation and wildlife, particularly birds, within the monument. Some of these impacts may be offset by NPS proposals to control tamarisk and restore native riparian vegetation at

major tributary confluences along the river. Continued use of the Black Falls Crossing would not likely cause any cumulative effects to existing wetlands, floodplains, or riparian resources at the crossing site.

All three of the natural springs in Wupatki National Monument have been severely impacted by historic ranching and NPS operations. Water flow at all three is believed to have steadily diminished during the 20th century—Wupatki Spring ceased flowing during the 1950s (possibly as a result of NPS efforts to stimulate its flow). The actual reasons for this are not known, but it is likely a combined result of long-term weather and vegetation change within the recharge area. The aquifer is recharged southward of the monument boundary on lands managed by the U.S. Forest Service. The NPS is participating in the local planning process for the Coconino National Forest to address land uses and vegetation conditions that may adversely affect spring flows. The proposed restoration of natural conditions to Heiser Spring should have a moderate beneficial impact to wildlife, particularly pronghorn.

CONCLUSION

Historic and continuing land use within the Little Colorado River basin and manipulation of the Little Colorado River through impoundments have severely impacted wetland, floodplain, and riparian resources within Wupatki National Monument. Under the No-Action Alternative, the reach of the Little Colorado River within the monument would remain within the backcountry area that is closed to general visitor access. The Black Falls Crossing Road would continue to be used as an NPS administrative road and by local Navajo residents. Livestock would continue to graze on both riverbanks within the 100-year floodplain through the monument

because no fence structure would survive floods of this magnitude. The NPS is considering tamarisk removal and native riparian vegetation restoration above the 100-year floodplain at large tributary confluences, such as Deadman Wash. The No-Action Alternative would likely have negligible to minor impacts to existing wetlands, floodplains, and riparian resources along the Little Colorado River.

Historic ranching and NPS management actions have severely impacted the only three springs within the monument. Under the No-Action Alternative, Peshlaki Spring and Heiser Spring would remain within the backcountry area that is closed to general visitor access. There would be no visitor use or NPS operations impacts to the springs. Short-term continued diversion and livestock use of Heiser Spring would not change existing wetland or riparian habitat conditions. The NPS proposal to eventually restore early historic conditions at Heiser Spring would have long-term, moderate beneficial impacts to wetland and riparian resources within the monument. Water flow at the springs is believed to have steadily diminished during the 20th century, likely from combined long-term weather and vegetation change within the recharge area. The NPS would coordinate with the U.S. Forest Service to address potential impacts to the recharge area in the Coconino National Forest.

In addition, there would be other, less severe effects as a result of implementing this alternative.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Wupatki National Monument; (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 relevant National Park Service planning

documents, there would be no impairment of the park's resources or values.

Effects Of Alternative 1: Limit Motorized Sightseeing And Focus On Extended Learning

IMPACT ANALYSIS

Alternative 1 would provide for increased level of dispersed hiking within the Guided Adventure Zone, including overnight hikes to Crack-in-Rock Pueblo. Increased visitor use would likely have negligible impacts to intermittent drainage floodplains along the hiking route.

The new campground near Heiser Spring would be developed within an abandoned employee housing area. The spring and housing area has been heavily impacted by historic ranching and NPS use, and building the campground would avoid direct impacts to wetlands and riparian habitat. In addition to the campground and limited overnight visitor use, increased visitor use within the area Extended Learning Zone around Heiser Spring would interfere with NPS efforts to restore native riparian vegetation and surface flow to the spring. The spring is one of only two perennial surface water sources within the monument. Limited overnight visitor use around the campground and sustained visitor use within the Extended Learning Zone would result in localized secondary impacts to the spring, such as vegetation trampling or introduction of nonnative species. The actual amount of disturbance is difficult to quantify, and would depend upon the timing, frequency, and size of visitor groups. The proposed campground and learning zone around Heiser Spring would likely cause long-term, moderate adverse impacts to

wetlands and riparian habitat within the monument.

The remaining actions proposed under Alternative 1 would have the same impacts as those identified for the No-Action Alternative.

CUMULATIVE EFFECTS

The geographic area used in the consideration of cumulative effects includes the western portion of the Little Colorado River watershed and is bounded in the south by the Mogollon Plateau and Clear Creek, the Little Colorado River and Painted Desert on the east and the San Francisco Peaks and Coconino Plateau on the west.

The combined new campground and Extended Learning Zone would likely deter NPS efforts to restore Heiser Spring, resulting in cumulative effects to wetlands and riparian habitats within the monument. Cumulative effects from the remaining actions would likely be the same as under the No-Action Alternative.

CONCLUSION

The impacts to wetlands, floodplains, and riparian habitats would be the same as identified for the No-Action Alternative, except increased visitor activity around Heiser Spring would potentially deter NPS efforts to restore wetlands and riparian habitat at the spring.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Wupatki National Monument; (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 relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects Of Alternative 2: Emphasize Motorized Sightseeing And Resource Protection Through On-Site Education

IMPACT ANALYSIS

Alternative 2 proposes to increase the level of vehicle access to Crack-in-Rock Pueblo via the existing primitive road. This would likely result in increased impacts where the road crosses the floodplains of intermittent drainages, including Antelope and Citadel washes. Anticipated impacts include increased rutting of drainage channel banks and bank and wash bottoms.

Under Alternative 2, the Black Falls Crossing Road would also be opened to visitors. This could result in an increased number of vehicles crossing at the Little Colorado River, which would have a negligible to long-term, minor adverse term impacts on the river floodplain.

The remaining actions proposed under Alternative 2 would have the same impacts as under the No-Action Alternative.

CUMULATIVE EFFECTS

The cumulative effects upon wetlands, floodplains, and riparian habitats would be the same as those described for the No-Action Alternative, with the following exception:

Increased vehicle-use across and through reaches of intermittent drainage systems within Wupatki could lead to the establishment of multiple ruts and crossings, resulting in slight cumulative effects to floodplains within the monument.

CONCLUSION

Except for the impacts of increased vehicle use on intermittent drainage

channels and floodplains, the impacts to wetlands, floodplains, and riparian habitats would be the same as under the No-Action Alternative.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Wupatki National Monument; (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 relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects Of Alternative 3 (Preferred): Preserve Sensitive Park Resources While Diversifying The Range Of Visitor Experiences

IMPACT ANALYSIS

Alternative 3 would provide for increased levels of dispersed hiking within the Guided Adventure Zone, including overnight hikes to Crack-in-Rock Pueblo. Increased visitor use would likely have negligible impacts to intermittent drainage floodplains along the hiking route.

A new, self-guided trail would be established between Wupatki and Wukoki Pueblos, which would follow along the channel bottom of Deadman Wash. Significant unguided visitor use of the trail is anticipated, which would cause long-term, minor adverse impacts to the wash from trampling and local disruption of the open channel.

The remaining actions proposed under Alternative 3 would have the same impacts as are identified for the No-Action Alternative.

CUMULATIVE EFFECTS

The cumulative effects upon wetlands, floodplains, and riparian habitats would be the same as under the No-Action Alternative.

CONCLUSION

Except for the impacts of increased visitor use on intermittent drainage channels and floodplains, the impacts to wetlands, floodplains, and riparian habitats would be the same as under the No-Action Alternative.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Wupatki National Monument; (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 relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects Of Alternative 4: Emphasize Integrated Story Between The Parks And Minimize Development

IMPACT ANALYSIS

Under Alternative 4, the Black Falls Crossing Road would be abandoned and restored to natural vegetation and wildlife habitat. This would render the crossing on the Little Colorado River obsolete. As much as 300 square feet of the river channel that is currently impacted by vehicles crossing the river would be allowed to naturally recover, resulting in a negligible to long-term, minor beneficial impact on wetlands, floodplains, and riparian habitat. This benefit might be offset because the NPS could no longer access the river area with

vehicles, and a nearby area of Deadman Wash proposed for tamarisk control projects would become more expensive and require more time to accomplish.

Alternative 4 proposes to increase the level of vehicle access to Crack-in-Rock Pueblo via the existing primitive road. This would likely result in long-term, minor adverse impacts where the road crosses the floodplains of intermittent drainages, including Antelope and Citadel washes. Anticipated impacts include increased rutting of drainage channel banks and bank and wash bottoms.

A new, self-guided trail would be established between Wupatki and Wukoki Pueblos, which would follow along the channel bottom of Deadman Wash. Significant unguided visitor use of the trail is anticipated, which would cause long-term, minor adverse impacts to the wash from trampling and local disruption of the open channel.

The remaining actions proposed under Alternative 4 would have the same impacts as those identified for the No-Action Alternative.

CUMULATIVE EFFECTS

The cumulative effects upon wetlands, floodplains, and riparian habitats would be the same as those identified for the No-Action Alternative, with the following exceptions:

The abandonment and restoration of the Black Falls Crossing Road would render the Black Falls Crossing obsolete, which would have a beneficial cumulative impact on wetlands, floodplains, and riparian habitat along the Little Colorado River.

Increased vehicle use across and through reaches of intermittent drainage systems along the Crack-in-Rock Road could lead to the establishment of multiple ruts, tracks, and crossings, resulting in slight

cumulative effects to floodplains within the monument.

CONCLUSION

Under Alternative 4, the Black Falls Crossing Road would be abandoned, rendering the Little Colorado River crossing obsolete and having a negligible to long-term, minor beneficial impact to wetlands, floodplains, and riparian habitat along the river. This benefit might be offset because proposed NPS tamarisk control projects nearby at the Deadman Wash confluence would become more expensive and require more time to accomplish. Increased vehicle use along the primitive Crack-in-Rock Road would likely result in long-term, minor adverse impacts where the road crosses the floodplains of intermittent drainages, including Antelope and Citadel washes. Visitor use upon the proposed Wupatki-Wukoki trail would have a negligible to long-term, minor adverse impact to approximately one mile of the intermittent floodplain within Deadman Wash. Most of the remaining impacts to wetlands, floodplains, and riparian habitats would be the same as those identified for the No-Action Alternative.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Wupatki National Monument; (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 relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Irreversible/Irretrievable Commitments Of Resources

Under the various proposed management alternatives, there would be no irreversible or irretrievable commitments of wetlands, floodplains, or riparian habitats.

Loss In Long-Term Availability Or Productivity Of The Resource To Achieve Short-Term Gain

Under the various management alternatives, no long-term loss of availability or productivity of wetlands, floodplains, or riparian habitats is proposed to achieve short-term gain. Under all of the alternatives except for Alternative 1, riparian resource conditions, especially at the two remaining perennial springs at Wupatki, would be maintained or improved over the long term. Under Alternative 1, the NPS would still attempt to restore Heiser Spring, but these efforts might be deterred in order to accommodate more convenient visitor activities within the monument.

Unavoidable Adverse Impacts

Historic and current land use within the Little Colorado River Basin has severely degraded riparian resources along the river. Historic ranching and NPS operations have severely impacted the only three perennial springs within Wupatki National Monument. The various proposed management alternatives would result in no major

impacts to wetlands, floodplains, or riparian habitats in Wupatki National Monument. None of the alternatives would result in the loss of jurisdictional wetlands or any impairment of floodplain function. Under the various management alternatives, proposed road system and visitor access changes would have negligible to locally minor impacts upon intermittent drainage channels and floodplains. Local Navajo residents would continue to use the Black Falls Crossing Road under all the alternatives except Alternative 4. Alternatives 2 and 4 would increase the level of vehicle use along the primitive Crack-in-Rock Road, which could result in multiple sets of ruts and crossings in the main dry wash floodplains. Under all of the alternatives, riparian resource conditions, especially at the two remaining perennial springs at Wupatki, would be maintained or improved over the long term.

ABILITY TO EXPERIENCE PARK RESOURCES.

This topic includes analysis of the following broad areas: access to park resources by the general public and by visitors with disabilities; access to information provided by collections (ability to see the "real thing") and to a minimally altered environment; and the ability of the public to understand park resources and the regional context of the park. Also considered were the ability to exercise personal freedom during a park visit, the provision of traditional employee/visitor experiences (interpretation through personal services and access to favorite sites), and the ability to participate in traditional recreational activities (biking, climbing, hiking, etc.).

Methodology

Visitor surveys and personal observation of visitation patterns combined with

assessment of what is available to visitors under current management were used to estimate the effects of the actions in the various alternatives. The impact on the ability of the visitor to experience a full range of park resources was analyzed by examining resources identified in the park significance statement.

Negligible: The impact is barely detectable, and/or will affect few visitors.

Minor: The impact is slight, but detectable, and/or will affect some visitors.

Moderate: The impact is readily apparent and/or will affect many visitors.

Major: The impact is severely adverse or exceptionally beneficial and/or will affect the majority of visitors.

Effects Of The No-Action Alternative: Existing Conditions

IMPACT ANALYSIS

Access to Park Resources by the General Public and by Visitors with Disabilities

Under current management visitors enter Wupatki primarily from the south, after visiting Sunset Crater Volcano National Monument, although approximately 20% come from the north via US89 and receive little park orientation prior to entering. Four developed visitor use areas containing seven "hardened" archeological sites are open to the public, as well as the Doney Mountain picnic area, located on USFS lands. These sites are reached by short trails from parking lots along the paved park road. Periodic guided hiking trips are offered into the park backcountry that afford an opportunity to visit archeological sites that have had less treatment or development.

Accessibility for visitors with physical challenges is limited. A portion of the Wupatki Pueblo trail is accessible, as is the visitor center. The rest rooms are not up to standard.

There are no long hiking opportunities available in the park; bicyclists are the primary recreation users in the monument, and both organized and personal bicycle trips occur on a regular basis. Other recreational activities, such as rock-climbing or cross-country exploration, are not offered. Many recreational activities are available on nearby USFS lands.

Crowding is not a serious issue at this time. People who visit at any time other than peak hours during spring and summer months can have uncrowded experiences.

The activities that occur at Wupatki are representative of what has been allowed for many years of management, with the exception of the late 1980s to mid-1990s, when unguided backcountry access was allowed by permit.

The scenic loop drive is integral to most visits and lends itself to inclusion with other travel plans.

The impact is long term, moderate, and beneficial.

Access to Information Provided by Collections (Ability to See the "Real Thing") and to a Minimally Altered Environment

A few artifacts are on display at the visitor center at Wupatki. Some have been removed from the visitor center because of cultural sensitivity or inadequate curatorial protection. Exhibit rehabilitation will provide the opportunity to increase the number of artifacts on display.

Although there have been alterations to the environment by the NPS, ranchers,

and others, the overall sense is that of a relatively pristine landscape. Views of geologic features and scenic vistas are available from the roads and trails. Few unnatural sounds intrude upon the area.

Night skies are spectacular, but viewing is limited since the park trails are closed informally at sunset. A few visitors undoubtedly enjoy the skies as they travel through the park at night.

The impact is long term, moderate, and beneficial.

Ability of the Public to Understand Park Resources and the Regional Context of the Park

The public facilities offer an opportunity to gain an overview of the cultural resources, with little attempt to encourage extensive visits of long duration. Non-personal service interpretation is accomplished through a variety of media, including wayside exhibits, site bulletins, and museum displays. Recent media explain the regional connections of Wupatki to other areas, but the older visitor center exhibits are lacking in this area. Replacement of outdated or insensitive exhibits is planned. Personal service interpretation is available at the visitor center and periodically on the trails.

School group visits are common, but generally are of short duration.

The impact is long term, moderate and beneficial.

CUMULATIVE EFFECTS

The geographic area being considered for cumulative effects for this alternative includes the Flagstaff Area National Monuments, the greater Flagstaff Area, and the most adjacent portions of the Coconino National Forest and the Coconino Plateau Natural Reserve Lands (CPNRL).

The limitation of vehicle access into portions of the USFS lands to the south as part of the FLEA planning process would potentially limit the range of visitor experiences, having a minor, long-term, adverse effect.

Increased tourism and growth of local communities, as well as the development of Roden Crater and the expansion of US89 will increase traffic and could result in more people looking for a side trip. Decisions at Grand Canyon that limit access by personal vehicle could increase the demand for that type of access at Wupatki. The combination of these factors along with this alternative could be major, adverse, and long term.

CONCLUSION

The No-Action Alternative encourages visits to Wupatki as part of an itinerary rather than a destination. The average stay by most visitors is relatively short and undermines their opportunity to experience a full range of resources and in-depth learning. The ability to drive the loop road through the two monuments and to experience the diversity of environment is highly valued.

The overall effect of the No-Action Alternative on access to park resources by the general public and by visitors with disabilities would be moderate and long term, with both beneficial and adverse elements as discussed.

The ability to see the real thing and the ability to experience a minimally altered environment would be changed moderately, with the preservation of the opportunity to make a loop drive and to visit a relatively complete visitor center exhibit. The ability to understand park resources and the regional context of the parks would be moderately beneficial, for the same reasons.

Most of the primary park resources are represented through the current

developed visitor use areas and the park visitor center. Special activities such as guided discovery hikes that allow access into the backcountry are not at a frequency level to allow most visitors the opportunity to take advantage of them, but the demand is relatively small. The primary method of conveying information is through non-personal service interpretation and contacts at the visitor center, which is open 364 days per year. Recreational opportunities are limited on NPS lands but are available on nearby USFS lands. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Wupatki National Monument; (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 relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects Of Alternative 1: Limit Motorized Sightseeing And Focus On Extended Learning

In this alternative, a slightly greater number and variety of sites would be open to visitors, with major changes in how visitors reach them. Fewer views of the grasslands would be available, but there would be more opportunity for intimate experiences with the natural resources throughout the park. Fewer people in some areas would mean natural soundscapes would be enhanced in those places, but this could result in some degradation in other more crowded locations. None of the park

would be available for self-guided experiences outside of Wupatki and Wukoki Pueblos, making it difficult, if not impossible to experience solitude in the monument. A primitive campground would be added to accommodate visitors who would stay overnight in the park as part of specific educational activities. A park residence would be converted for use as an educational center to facilitate in-depth learning.

IMPACT ANALYSIS

Access to Park Resources by the General Public and by Visitors with Disabilities

FR545 will be open only to the Wupatki Visitor center. Access to Lomaki and Citadel areas will be via guided tours. FR 150 will be closed to eliminate unregulated entry to the west end of the park. The Wukoki spur road will be realigned to meet FR545 north of the visitor center and the parking lot will be pulled back and the trail lengthened at that site. Ranger-led hikes will be taken into the Guided Adventure Zone, including the Crack-in-Rock area allowing visitors to view a variety of resources along the way.

This alternative will cause changes in the ways that visitors experience Wupatki. The alternative offers access to additional archeological sites and in-depth learning opportunities for visitors who are willing to devote additional time to participate in structured educational/interpretive activities (such as guided tours, guided backcountry hikes, workshops, and seminars). For these visitors, benefits would be moderate to major and long term.

In contrast, visitors with limited time or interest would have access to only two archeological sites (as opposed to four areas with seven sites currently). They might attend short interpretive

programs, but probably not the longer guided excursions beyond the visitor center. Under this alternative, the motorized sightseeing experience along the loop road beyond the visitor center would no longer be available. For these visitors, impacts would be moderate, adverse, and long term. Over time, visitors meeting this description would probably decrease, and impacts would decrease accordingly.

Visitors with disabilities would be affected in much the same way as they are under the No-Action Alternative. Visitors with disabilities could accompany the guided tours along the roadway to Lomaki and Citadel but would have little ability to use the trails. The trail access to Wukoki would be accessible to the base of the site but not to the pueblo itself.

Visitors with disabilities would likely benefit by the greater opportunity for personal service interpretation, which is relatively more accessible than media. The proposed campground would have accessible campsites, and the proposed education center would also be accessible.

The impact would be minor, long term, and beneficial.

Current conditions allow for relatively dispersed visitation of the Lomaki and Citadel areas. Guided access would put higher concentrations of visitors on the sites at the same time in order to accommodate scheduled trips. There could be more crowded conditions at Wupatki and Wukoki if greater numbers of visitors decide to limit their visits to these sites only. This would be a long-term, moderate, and adverse effect.

Those who stay in the primitive campground would have an excellent opportunity to enjoy uncrowded experiences. The number of people doing this would be relatively small. The effect

would be minor, beneficial, and long term.

An unknown in this alternative is how the restricted access to the north entrance will affect visitors' decisions regarding whether to visit the park at all. The loss of opportunity to explore the Lomaki and Citadel areas without a guide and to make a loop trip will be a major, long-term, adverse impact.

The main impact to recreation would be the loss of bicyclists' ability to use the road for unguided riding experiences. This would affect a relatively small population and would be a minor adverse effect of long-term duration.

The traditional activities of how employees interact with visitors at these sites would change drastically and would be a moderate impact, short term, with both beneficial and adverse aspects. It would be short term because employee turnover is such that within a few years there would be no employees who had participated in the earlier method of handling access, hence no "memory" of tradition.

Access to Information Provided by Collections (Ability to See the "Real Thing") and to a Minimally Altered Environment

New exhibits at the visitor center would likely include more artifacts on display as described in the No-Action Alternative.

The elimination or reduction of auto traffic through much of the park would likely increase wildlife sightings during the ranger-led excursions along FR545 and the Black Falls Crossing Road with a moderate long-term benefit.

Long vistas would be visible to visitors from the roads to Wupatki and Wukoki and on ranger-led excursions. The experience of observing natural and cultural resources along the Black Falls Crossing Road and the opportunity to see

species associated with a desert riparian area would no longer be available to park visitors wishing to explore the area on their own, but could be offered as part of a ranger-led activity.

The changes proposed for the road access to Wukoki would produce a quieter, less impacted setting for the Wukoki site. This would increase visitors' ability to experience natural soundscapes and view Wukoki in a more natural setting (increasing the opportunity to experience a minimally altered environment in terms of the setting for this archeological site). Cars would be eliminated for much of the length of FR545 and the Black Falls Crossing Road, except on guided sightseeing trips. The effect on those visitors able to spend longer periods of time in the park would be long term, beneficial, and moderate.

For the short-term visitor who does not participate in the extended learning activities, the effect would be long term, moderate, and adverse.

Enabling visitors to experience a night at Wupatki (at the primitive campground) could help them to better understand the physical and environmental conditions under which the prehistoric people lived. There would be increased opportunity to view nocturnal and crepuscular wildlife. Visitors would also be given the opportunity to experience the nighttime quiet if they were part of an activity that involved an overnight stay.

The presence of the campground would make astronomy programs possible, and archaeoastronomy could be discussed. Because of the relatively small number of visitors likely to take advantage of this opportunity, the effect would be a minor beneficial long-term one.

Ability of the Public to Understand Park Resources and the Regional Context of the Park

Guided road access to the Lomaki and Citadel areas would allow an increased level of personal services interpretation and a more in-depth experience than does the current unguided access. Those visitors who are able to participate would have a far greater opportunity to gain an understanding of the significance of the park's resources. The addition of guided tours and educational activities will result in a moderate long-term, beneficial impact for those visitors able to take part in the longer-term activities.

As in the No-Action Alternative, visitor center displays would be expanded and improved to include more interpretation and examples of the park's resources and all major park themes. A new educational center would have interpretive media that would greatly enhance visitors' ability to understand most park resources and would be geared to visitors interested in more in-depth learning experiences. The displays would include more artifacts and hands-on and interactive exhibits than under the No-Action Alternative. The themes addressed would include reference to the regional context of the park. The overall effect would be especially beneficial to school groups. The effect would be long term, moderate, and beneficial.

CUMULATIVE EFFECTS

The geographic area being considered for cumulative effects for this alternative includes the Flagstaff Area National Monuments, the greater Flagstaff Area, and the adjacent portions of the Coconino National Forest and the Coconino Plateau Natural Reserve Lands (CPNRL).

This alternative would make Wupatki a destination rather than part of an

itinerary and would lengthen the stay of the average visitor to enhance their opportunity to experience a full range of resources. This would be accomplished through major changes in the transportation alternatives.

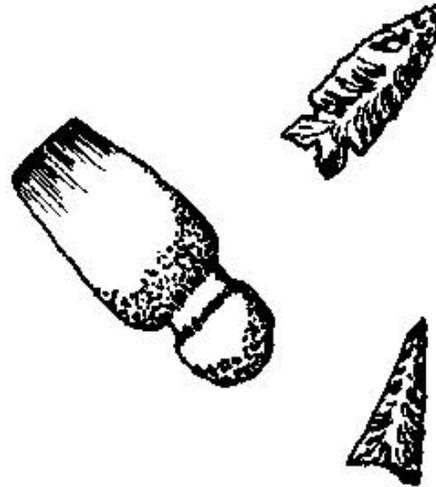
The inclusion of new lands to the north within the monument would open up new opportunities for visitors to experience a full range of resources. The effect would be long term, beneficial, and moderate.

The limitation of vehicle access into portions of the USFS lands to the south would potentially limit the range of experiences. The effect would be minor, long term, and adverse.

Increased tourism and growth of local communities as well as the development of Roden Crater could be at odds with the limitation of the drive-through experience. The expansion of US89 will increase traffic along the west end of Wupatki and could result in more people looking for a side trip.

Decisions at Grand Canyon that would limit access by personal vehicle could increase the demand for that type of access at Wupatki. These factors in combination with this alternative could have major, adverse, and long-term effects.

NPS efforts to make Wupatki a destination park and provide greater opportunity to experience a greater range of resources could be contrary to some actions being taken by other entities and supported by the actions of others. An alternative that would likely reduce the number of visitors could face opposition from tourism and transportation interests. The sum of these actions would still have a moderate, long-term, beneficial effect on visitors' ability to experience park resources.



CONCLUSION

The overall effect of Alternative 1 on access to park resources by the general public and for visitors with disabilities would be moderate. It would have both beneficial and adverse elements, as previously discussed.

The ability to understand park resources and the regional context of the parks would be affected moderately in a beneficial way.

This alternative would change the way visitors encounter park resources. Elimination of the drive-through experience would have a significant impact on regional visitors. The experience would be more educational for those visitors who take advantage of the opportunity.

The emphasis on Wupatki as a destination park, with most experiences occurring under the guidance of a park staff member, would assist visitors in gaining a greater understanding of the significance of the park.

There would be a greater opportunity to experience natural soundscapes. More kinds of ecological resources would be open to the public within the monument than under the No-Action Alternative.

Because guided tours are more time-consuming, fewer visitors would be likely to access areas that would be available only on guided tours. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Wupatki National Monument; (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 relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects Of Alternative 2: Emphasize Motorized Sightseeing And Resource Protection Through On-Site Education

In this alternative a greater number of archeological sites would be open to visitors. There would be fewer opportunities for intimate experiences with the natural resources throughout the park, because most resources would be experienced by vehicle. Natural quiet would be degraded, as motorized access increases. The drive-through experience available under existing conditions would continue, and visitors would be able to get a cursory look at the park, if they so desired. A more in-depth experience would be available for those who chose to attend ranger programs and read waysides and other interpretive media. None of the park would be available for self-guided experiences outside of the four front-country areas containing seven archeological sites and the Doney Mountain picnic area, making it difficult

if not impossible to experience solitude in the monument. Monument boundary expansions in the Crack-in-Rock area would allow better access for guided motorized trips, thereby increasing the availability of this resource to park visitors. The existing visitor center would be closed, and the staff would be redistributed to the archeological sites that would be open to visitation. A small visitor contact station would be constructed at the north entrance to orient visitors as they arrive.

IMPACT ANALYSIS

Access to Park Resources by the General Public and by Visitors with Disabilities

FR545 access would remain open 24 hours a day with 2-way traffic and nighttime closures at the front-country visitor use areas. Access to the Crack-in-Rock area would be through guided motorized trips and short hikes. More visitors would be able to visit the sites along the Crack-in-Rock Road loop. Visitors would no longer be allowed to visit the Crack-in-Rock area via guided overnight hikes.

Discovery hikes into the park backcountry would no longer be offered. There would be no change in the way that visitors access the four archeological areas containing seven archeological sites, or Doney Mountain picnic area, with the exception of Wukoki, which would have a longer trail access after relocation of the parking lot away from the site.

The overall effect on the majority of visitors would be moderate, long term, and beneficial.

Motorized trips to Crack-in-Rock would allow people with mobility impairments to view at least some of the sites from their vehicles. Access to other sites would not change. The effect would be long

term and minor, and there would be both beneficial and adverse effects.

Under this alternative, visitors would no longer be able to experience many of the pueblo sites that would be characterized as minimally altered via discovery hikes. Crack-in-Rock would remain available via motorized tours and would enhance some visitors' ability to see a minimally altered site.

Since the trips would be motorized, visitors would be exposed to the sights and sounds of vehicular traffic until the excursion stopped. Then the experience would be one of viewing pueblos in a relatively pristine natural setting with long vistas. The likelihood of viewing wildlife would be high. Noise pollution (once the vehicles have stopped) would be minimal. Some of the sense of discovery experienced on the traditional Crack-in-Rock hikes would be lost, and sites encountered along the hiking route would not be available on the motorized route.

The overall effect would be minor (owing to the relatively small number of visitors affected) and long term, and there would be both adverse and beneficial effects.

There would be no change from the No-Action Alternative regarding recreational opportunities.

Access to Information Provided by Collections (Ability to See the "Real Thing") and to a Minimally Altered Environment

Much less physical evidence in the form of artifacts on display would be available for visitors to experience with the loss of visitor center/museum facilities.

Little of the evidence from Navajos, ranchers, and CCC is present in the sites that would be open to the public. Visitors with disabilities, who might be best accommodated in a museum setting,

would have fewer items available for viewing.

An increase in the number of overnight excursions to Crack-in-Rock could enhance night sky viewing.

Only those visitors who attended ranger programs would be likely to get detailed comparisons of the artifacts left by the separate cultures of Wupatki.

The overall effect on visitors would be moderate, long term, and adverse.

Ability of the Public to Understand Park Resources and the Regional Context of the Park

The construction of a small visitor contact station at the north entrance to the park would allow the approximately 20% of visitors who enter from that direction to gain a brief introduction to park resources as they enter the park. The major park themes could be addressed, and park rules and regulations would be provided. Visitors would have a greater opportunity to understand the park resources. Visitors entering from the south would receive orientation from the Sunset Crater Volcano visitor center. The benefit would be moderate and long term.

Visitors would not have as great an opportunity to understand and experience the elements of the stories and resources of Wupatki that are typically interpreted in museum displays. The closure of the visitor center would have moderate, long-term, adverse consequences for many that learn regional context and other themes from exhibits and other media.

Closure of the visitor center would allow the park to more fully staff the pueblo sites along FR545 and to provide more ranger-led activities. Increased personal interpretation would enable visitors to learn about the resources on-site. This would likely lead to a greater

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understanding of the significance of the resources visible at these sites. This would in part offset the loss of the museum experience.

The closure of the visitor center and redistribution of employees would represent a major departure from the way that visitors have enjoyed the park and how employees have divided their duties. Operation of the orientation/contact station at the north entrance would also be a change. Although there could eventually be beneficial elements, the effect on traditional experiences for current employees would likely be viewed as moderate, adverse, and short term. In the long term, employee turnover would be such that the new approach would no longer be in conflict with tradition.

These activities would not reach as many visitors as current conditions. The effect for visitors who take advantage of the long-term opportunities would be moderate, long term, and beneficial. For those who do not, it would be moderate, long term, and adverse.

Because discovery hikes tend to be small groups that are led to seldom-visited sections of the park, they provide a particularly effective setting for visitors who wish to learn more about the park. This opportunity would no longer exist under this alternative, constituting a minor adverse impact on park visitors, because the number of people who attend discovery hikes other than the Crack-in-Rock tours is small under existing conditions.

New waysides along the Black Falls Crossing Road would interpret Navajo history and would provide a minor, long-term benefit.

CUMULATIVE EFFECTS

The geographic area being considered for cumulative effects for this alternative

includes the Flagstaff Area National Monuments, the greater Flagstaff Area, and the adjacent portions of the Coconino National Forest and Coconino Plateau Natural Reserve Lands (CPNRL).

This alternative emphasizes motorized sightseeing and shifts educational emphasis away from a centralized facility and disperses it to various sites within the park. It would also likely provide a greater degree of protection of archeological sites through NPS presence.

The inclusion of new lands within the monument to the north (Coconino Plateau Natural Preserve Lands) would open up new opportunities to experience a full range of resources, which would be a long-term, moderate, beneficial effect.

Closure of roads on USFS lands could increase the demand for motorized sightseeing on the monument. This effect would be minor, long term, and adverse. An increased number of outfitter guides could be interested in providing motorized access to Crack-in-Rock, which would have a minor, beneficial, long-term effect on visitor experience.

Improvements to US89, development of Roden Crater, promotion of the monuments by the city of Flagstaff, and general population increases could bring more visitors to the area who are interested in side trips and motorized sightseeing. Restriction of private vehicle traffic at Grand Canyon could increase the demand for alternative motorized sightseeing experiences in the monument. This would have a moderate, adverse, long-term effect.

The emphasis of this alternative to make motorized sightseeing available to visitors would seem to be compatible with many other projects that are in progress. However, the expected increase in motorized traffic could easily put such values as natural quiet, minimally altered environment, and ability for visitors to

understand the park's significance at risk through overcrowding. The closure of the visitor center and relocation of staff to the sites would result in significantly less visitor contact, although all visitors would receive some interaction with the NPS at either the Sunset Crater Volcano visitor center or the new contact station at the north entrance of Wupatki.

CONCLUSION

Visitors would have an opportunity to experience more variety of resources on-site within park boundaries in this alternative compared with the No-Action Alternative. More restrictive uses of lands previously under other jurisdictions would decrease the ability of visitors to experience resources related to park significance. Combined with more restrictions on visitation of public lands throughout the region, the impact to visitor experiences is one of decreased ability to view as much of the resources.

Some new areas would be open to visitors on ranger-led programs. Through interpretation, these programs would allow access to more of the tangibles (grasslands, archeological sites) and intangibles (oral histories, contemporary tribal affiliations with the cultural and natural resources of the park, etc.) of the Wupatki landscape and cultures than in the No-Action Alternative.

In combination with actions being taken outside of the park, an increase in visitation seems likely under this alternative.

In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

Effects Of Alternative 3 (Preferred): Preserve Sensitive Park Resources While Diversifying The Range Of Visitor Experiences.

This alternative emphasizes diversification of visitor experience while preserving sensitive park resources. Land management objectives for areas outside of the monument would be accomplished through partnerships and cooperation. Motorized sightseeing would remain the same as under the No-Action Alternative, and FR545 would remain open 24 hours a day, although individual sites would be gated at night. Visitor orientation would occur both at a new contact station at the north entrance near US89 (to contact visitors before they interact with park resources) and at the existing visitor center. Guided hikes would continue, and new trails and media would be introduced.

IMPACT ANALYSIS

Access to Park Resources by the General Public and by Visitors with Disabilities

Access to most of the park resources would remain unchanged from existing conditions. New access would occur into the northern expansion (Coconino Plateau Natural Reserve Lands), via a trail from the Lomaki area, allowing visitors to experience a portion of the grasslands of the park. A trail from the visitor center to Wukoki Pueblo would also be added. The Black Falls Crossing Road would be open to administrative uses only (which will include local access to the Navajo reservation and the possibility of guided activities), and USFS lands to the south of the monument would still be open to the public under USFS ownership. A Guided Adventure Zone would allow guided hikes into undeveloped areas of the

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monument. On balance, the benefit would be long term and moderate.

Accessibility would remain roughly the same as it is under the No-Action Alternative. The only changes from existing conditions relative to recreational opportunities would be the addition of two hiking opportunities. The benefit would be long term and moderate.

Access to Information Provided by Collections (Ability to See the "Real Thing") and to a Minimally Altered Environment

There would be no change from existing conditions relative to viewing of artifacts.

The new trails into the Wupatki grasslands and the trail to Wukoki would open new opportunities for visitors to experience these resources. People would also be exposed to new vistas and have a somewhat greater ability to experience natural soundscapes. The impact would be long term, minor to moderate, and beneficial.

There would be no change from existing conditions relative to the viewing of night skies.

Experiencing natural soundscapes would be slightly enhanced, because visitors would be able to access quiet areas of the park, away from sounds associated with the developed areas, on the new trails. This opportunity would be hindered by the closure of the Black Falls Crossing Road to public entry. This would not provide a benefit for visitors with mobility impairments. Overall impact would be minor, long term, and beneficial.

Ability of the Public to Understand Park Resources and the Regional Context of the Park

The construction of a contact station at the north entrance to Wupatki would be

beneficial in contacting the approximately 20% of visitors entering through that entrance.

The opening of a portion of the grassland area for visitation would provide visitors with new opportunities to see natural resources. Because this area is away from some of the more heavily traveled areas of the park, this might increase visitors' opportunities to see native flora and fauna. This would be a long-term, minor, beneficial change for visitors, depending on how many visitors walked the trail.

There would be negligible change from existing conditions regarding traditional employee experiences.

CUMULATIVE EFFECTS

The geographic area being considered for cumulative effects for this alternative includes the Flagstaff Area National Monuments, the greater Flagstaff Area, and the adjacent portions of the Coconino National Forest and the Coconino Plateau Natural Reserve Lands (CPNRL).

The availability of CPNRL would have limited impact in this alternative, because most of the land would not be available for visitor experience, at least in the short term. The short-term impact would be negligible.

Increased traffic could be expected with the combination of road improvements on US89, general increases in tourism, promotion and new policies on USFS land and at Grand Canyon that could create new demand for access to the natural and cultural resources at Wupatki, and motorized sightseeing.

The actions proposed in this alternative, in combination with identified external issues, would likely result in minor effects on visitors. The most likely effect would be increased visitation with greater ease of transportation and greater demand.

Access to a wide variety of park resources under this alternative would not change significantly from that available under the No-Action Alternative.

CONCLUSION

Within the park boundaries, visitors would have access to all of the park resources that are available under existing conditions, with the exception of the Black Falls Crossing Road. Visitors would have added access to the new trail to Wukoki and the grasslands near Lomaki.

With enhanced interpretation, visitors would gain a greater understanding of all park resources, including those on expanded lands, although many of the parks' resources would be off limits to visitation. The overall impact to visitors' experience of the park resources would be long term and beneficial, but minor.

In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Wupatki National Monument; (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 relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects Of Alternative 4: Emphasize Integrated Story Between The Parks And Minimize Development

This alternative would restructure the way that visitors enter and experience Wupatki. All visitors would enter through Sunset Crater Volcano and exit through

Wupatki. Development, facilities, services, and orientation would be concentrated at Sunset Crater Volcano. As visitors move on toward Wupatki, they would be provided with fewer facilities and a more primitive experience and would find more pristine resource conditions with less development. Park boundaries would be expanded slightly to the south for better alignment with significant resources and, as in other alternatives, would be expanded to the north.

IMPACT ANALYSIS

Access to Park Resources by the General Public and by Visitors with Disabilities

Visitors would enter Wupatki via Sunset Crater Volcano. At the Wupatki visitor center location, they could either continue through Wupatki to the north entrance (one-way only) or return to Sunset Crater Volcano. Approximately 20% of visitors currently enter via the north entrance and would be adversely affected by this alternative. Providing guided motorized trips to Crack-in-Rock would allow a greater number of visitors access to this minimally altered environment; however, the experience would not expose visitors to as many of these types of resources as the overnight hikes do, and it would introduce vehicles into the area.

The closure of the Black Falls Crossing Road to visitation would eliminate it from visitor experience, meaning that significant parts of the Wupatki story (the history of Navajo use in the area, natural resources associated with a desert riparian and wash area) may not be seen by visitors. In this alternative the experience at Wupatki would be one of a very primitive setting, with few intrusions on the landscape. Visitors would have less opportunity to experience the full variety of resources within park

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boundaries in this alternative compared with the No-Action Alternative. The overall effect would be a major reduction in park resources available for visitation (the Black Falls Crossing Road would be closed, no museum facility at Wupatki would be available for display of park artifacts, and discovery hikes would be eliminated from various areas of the park).

The impact would be adverse, moderate, and long term.

Visiting Wukoki ruin would require a longer trail (accessible) to the site. Guided motorized tours to Crack-in-Rock would allow visitors with disabilities to reach the general area, but mobility impaired visitors would still not be able to reach the pueblo or petroglyphs. The loss of the visitor center would adversely affect visitors with disabilities, because they would no longer have access to information and resources that were provided there. The long-term adverse effects would be moderate.

The addition of guided motorized access to Crack-in-Rock and the new hiking trail access from the visitor center to Wukoki would increase opportunities to experience scenic and recreational pursuits. They would also help frame the regional context by allowing visitors to experience resources firsthand. The loss of two-way unrestricted access on the park loop road (FR545) would be a loss of a sightseeing opportunity for some. The closure of the visitor center would adversely impact many visitors' ability to understand regional context. The closure of the Black Falls Crossing Road to the public would be a minor adverse impact.

The overall impact of this alternative would be long term, adverse, and minor.

One-way travel beyond the Wupatki visitor center would restrict the choices available for many visitors. A guided motorized tour of Crack-in-Rock could be

viewed a less "free" experience to explore than the currently available overnight hikes. The overall effect would be moderate, long term, and adverse.

Generally there would be no change from existing conditions relative to uncrowded visitor experiences, with some opportunity provided by the new Wukoki Trail. The overall effect would be minor, beneficial, and long term.

The new hiking opportunity to Wukoki Ruin would provide a minor long-term recreation benefit.

Access to Information Provided by Collections (Ability to See the "Real Thing") and to a Minimally Altered Environment

No artifacts would be on display at Wupatki, because the visitor center would be closed in this alternative. Some artifacts could be on display at Sunset Crater Volcano, but the context would likely be lost on the visitor. The adverse impact would be long term and moderate.

Greater numbers of visitors would be able to access the Crack-in-Rock area and experience a minimally altered environment; however, the experience would not be as intimate as the existing overnight hiking opportunities, because people would use motor vehicles rather than hiking to get there.

Hiking trail access to Wukoki would allow interaction with a minimally altered environment in that area. The public would lose that opportunity along the Black Falls Crossing Road, because it would be closed to the public. The overall impact would be minor, with both adverse and beneficial long-term elements.

Opportunity to experience the night sky from Crack-in-Rock Pueblo would be eliminated. The opportunity to experience natural soundscapes would

decrease, because there would be no discovery hikes led to the more remote areas of the park. Crack-in-Rock tours would be guided motorized trips (instead of hiking). The motorized trips would allow visitors to experience natural quiet once they reach their destination and exit the vehicles. The overall effect would be minor, with both beneficial and adverse effects.

Ability of the Public to Understand Park Resources and the Regional Context of the Park

The closure of the visitor center would impact visitors' ability to gain an overview and understand the park resources; however, this loss would be offset by the placement of more staff on-site at the archeological features and by the orientation at Sunset Crater Volcano.

The visitor center at Sunset Crater Volcano would encompass major park themes for both monuments, and the one-way flow of traffic through Wupatki would mean that people would be oriented before visiting the park. The elimination of the Wupatki visitor center would result in more rangers available on-site to answer questions and lead programs, which would augment visitor understanding of both parks and the region. The overall long-term benefit would be moderate.

CUMULATIVE EFFECTS

The geographic area being considered for cumulative effects for this alternative includes the Flagstaff Area National Monuments, the greater Flagstaff Area, and the adjacent portions of the Coconino National Forest and Coconino Plateau Natural Reserve Lands. The acquisition or ability to use these lands would have a long-term, minor, beneficial effect because more visitors would have the opportunity to see a greater number and type of resources.

Closure of roads on USFS land through the FLEA planning process could increase demands on the park for motorized access. This alternative does not lend itself to the kind of experience that those users would be pursuing and would have a minor, long-term, adverse effect.

Marketing of the parks and general increased demands for access by local populations could be contradictory to the restrictions of road access, as could the development of US89 into a four-lane divided highway and the resultant pressure for side trips from that highway. The policies at Grand Canyon that are restrictive of personal vehicle access could also increase demand for an unrestricted access at Wupatki. The result could be a moderate, long-term, adverse impact.

The increased interest in outfitter guides could assist in providing motorized access to the Crack-in-Rock area. This would be a moderate, long-term, beneficial effect.

The actions proposed in this alternative, in combination with actions that are likely to occur outside of the park, would have a long-term, moderate, and adverse effect on visitors' ability to experience park resources.

CONCLUSION

The elimination of access to the Black Falls Crossing Road would eliminate this area from visitor experience, meaning that significant parts of the Wupatki story (the history of Navajo use in the area, the ecology of the river and its environs) would be more difficult to comprehend. However, guided trips to Crack-in-Rock would add opportunities to see sites that have not been stabilized or previously developed for visitation.

This alternative would cause a moderate adverse impact on visitors' ability to experience a full range of resources related to park significance. This would affect regional visitors as well. Because of

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the more primitive setting for Wupatki, regional visitors might be apt to stop at the Sunset Crater Volcano visitor center only, and not venture into Wupatki. They would then miss out on the views and other park resources available. This would be a minor to moderate effect on regional visitors.

In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Wupatki National Monument; (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 relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Irreversible/Irretrievable Commitments Of Resources

There would be no irreversible or irretrievable commitments of resources.

Loss In Long-Term Availability Or Productivity Of The Resource To Achieve Short-Term Gain

There would be no short-term gains affecting long-term productivity.

Unavoidable Adverse Impacts

Under the No-Action Alternative, the more recent media explain the regional connections of Wupatki to other areas, but the older exhibits are lacking in this area. There are no long hiking opportunities available in the park. Other recreational activities such as rock-

climbing or cross-country exploration are not offered. Most visitor experiences are self-guided. There are no opportunities within the park for unguided backcountry access.

Alternative 1 would change the way visitors encounter park resources. Many activities would be guided, resulting in a loss of personal freedom for visitors. Elimination of the drive-through experience would have a significant adverse impact on regional visitors. Because guided tours are more time-consuming, fewer visitors would be likely to access areas that would be available only on guided tours.

Under Alternative 2, the opportunity to experience natural soundscapes would decrease. More restrictive uses of those lands previously under state jurisdiction would decrease the ability of visitors to experience resources related to park significance within the boundary expansion. Combined with more restrictions on visitation of public lands throughout the region, the impact to visitor experiences would be one of decreased ability to view as much of the resources (in and outside of monument boundaries), compared with recent years. The closure of the visitor center would mean that fewer artifacts could be on display. Thus, only resources that could be seen on-site would be included in the visitors' experiences. Many kinds of artifacts would be excluded from the visitor experience.

There would be no adverse effects on the ability to experience park resources under Alternative 3.

Under Alternative 4, the elimination of access to the Black Falls Crossing Road would eliminate this area from visitor experience, meaning that significant parts of the Wupatki story (the history of Navajo use in the area, the ecology of the river and its environs) would be more

difficult to comprehend. This alternative would cause a moderate to major adverse impact on visitors' ability to experience a full range of resources related to park significance. This would affect regional visitors as well. Because of the more primitive setting for Wupatki, regional visitors might be apt to stop at the Sunset Crater Volcano visitor center only, and not venture into Wupatki. They would then miss out on the views and other park resources available. This would be a minor to moderate effect on regional visitors.

PARK NEIGHBORS; LOCAL, STATE, AND TRIBAL LAND MANAGEMENT PLANS; AND LAND/RESOURCE MANAGING AGENCIES

Methodology

Concerns covered by this section include effects on neighbors' access and emergency response, economic contribution of the park to local economies, access to culturally sensitive areas by traditional users, traditional land uses external to the boundary, and possible conflicts between the proposed action and local, state, or Indian tribal land use plans, policies, or controls. Levels of intensity of impacts on park neighbors are as follows.

Negligible: The impact is barely detectable and/or will affect few neighbors.

Minor: The impact is slight, but detectable, and/or will affect a minority of neighbors.

Moderate: The impact is readily apparent and/or will affect many neighbors.

Major: The impact is severely adverse or exceptionally beneficial and/or will affect the majority of neighbors.

Effects Of The No-Action Alternative: Existing Conditions

Most impacts resulting from this alternative would be of a positive nature to National Park Service (NPS) neighbors, American Indian tribes, and other land and resource managers. The monument is open 24 hours a day. Access within the monument from FR545 to the Coconino Plateau Natural Reserve Lands (CPNRL) (CO-Bar Ranch) north of the monument, the Navajo Reservation east of the monument, and Forest Service lands south of the monument are unrestricted. Keeping the road open has major, long-term benefits to forest users, to the residents living between the two monuments, and to those traveling to the Navajo Reservation via FR545.

Shared projects with the Arizona Game and Fish Department are focused on preserving wildlife and habitat, and result in minor, adverse long-term impact to that agency in terms of wildlife management workloads, but beneficial, minor, long-term impacts relative to their mission in sustaining healthy wildlife populations.

The alternative accommodates American Indian access to traditional cultural resources within the monument, resulting in major, long-term, beneficial, impacts to those users.

Cooperative efforts with the Forest Service have major, long-term beneficial impacts in terms of joint law enforcement, resource management and protection, and visitor services. The NPS is available to respond to wildfire situations in the immediate area pending the availability of Forest Service personnel, resulting in moderate, long-term, beneficial impacts to that agency.

The Forest Service is involved in a major planning effort for a large area adjacent

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to or surrounding the Flagstaff National Monuments. This plan, the Flagstaff Lake Mary Ecosystem Analysis (FLEA) is addressing several topics, including recreational opportunities, access, roads, off-highway vehicles, trails, forest health, camping, group uses, special events, outfitter/guides, , and commercial uses. The National Park Service is a participant in this planning activity and will represent concerns that arise from proposals that affect areas near the monuments. The National Park Service review and recommendations of the FLEA could result in minor, short-term impacts to Forest Service administrative and writing workloads. National Park Service input would be directed at resource preservation, land and resource uses, and appropriate visitor uses and recreational activities that do not result in adverse impacts to the monuments. Such input could result in moderate, long-term impacts to the Forest Service relative to FLEA elements that could address protection of park resources, vistas, and natural sounds.

Occasionally, visitors are directed to U.S. Forest Service areas to pursue recreational activities not allowed in the monument but provided for on nearby locations. This could result in minor, short-term adverse impacts to Forest Service workloads in terms of visitor use management activities.

Cooperative relationships with the CPNRL (north of the monument) result in major, long-term benefits through shared resource management activities involving cultural and natural resources inventory and preservation. Impacts to the CPNRL from boundary expansion to the north would be the loss of approximately 31 sections of land removed from cattle grazing. However, the president of CPNRL is entirely supportive of this monument expansion. The impact would

be moderate, long term, and adverse, but supported by the landowner.

With expansion, the existing use of state lands would change. CPNRL currently holds grazing permits from the state. If acquired by the NPS, approximately ten sections would be taken out of the state grazing permit lands. This would have a minor, long-term, adverse impact resulting from the loss of state grazing revenues. The issue of acquiring state land would present many challenges and would probably be dependent on the ability of the federal government to secure funding to complete a direct purchase.

Monument protection employees occasionally monitor rock art panels across the Little Colorado River and on the Navajo Reservation, resulting in a major, long-term beneficial impact to the Navajo Nation in terms of resource preservation.

There could be occasional visitor traffic that enters the CPNRL, or crosses the Little Colorado River and onto the Navajo Reservation. This traffic could cause minor, short-term, adverse impacts in the form of traffic and perhaps unwanted visitors into these properties.

CUMULATIVE EFFECTS

The geographic area considered in this alternative includes the City of Flagstaff on the south, the CPNRL on the north, US89 on the west, the Little Colorado River at Wupatki, the eastern limits of the Cinder Hills Off Highway Vehicle Recreation Area at Sunset Crater Volcano, and the lands generally enclosed by these landmarks.

Activities taken by the state in widening US89 also affect Forest Service activities in the area. Increasing population in Alpine Ranchos will increase pressure on the Forest Service for demand for recreational and woodcutting

opportunities for these nearby residents. Expansion of the City of Flagstaff will also increase the demand for recreational opportunities.

Cooperative efforts with the Forest Service would continue to produce major, long-term, beneficial impacts in law enforcement, resource management, wildfire management, protection, and visitor services. Parallel planning by the NPS and the Forest Service, and the involvement of each agency in the other's planning efforts will have minor, short-term, adverse impacts to the Forest Service workloads resulting from their participation in NPS planning, and their accommodation of NPS participation in their planning.

Although this alternative accommodates American Indian access to park resources, increases in visitor numbers and activities could have a minor, long-term, adverse impact on tribal members because of increased contacts with others when accessing traditional use areas.

The combined effects of the proposed actions by all land and resource management agencies result in moderate impacts to one another and to park neighbors. The contribution to these impacts resulting from proposed NPS actions would be minor.

CONCLUSION

Within existing conditions, the management actions of the NPS provide beneficial impacts to other agencies, neighbors, and American Indian tribes. The existing conditions result in only minor impacts to the workloads of others in terms of additional administrative tasks, interpretive planning, agreement reviews, and joint planning efforts. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

Effects Of Alternative 1: Limited Motorized Sightseeing And Focus On Extended Learning

IMPACT ANALYSIS

Actions proposed in this alternative that have the potential to adversely affect park neighbors and other resource and land managing agencies include closing the north access to the monument and restricting FR545 west of the visitor center to administrative and ranger-guided visitor activities; restricting Black Falls Crossing Road to administrative use and access to the Navajo Reservation by Navajo residents; construction of a primitive campground, providing visitor orientation and educational programs through partners and/or concession operations; and expansion of the monument boundaries.

Cooperative efforts with the Arizona Game and Fish Department would be the same as in the No-Action Alternative.

Cooperative efforts with the Forest Service would be the same as in the No-Action Alternative.

The implications of the FLEA planning process would be the same as in the No-Action Alternative.

Visitors would be occasionally directed to Forest Service areas, as they are under the No-Action Alternative.

Cooperative relationships with the CPNRL would be the same as in the No-Action Alternative.

Monument protection employees would occasionally monitor rock art panels across the Little Colorado River, as in the No-Action Alternative.

There could be occasional visitor traffic that crosses the Little Colorado River and onto the Navajo Reservation as in the No-Action Alternative.

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The closure of FR545 west of the visitor center would have a moderate, long-term, adverse effect on the residents living on the CPNRL north of the park and families and individuals that live across the Little Colorado River on the Navajo Reservation. This closure would require these residents to access US89 via Sunset Crater or Cameron-a drive that would, at minimum, add about 20-30 miles to their commute.

Because FR545 would be terminated at the visitor center, there would be an increase in the number of visitor vehicles entering and exiting the park from the south. This increase of traffic flow would result in minor to moderate, long-term adverse impacts on the individuals and families living in the Alpine Ranchos area. Increases in traffic would result in an increase in congestion and commute times and could potentially increase the rate of accidents.

Closure of FR545 would present an inconvenience to land managing agencies attempting to access land adjacent to the park. This would be a minor, short-term adverse impact, because efforts would be made to accommodate and facilitate administrative access across monument lands by land managing agencies.

Closure of FR545 would present an inconvenience to American Indian tribes attempting to gain unrestricted access to traditional use areas and sacred sites. The impact of this action is considered to be moderate but would be mitigated by making every effort possible to accommodate and facilitate all authorized access. Access to traditional use areas and sacred sites could be accommodated through a permit system (formal or informal) that creates the least inconvenience to the affiliated tribes, while ensuring resource protection, and allows the National Park Service to provide them with adequate privacy.

The restriction of Black Falls Crossing Road to administrative uses would have an adverse, but negligible, effect on the residents living across the Little Colorado River on the Navajo Reservation. This action would require that the NPS familiarize the local residents on the modified use of the road and the appropriate accessing procedures. There are a number of non-Navajo residents that occasionally use the road as a shortcut to US89. The actual number is unknown, but believed to be very low. There would be a moderate, long-term, adverse impact to these individuals losing access to that road.

The closure of this road would have a negligible, long-term, adverse impact on all land managing agencies, as efforts would be made to accommodate and facilitate administrative access along this road for legitimate purpose by those agencies.

This alternative would improve facilities and the interpretive features necessary to provide increased information regarding the park story and could result in moderate, short-term, beneficial economic impacts to local vendors and contractors during any construction.

The proposed boundary expansion would convert Forest Service, state, and private lands to NPS ownership. On Forest Service land, the boundary expansion would have a moderate, short-term effect on their administrative workload, resulting from redirected uses to other parts of the forest, and would eliminate a number of traditional forest uses such as hunting, woodcutting, and camping in the lands that would be acquired. Boundary expansion into forest lands could result in the eventual removal of livestock grazing. Grazing in the recent past has been minimal, with sheep being the primary stock using the area. The Gannon Ranch, immediately south of the monument, has been allowed to graze a

very few head of cattle in this area. There would be negligible, long-term adverse impact to that rancher in the loss of grazing area. The Navajo Nation holds the grazing permit for most of the forest land; however, the Navajo Nation has not grazed stock on the land for more than ten years. The expansion would be a minor, long-term, adverse impact to the Navajo Nation, resulting from the loss of about seven sections of grazing land. Impacts to the CPNRL would be the loss of approximately 31 sections of land removed from cattle grazing. However, the president of CPNRL is entirely supportive of this monument expansion. The impact to the ranch would be moderate and long term (permanent). CPNRL currently holds grazing permits from the state for approximately 10 sections. Monument expansion would have a moderate, long-term, adverse impact to the state grazing revenues. The issue of acquiring state land would present many challenges and would probably be dependent upon the ability of the federal government to secure funding to complete a direct purchase.

CUMULATIVE EFFECTS

The geographic area considered in this alternative is the same as in the No-Action Alternative.

The effects of Forest Service planning (FLEA) and NPS involvement in that planning would be the same as in the No-Action Alternative.

The effects of widening US89, increasing population in Alpine Ranchos, and expansion of the City of Flagstaff would be the same as in the No-Action Alternative.

Cooperative efforts with the Forest Service would be the same as in the No-Action Alternative.

The closure of FR545 and boundary expansion would cause minor to

moderate, short-term adverse impacts to the Forest Service, resulting from more remote access to USFS lands, and administrative workloads in redirecting and managing uses in other areas of the forest. The loss of grazing lands to monument expansion could result in a moderate, long-term, adverse impact to the USFS because of the loss of grazing permit revenues.

Closing the west end of FR545 as an entrance and exit to the park could have a major, long-term, adverse impact on neighbors who would normally use that road for access to and from the north and would increase the time and commuting distances for neighbors traveling to adjacent Forest Service lands, the Navajo Reservation, sections of the neighboring ranches, and Alpine Ranchos residences that are normally accessed from the north.

Closing the north entrance to the monument would create additional two-way traffic on FR545, resulting in moderate, long-term impacts to neighbors in terms of traffic congestion, longer commutes, and increased costs of commuting and some trips would be significantly longer when access to US89 is only through Sunset Crater.

Boundary expansion would have negligible, short-term, adverse impacts on the Gannon Ranch, resulting from the loss of grazing land.

Boundary expansion would have minor, but long-term, adverse impacts on the Navajo Nation resulting from the loss of about seven sections of grazing land now available on Forest Service lands.

Boundary expansion would have moderate, long-term, adverse impacts to the CPNRL through the loss of approximately 31 sections of grazing land; however, CPNRL is entirely supportive of expansion.

Any increases in visitor numbers and activities could have a moderate, long-term, adverse impact on American Indian tribes because of increased contacts with others when accessing traditional use areas.

The closure of FR545 could also result in minor, long-term, adverse impacts to American Indian groups by rerouting access to traditional use areas.

The combined effects of the proposed actions by all land and resource management agencies would result in moderate impacts to one another and to park neighbors. The contribution to these impacts resulting from proposed NPS actions would be a moderate component, primarily resulting from the boundary expansion and partial closure of FR545.

CONCLUSION

Cooperative management and protection efforts with the Forest Service, the Navajo Nation, and the CPNRL would continue to produce major, long-term beneficial impacts in law enforcement, resource management, wildfire management, protection, and visitor services.

Closure of FR545 west of the visitor center as an entrance and exit to the park could have a moderate, long-term, adverse impact on neighbors, other land and resource managers, and residents of the Navajo Nation, who would normally use that road for access to and from the north.

Increased congestion and contact with others could have a moderate, long-term impact on American Indian tribes seeking traditional cultural uses.

In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

Effects Of Alternative 2: Emphasize Motorized Sightseeing And Resource Protection Through On-Site Education

IMPACT ANALYSIS

In this alternative a new visitor contact station would be constructed at the intersection of US89 and FR545, the park's existing north entrance. The Black Falls Crossing Road would see directed interpretive use, including construction of new interpretive wayside exhibits. Orientation and interpretive programs would be performed by partners, affiliated tribes, organizations, and institutions, rather than by park staff; and park boundaries would be expanded to accommodate administrative needs and to ensure that natural and cultural resources contributing to the purpose and significance of the park are contained within park boundaries.

Cooperative efforts with the Arizona Game and Fish Department would be the same as in the No-Action Alternative.

Cooperative efforts with the Forest Service would be the same as in the No-Action Alternative.

The implications of the FLEA planning process would be the same as in the No-Action Alternative.

Visitors would be occasionally directed to Forest Service areas, as in the No-Action Alternative.

Cooperative relationships with the CPNRL would be the same as in the No-Action Alternative.

Monument protection employees would occasionally monitor rock art panels across the Little Colorado River as in the No-Action Alternative.

There could be occasional visitor traffic that enters the CPNRL or crosses the Little Colorado River and onto the Navajo Reservation as in the No-Action Alternative.

Park neighbors using the north entrance, and needing fee waivers, would be required to stop and identify themselves to the staff during hours when the contact station is in operation. This would result in a minor, long-term, adverse impact. The new contact station at the north entrance could have a moderate, long-term, beneficial effect on all park neighbors, especially those residents living along US89, as it would provide another point of contact during emergencies.

The new contact station could provide orientation information to area visitors, thus providing moderate, long-term, beneficial impacts to the Forest Service and other land and resource managers.

Motorized sightseeing tours into the Crack-in-Rock area could result in increased congestion, dust, and noise, resulting in moderate, long-term, adverse impacts to employees living and working on the CPNRL.

Interpretive uses of the Black Falls Crossing Road would broaden the visitor experience, but the potential exists for increasing conflict between park visitors and local residents. This would include vehicle congestion, increased levels of dust negatively impacting views, and exposure of neighboring Navajo Reservation residents to moderate, long-term, adverse impacts from increased sights and sounds of vehicle traffic.

Having other organizations or agencies provide some interpretive services for the NPS could free up some staff time to be devoted to other park resource management and visitor services needs. Programs provided by other agencies and organizations could result in major, long-

term, beneficial impacts in the form of monetary profits from services provided.

The effects of the proposed boundary expansion would be the same as in Alternative 1.

CUMULATIVE EFFECTS

The geographic area considered is the same as in the No-Action Alternative.

The effects of Forest Service planning (FLEA) and NPS involvement in that planning would be the same as in the No-Action Alternative.

The effects of widening US89, increasing population in Alpine Ranchos, and expanding the City of Flagstaff would be the same as in the No-Action Alternative.

Cooperative efforts with the Forest Service and other land and resource managers would be the same as in the No-Action Alternative.

Boundary expansion would have the same effect as in Alternative 1.

Concession- or partner-conducted interpretive activities could be done for a fee. This would have the potential for major, long-term, beneficial impacts to cooperators in terms of monetary gains.

Motorized sightseeing tours could have moderate, long-term, adverse impacts on CPNRL workers and residents resulting from dust, noise, and congestion.

Any increases in visitor numbers and activities would have the same effects as in the No-Action Alternative.

The combined effects of the proposed actions by all land and resource management agencies would result in moderate impacts to one another, and to park neighbors. The contribution to these impacts resulting from proposed NPS actions would be a moderate component, primarily resulting from the boundary expansion and "for fee" activities.

CONCLUSION

Cooperative management and protection efforts with the Forest Service, the Navajo Nation, and with the CPNRL would continue to produce major, long-term, beneficial impacts in law enforcement, resource management, wildfire management, protection, and visitor services.

For-fee interpretive programs conducted by partners or concessionaires could have major, long-term, beneficial impacts from profits gained.

Increased congestion and contact with others could have a moderate, long-term adverse impact on American Indian tribes seeking traditional cultural uses.

In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

Effects Of Alternative 3 (Preferred): Preserve Sensitive Park Resources While Diversifying The Range Of Visitor Experiences

IMPACT ANALYSIS

Under this alternative a new visitor contact station would be constructed at the intersection of US89 and FR545, the park's existing north entrance; Black Falls Crossing Road would be restricted to administrative use only; park boundaries would be expanded to accommodate administrative needs and to ensure that natural and cultural resources contributing to the purpose and significance of the park are contained within park boundaries. Changes to the Black Falls Crossing Road would have negligible impact on Navajo Reservation traffic. The NPS would work out a system (signing, gates, etc.) that would allow the tribe to use the road.

Cooperative efforts with the Arizona Game and Fish Department would be the same as in the No-Action Alternative.

Cooperative efforts with the Forest Service would be the same as in the No-Action Alternative.

The implications of the FLEA planning process would be the same as in the No-Action Alternative.

Visitors would be occasionally directed to Forest Service areas, as they are in the No-Action Alternative.

Cooperative relationships with the CPNRL would be the same as in the No-Action Alternative.

Monument protection employees would occasionally monitor rock art panels across the Little Colorado River as in the No-Action Alternative.

There could be occasional visitor traffic that enters the CPNRL or crosses the Little Colorado River and onto the Navajo Reservation as in the No-Action Alternative.

The new visitor contact station would provide orientation information to area visitors, thus providing moderate, long-term, beneficial impacts to the Forest Service and other land and resource managers. This facility at the north entrance could have a moderate, long-term beneficial effect on all park neighbors, especially those residents living along US89, as it would provide another point of contact during emergencies.

The restriction of Black Falls Crossing Road to administrative uses would be the same as in Alternative 1.

Cooperative relationships with the CPNRL would be the same as in the No-Action Alternative.

No boundary expansion to the south into the Coconino National Forest is proposed in this alternative. Future resource

preservation and user activities would be determined through the Flagstaff Lake Mary Ecosystem Analysis (FLEA) being conducted by the Forest Service. The National Park Service is participating in that analysis. The outcome will provide the management direction for large area of the forest, including the area adjacent to Wupatki National Monument.

CUMULATIVE EFFECTS

The geographic area considered in this alternative is the same as in the No-Action Alternative.

The effects of Forest Service planning (FLEA) and NPS involvement in that planning would be the same as in the No-Action Alternative.

The effects of widening US89, increasing population in Alpine Ranchos, and expansion of the City of Flagstaff would be the same as in the No-Action Alternative.

Cooperative efforts with the Forest Service and other land and resource managers would be the same as in the No-Action Alternative.

Boundary expansion would have moderate, long-term, adverse impacts to the CPNRL through the loss of approximately 31 sections of grazing land; however, CPNRL is entirely supportive of expansion.

Any increases in visitor numbers and activities could have a moderate, long-term, adverse impact on American Indian tribes because of increased contacts with others when accessing traditional use areas.

The new visitor contact station could result in moderate, long-term, beneficial impacts to Forest Service and other resource managers by providing orientation to area visitors and serving as an emergency contact facility.

The combined effects of the proposed actions by all land and resource management agencies would result in major impacts to one another, and to park neighbors. The contribution to these impacts resulting from proposed NPS actions would be a moderate component, primarily resulting from the boundary expansion and closure of Black Falls Crossing Road.

CONCLUSION

Cooperative management and protection efforts with the Forest Service, the Navajo Nation, and the CPNRL would continue to produce moderate, long-term beneficial impacts in law enforcement, resource management, wildfire management, protection, and visitor services.

Increased congestion and contact with others could have a moderate, long-term adverse impact on American Indian tribes seeking traditional cultural uses.

In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

Effects Of Alternative 4: Emphasize Integrated Story Between The Parks And Minimize Development

IMPACT ANALYSIS

Under this alternative, FR545 from the visitor center to the north entrance at the junction with US89, would become one-way and be closed to use at night; Black Falls Crossing Road would be open for administrative use only; park boundaries would be expanded to accommodate administrative needs and to ensure that natural and cultural resources contributing to the purpose and significance of the park are included within park boundaries.

ENVIRONMENTAL CONSEQUENCES

Cooperative efforts with the Arizona Game and Fish Department would be the same as in the No-Action Alternative.

Cooperative efforts with the Forest Service would be the same as in the No-Action Alternative.

The implications of the FLEA planning process would be the same as in the No-Action Alternative.

Visitors would be occasionally directed to Forest Service areas as they are under the No-Action Alternative.

Cooperative relationships with the CPNRL would be the same as in the No-Action Alternative.

Monument protection employees would occasionally monitor rock art panels across the Little Colorado River, as they do under the No-Action Alternative.

Conversion of FR545 to one-way would have a moderate, long-term, adverse impact on the residents living on the CPNRL north of the park, some residents living in Alpine Ranchos, and families and individuals that live across the Little Colorado River on the Navajo Reservation. This closure would limit the ability of these residents to get to their property from US89 through Wupatki National Monument. These residents would have to drive either through Sunset Crater Volcano National Monument or through Cameron, which would add a minimum of 20-30 miles to their commute.

Because FR545 would become one-way at the visitor center, there would be an increase in the number of visitor vehicles entering and exiting the park from the south. This increase of traffic flow would result in a minor to moderate, long-term, adverse impact on the individuals and families living in the Alpine Ranchos area. Increases in traffic would result in an increase in traffic congestion and add to their commute times.

The conversion of this road to one-way would have a moderate, long-term, adverse impact on adjacent land managing agencies. This action would prevent users from entering or exiting the Forest Service land south of the park via FR545. Users would have to travel a few miles (up to five) over unimproved roads to access traditional use areas. There would be an increase in use of adjacent forest road and trails that would require a higher investment by USFS in maintenance and resource protection.

Conversion of FR545 to one-way would present an inconvenience to American Indian tribes attempting to gain unrestricted access to traditional use areas and sacred sites. This would be a moderate, long-term, adverse impact.

The closure of Black Falls Crossing Road would have a major, long-term, adverse impact on the residents living across the Little Colorado River on the Navajo Reservation by removing this access point to and from the Navajo Reservation. The road closure might decrease collection of traditionally used plants that are becoming increasingly rare outside the monument. There are a number of nonlocal residents that occasionally use the road as a shortcut to US89. The actual number is unknown, but it is believed to be very low. These individuals would experience the same long-term, adverse impact by loss of this access.

The closure of this road would have a minor, long-term, adverse impact on all land managing agencies resulting from loss of this access to the Navajo Reservation.

The proposed boundary expansion would be the same as in Alternative 1.

CUMULATIVE EFFECTS

The geographic area considered in this alternative includes the City of Flagstaff

on the south, the CPNRL on the north, US89 on the west, the Little Colorado River at Wupatki, the eastern limits of the Cinder Hills Off Highway Vehicle Recreation Area at Sunset Crater Volcano, and the lands generally enclosed by these landmarks.

The effects of Forest Service planning (FLEA) and NPS involvement in that planning would be the same as in the No-Action Alternative.

Activities taken by the state in widening US89 also affect Forest Service activities in the area. Increasing population in Alpine Ranchos will increase pressure on Forest Service through demand for recreational opportunities for these nearby residents. Expansion of the city of Flagstaff will also increase recreational demand pressures. NPS actions, in combination with these other actions, would result in major short- and long-term effects to the Forest Service by requiring a substantial commitment of staff time to plan and implement new direction for the forest.

Cooperative efforts with the Forest Service and other land and resource managers would continue to produce major, long-term, beneficial impacts in law enforcement, resource management, wildfire management, protection, and visitor services.

Effects of boundary expansion would be the same as in Alternative 1.

Any increases in visitor numbers and activities could have the same effects as in the No-Action Alternative.

Converting FR545 to one-way could result in moderate, long-term, adverse impacts to American Indian groups by restricting or rerouting access to traditional use areas.

Converting FR545 to one-way could have minor to moderate, long-term, adverse impacts to neighbors and other land and

resource managers by restricting or redirecting access to lands adjacent to the monument from US89. Access would be through Sunset Crater Volcano.

The combined effects of the proposed actions by all land and resource management agencies would result in major impacts to one another, and to park neighbors. The contribution to these impacts resulting from proposed NPS actions would be a major component, primarily resulting from the boundary expansion and "for fee" activities.

CONCLUSION

Cooperative management and protection efforts with the Forest Service, the Navajo Nation, and the CPNRL would continue to produce major, long-term, benefits in law enforcement, resource management, wildfire management, protection, and visitor services.

Conversion of FR545 to one-way would have a major, long-term, adverse impact on the residents living on the CPNRL north of the park, some residents living in Alpine Ranchos, and families and individuals that live across the Little Colorado River on the Navajo Reservation, because their access from US89 would be restricted and rerouted through Sunset Crater Volcano.

Boundary expansion could have moderate, long-term, adverse impacts on access by American Indian tribes.

Closure of the Black Falls Crossing Road and increased congestion and contact with others could have a moderate, long-term impact on American Indian tribes seeking traditional cultural uses.

In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

Irreversible/Irretrievable Commitments Of Resources

There would be no irreversible or irretrievable commitments of resources.

Loss In Long-Term Availability Or Productivity Of The Resource To Achieve Short-Term Gain

There would be no short-term gains affecting long-term productivity.

Unavoidable Adverse Impacts

Under the No-Action Alternative, there could be occasional visitor traffic that enters the CPNRL or crosses the Little Colorado River and onto the Navajo Reservation. This traffic could cause minor, short-term, adverse impacts in the form of traffic and perhaps unwanted visitors into these properties.

Under Alternative 1, closing FR545 as an entrance and exit to the park could have a moderate, long-term, adverse impact on neighbors, other land and resource managers, and residents of the Navajo Nation as well as on American Indian tribes and local ranchers who would normally use that road for access to and from the north. Boundary expansion could have moderate, long-term, adverse impacts on access by American Indian Tribes. Increased congestion and contact with others could have a moderate, long-term impact on American Indian tribes seeking traditional cultural uses.

Under Alternative 2, boundary expansion could have moderate, long-term, adverse impacts on access by American Indian tribes. Increased congestion and contact with others could have a moderate, long-term impact on American Indian tribes seeking traditional cultural uses.

Under Alternative 3, increased congestion and contact with others could have a moderate, long-term impact on American Indian tribes seeking traditional cultural uses.

In Alternative 4, conversion of FR545 to one-way would have a major, long-term, adverse impact on the residents living on the CPNRL north of the park, some residents living in Alpine Ranchos, and families and individuals that live across the Little Colorado River on the Navajo Reservation, because their access from US89 would be restricted and rerouted through Sunset Crater Volcano. Boundary expansion could have moderate, long-term, adverse impacts on access by American Indian tribes. Closure of the Black Falls Crossing Road and increased congestion and contact with others could have a moderate, long-term impact on American Indian tribes seeking traditional cultural uses.

OPERATIONAL EFFICIENCY

Methodology

Operational efficiency, for the purpose of this analysis, refers to adequacy of the staffing levels and quality and effectiveness of the infrastructure used in the operation of the park in order to adequately protect and preserve vital park resources and provide for an effective visitor experience. This includes an analysis of existing and needed staffing levels and of the condition and usefulness of the facilities and developed features used to support the operations of the park. Facilities include the roads that are used to provide access to and within the park (both administrative and visitor use), housing used for staff required to work and live in the park, visitor orientation facilities (visitor centers, developed and interpreted sites, and other interpretive features), and the necessary administrative buildings (office

and workspace for park staff), garages, shops, storage buildings, and yards used to house and store the equipment, tools, and materials used to maintain the constructed facilities and features that support the operations of the park. This also includes the presence of utilities such as telephones, sewer, water, and electric and other constructed features used to facilitate the operations of the parks.

In addition to the above, discussion of impacts to park operations focuses on (1) employee and visitor health and safety, (2) ability to protect and preserve resources, (3) staff size, whether staffing needs to be increased or decreased, (4) existing and needed facilities, (5) communication (i.e., telephones, radio, computers, etc.), and (6) appropriate utilities (sewer, electric, water). Park staff knowledge was used to evaluate the impacts of each alternative and is based on the current description of park operations presented in the Affected Environment section of this document. Definitions for levels of impacts to operational efficiency are as follows:

Negligible: Changes would be so small that it would not be of any measurable or perceptible consequence.

Minor: Changes would be small, and if measurable, the consequences would be small and localized.

Moderate: Changes would be measurable and would have a consequence.

Major: Changes would be measurable and would have substantial consequences.

Effects Of The No-Action Alternative: Existing Conditions

IMPACT ANALYSIS

Under the No-Action Alternative, operational efficiency would continue in

approximately the same manner as it currently exists.

Partnerships with private landowners, the State of Arizona, and the USFS lands immediately adjacent to the south boundary of the park would have a minor to moderate effect on operational efficiency. This effect would be long term and beneficial. The USFS will be regulating use and access, including the closure of a number of nonessential roads, regulation of off-road driving, and the development of definable trail systems. The need for NPS patrols along the south boundary for resources protection and law enforcement purposes would continue. If the use of this area were to increase, there would also likely be a need to provide 24-hour emergency response.

The proposed expansion of the monument to the north into Coconino Plateau Natural Reserve Lands would have an overall beneficial and long-term impact on operational efficiency. The changes to operational efficiency would be minor. Resources within the park would be afforded greater protection because of the addition of a land buffer managed in a manner that would be more consistent with NPS practices. There would be an increased ability to control and regulate use and access. With the addition of new lands there would be an increase in the number of acres and natural and cultural resources to protect and preserve. There would also be an increase in the number of administrative access roads that would require maintenance and patrol. Resources staff would need to direct their attention to a number of natural and cultural resources management concerns and issues, including the rehabilitation of an area that has been subject to cattle grazing for a number of years. The proposed expansion would include the addition of unimproved roads, fencing, and livestock

ENVIRONMENTAL CONSEQUENCES

water features that would require maintenance.

The installation of new wayside and museum exhibits would have long-term impacts that would moderately change operational efficiency in a beneficial manner. Increased information presented to the visiting public would afford a higher level of awareness of the significance of the resources in the park and provide information regarding use and access restrictions. This in turn would increase the level of protection afforded park resources and reduce the need for law enforcement patrols.

Increasing accessibility to facilities and natural and cultural features would have a negligible to minor impact on operational efficiency. The impact would be beneficial and long term. It would result in the development of the appropriate infrastructure that would make available certain areas of the park that are currently inaccessible to visitors that have disabilities.

Addressing the existing health and safety issues is likely to have a moderate to major, beneficial impact on operational efficiency. Many of the existing deficiencies and health and safety needs in the other facilities in the park would be addressed and mitigated.

Under this alternative, a storage unit would be constructed at the New Heiser maintenance yard. The structure would replace the Quonset hut at the Old Heiser maintenance yard and would be built in a previously disturbed area. This action would have a long-term moderate impact on operational efficiency. The action would result in the removal of a dilapidated facility that poses a number of health and safety issues. It will result in the rehabilitation of an extensively disturbed area and allow it to be returned to a more nature condition and appearance. A new facility would be

constructed that will allow the consolidation of material and equipment that is currently stored in a number of inappropriate and ineffective facilities, some of which are marginally functional. They are also stored in locations that are spread through the three Flagstaff Area National Monuments.

Under this alternative, the springs in the vicinity of the Old Heiser maintenance area and the associated disturbed lands will be rehabilitated. This action will have a long-term, beneficial impact that would have a negligible effect on operation efficiency. It will result in the restoration of an extensively impacted area and will return a portion of the park to a condition that approximates what existed prior to the disturbance.

Formalization of the backcountry closure is expected to have a minor, long-term beneficial effect on operational efficiency. There will be an initial short-term minor impact due to the need to increase staff presence in order to effectively implement the change in use of the backcountry. Mostly this will consist of making contact with visitors who are unaware that they have entered an area that is closed to unguided access. This change in management is not likely affect a large number of the visiting public. This impact will be mitigated, as the public becomes familiar with the change in management of the backcountry.

Under the No-Action Alternative, the park would continue to be accessed via US89 and FR545. This would have a negligible to minor, adverse impact on park operations. Visitors and staff would continue to be exposed to dangerous situations while entering or exiting FR545 from US89. There is potential for this situation to increase, given the potential growth of the city of Flagstaff and the surrounding areas and the number of visitors that are likely to visit the

Flagstaff Area and the scenic destination points in the northern Arizona and Four Corners regions.

There would be minor adverse impacts to park operations with the continued use of FR545. It is likely that there would be an increase in both visitor and commuter traffic resulting in a likely increase in the number of accidents. Maintenance needs would increase. Given current staffing and funding levels, any increase in the use of FR545 would likely result in a worsening of the condition of the roadway than currently exists.

The growth and development of the city of Flagstaff and the surrounding areas is likely to increase the use of USFS land immediately adjacent to the parks. This would have a minor to moderate, adverse impact on park operations. Given the current inability to physically close any of the roads in the park, an increase in use of the associated roads would increase the difficulties that already exist in protecting park resources. This includes the accessing of areas of the park that are closed to visitation and intentional and unintentional damage to archeological resources. There would be an increase on staff demands to accomplish patrols and to provide 24-hour emergency response.

It is unlikely that there would be an increase in the demand for use of roads that provide access to the Coconino Plateau Natural Reserve Lands.

It is expected that use of the Black Falls Crossing Road by individuals and families residing on the reservation will increase due to population increases. This would have a minor to moderate, adverse impact on park operations. Increased use would result in increased need for maintenance and patrols. Increased traffic would increase the likelihood of accidents. This road is dirt and is within view of the Wupatki visitor center, and

increased use would mean an increase in the amount of dust experienced at the visitor center.

This No-Action Alternative would have a negligible, adverse impact on the remaining roadways within the park.

Use of most of the roads would continue to be unregulated, which would continue to make protection of park resources difficult. Issues of unauthorized access into closed portions of the park and the impacts resulting from intentional and unintentional visitor damage to the park's archeological resources would be likely to increase. This would have a minor to moderate, adverse impact on operational efficiency.

Park staff would continue to experience a long and sometimes difficult commute to conduct business in some of the other parks or in the city of Flagstaff. That same situation would exist for Flagstaff Area employees who need to conduct business in the park. This would have a negligible, adverse impact on operational efficiency.

Under the No-Action Alternative, visitor use of the park would continue as it exists currently, which would have a negligible, adverse impact on park operations. Most visitor uses are concentrated at the Wupatki visitor center. There would continue to be an inability to provide immediate contact after visitors enter the park, and there would still be no staff present to provide orientation at any of the developed sites. Visitors to these developed areas would continue to be exposed to climatic extremes, poisonous wildlife, and uneven surfaces while gaining access into and around the interpreted features.

Implementation of the No-Action Alternative would have a minor to moderate, adverse impact on the park's facilities. The existing visitor center would remain inadequate and obsolete.

ENVIRONMENTAL CONSEQUENCES

Although some improvements would be made, it would still be in need of major upgrading and remodeling, including a number of changes that are required to ensure visitor and staff health and safety.

The No-Action Alternative would not have an impact on the traditional user of the park.

The No-Action Alternative would have a minor to moderate adverse impact on the utilities in the park. Without improvements, the park would continue to be subjected to repeated brown- and blackouts. Overall, this would have a constant and long-term adverse impact on the ability to conduct business and the quality of life of the employees that reside in the park.

Implementation of the No-Action Alternative would have a minor to moderate, adverse impact on staffing within the park. Existing staff levels are deficient, and there are serious limitations on the park's ability to provide adequate and acceptable levels of visitor services, resource protection and preservation, and maintenance of facilities.

CUMULATIVE EFFECTS

The geographic area of consideration in this alternative includes the City of Flagstaff on the south side, the Coconino Plateau Natural Reserve Lands on the north, US89 on the west, and the Navajo Reservation just across from the Little Colorado River on the west.

Growth and development of the City of Flagstaff and the outlying communities, including the Navajo Reservation, would have a minor to moderate, adverse effect on operational efficiency. The most significant effect would be an increase in visitation to the park, which would impact the ability of park staff to protect, preserve, and interpret park resource, and place great demand on existing

facilities. Increased growth would also mean an increase in commuter traffic from the outlying communities. The result would be an increase in the need for law enforcement patrol and emergency response. Increased commuter traffic coupled with increased two-way traffic on FR545 would result in increased maintenance needs for the roadway and an increased potential for accidents.

CONCLUSION

The No-Action Alternative would result in no substantial change in the operations of the park. The effects of implementing the No-Action Alternative would be minor to moderate. Most of the major roads providing access to the park would likely see an increase in visitor and commuter traffic, which would result in additional congestion and a likely increase in accidents. Maintenance needs would increase. Increased use of all roads leading to the park would increase the difficulties that already exist in protecting park resources, including accessing areas of the park that are closed to visitation and intentional and unintentional damage to archeological resources.

The effects to facilities, utilities, and staffing would be minor to moderate adverse. Without improvement to the facilities or utilities, conditions would worsen. Many improvements are needed to protect visitor and staff health and safety. Current staff levels have achieved a certain level of efficiency; however, limitations do exist that inhibit the park's ability to provide adequate levels of resource protection and preservation, maintenance of existing facilities, and visitor services. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

Effects Of Alternative 1: Limit Motorized Sightseeing And Focus On Extended Learning

Impact Analysis

The impacts of establishing partnerships with the USFS, the State of Arizona, and private landowners south of the monument would be the same as described in the No-Action Alternative.

The impacts of the proposed expansion of the boundaries of the monument into the Coconino Plateau Natural Reserve Lands would be the same as described in the No-Action Alternative.

The impacts resulting from the installation of new wayside and museum exhibits would be the same as described in the No-Action Alternative.

The impacts resulting from increasing the park's ability to accommodate visitors with disabilities would be the same as described in the No-Action Alternative.

The impacts that would occur as a result of addressing health and safety issues would be the same as those described in the No-Action Alternative.

The impacts that would occur with the construction of a new storage facility at the New Heiser maintenance yard would be the same as described in the No-Action Alternative.

The impacts that would occur as a result of restoration of the landscape in the vicinity of Old Heiser would be the same as those described in the No-Action Alternative.

Since this alternative would completely change how the public would access the park, there would be no impacts with the formalization of the backcountry closure.

The conversion of access within the park from 24-hour to day-use only would have

a major, beneficial, long-term effect on operational efficiency. It would regulate access into the park and reduce the volume of traffic. Roadway maintenance requirements would be dramatically reduced, and the potential for accidents would be decreased, resulting in a corresponding decrease in the need for patrols and 24-hour emergency response. The regulation of access, including the realignment of the Wukoki Road and the closure of access into the park from a number of locations, should reduce the number of incidents of resource damage and loss.

As a result of this change there would, however, be an estimated doubling of the volume of traffic using the segment of FR545 between Wupatki and Sunset Crater Volcano. Such use would have a moderate, adverse, long-term impact on operational efficiency. It would increase the need for law enforcement patrols and road maintenance. The potential for accidents would increase, and there would still be a need for 24-hour emergency response, however, the need should be reduced somewhat. The potential for a reduction in traffic on the road exists, because the park would no longer be a drive-through experience as part of a larger travel plan.

Extensive funding and effort would be required to realign the Wukoki Road and modify the lower portion into an acceptable and aesthetically pleasing trail. Ground-disturbing activities would require staff time for consultation, clearance, and/or mitigation of impacts to natural and cultural resources. With the implementation of this action, there would be major short-term impacts to operational efficiency. Once the construction and rehabilitation is completed, this action would have a negligible to minor impact on operational efficiency.

ENVIRONMENTAL CONSEQUENCES

Guided tours would be provided at Wupatki, Wukoki, Doney Mountain, Citadel, and Lomaki. This alternative would have a moderate impact on operational efficiency. The beneficial side of the effect is that it would reduce the need for patrols for resource protection purposes. It would, however, increase the need for interpretive staff in order to conduct the tours and provide the in-depth learning experiences. During peak visitation days, there would be congestion at the visitor center and parking lot, which would have a minor impact on operational efficiency. This alternative would slightly increase maintenance needs, especially as related to the use of the visitor center's rest room facility. A greater demand would be placed on the wastewater system. It would also place greater demands on law enforcement and interpretive staff in terms of crowd control and ensuring protection of the resources in the visitor center.

The existing visitor center and associated housing and the maintenance areas at the visitor center and at New Heiser would be retained and used as they are now. This would have a minor to moderate impact on operational efficiency. The existing visitor center would remain inadequate and obsolete, requiring major upgrading and remodeling to protect visitor and staff health and safety. During peak visitation days, there would be congestion at the visitor center, and the capacity of the parking lot would be reached.

Because this alternative would require an increase in staff, there would be a necessary increase in the amount of office space and permanent and temporary housing requirements, which would have a moderate impact on park operations. The primary impact would be an increase in maintenance needs and use of the utility systems. Problems that

currently exist with the electrical and telephone service, waste removal systems, and water supply would be exacerbated.

The one significant change would be the conversion of one of the existing residences at New Heiser to an education facility. This would require extensive modification of the selected facility to accommodate this use. There would be a minor effect on park operations, including initial construction/rehabilitation costs, increased utility costs, and increased maintenance costs.

A new primitive campground would be constructed at the Old Heiser maintenance area. This action would have a major, short-term, beneficial effect by cleaning up much of what remains of the old residential and maintenance facilities. Many of the existing health and safety issues would be eliminated; however, this action would have a moderate, long-term impact on park operations. There would be minor to moderate, short-term impacts as a result of the campground development and construction, including mitigation of impacts to natural and cultural resources, initial costs for construction, and long-term costs associated with maintenance requirements. Since this facility has the potential to be used on a 24-hour basis for most of the year, there would be increased costs for law enforcement and 24-hour emergency response.

This alternative would have a moderate impact on the staffing component of operational efficiency. Because of the reduction of unregulated access to the park, there would be a reduction in the need for law enforcement patrols. This would not mean that fewer staff members are needed, because there would be a need to increase law enforcement patrols along FR545

between the park and Sunset Crater Volcano. In addition, law enforcement patrol and 24-hour emergency response would be needed because of the presence of the new campground.

There would be increased maintenance needs with the increased use of residences and administrative facilities. New maintenance requirements would exist with the construction of the new campground. Because the number of archeological sites available for interpretation would increase, staff would be needed to address compliance and mitigation requirements. In addition, resource monitoring, routine housekeeping, and annual maintenance would be required. Administrative needs would be increased, including initiation and execution of personnel actions and purchasing and contracting for supplies, materials, and services.

This proposal would also include a limited expansion of park boundaries to the south, which would have a moderate beneficial effect on park operations. The expansion would include within park boundaries all of FR545, immediately south of the park on the west end, eliminating any questions or concerns regarding jurisdiction.

CUMULATIVE EFFECTS

Cumulative effects to operational efficiency under Alternative 1 would be similar to those identified for the No-Action Alternative.

CONCLUSION

This alternative would have a long-term, moderate, beneficial effect on the operational efficiency of the park. It would dramatically change the use of the park from a drive-through experience to a destination park, which would result in a major increase in the management of unregulated use and access into the park, affording greater protection of park

resources. The proposed actions would have a moderate impact on park operations, resulting in higher operational costs and an increase in the need for maintenance of the roadway segment between Wupatki and Sunset Crater Volcano, and a new primitive campground. Proposed limited boundary expansions coupled with changes in how adjacent land managers propose to manage their land would have a moderate beneficial impact on the park. The level of protection and preservation of park resources would be greatly increased.

Effects Of Alternative 2: Emphasize Motorized Sightseeing And Resource Protection Through On-Site Education

IMPACT ANALYSIS

Many of the impacts identified in the No-Action Alternative (partnerships, installation of new waysides and museum exhibits, accessibility, construction of a new storage facility, habitat restoration, and backcountry closure) would be the same for this alternative.

The impacts of the proposed expansion of the boundaries of the monument into the Coconino Plateau Natural Reserve Lands would be the same as described in the No-Action Alternative, with the following exception: Coconino Plateau Natural Reserve Lands roads would be used to provide motorized tours to Crack-in-Rock. This would have a moderate adverse impact on park operations. This would add a new road to the park's roadway inventory, and there would be associated maintenance needs because of the prescribed use of the road.

With the implementation of the actions listed below, unguided visitor access would be reduced. There would still be a

ENVIRONMENTAL CONSEQUENCES

need for law enforcement patrols for resource protection purposes. The effect of these actions would have a negligible to minor impact on operational efficiency.

The spur roads to all of the major interpretive sites (Lomaki/Box Canyon, Citadel/Nalakihu, Doney Mountain picnic area, Wukoki, and Wupatki Pueblo) would be gated at night to prevent access. This would require either the addition of staff or the modification of staff schedules to perform end-of-the-day patrol to escort visitors out of these areas so that the gates could be closed. The effect of these actions would have a minor, adverse impact on operational efficiency.

Gates would be installed at each developed site and would be closed at any time staff were not on-site. Minimal support facilities would be installed at all day-use sites for on-site staff and visitors. This would have a minimum to negligible adverse impact on park operations.

Extensive funding and effort would be required to realign the Wukoki Road and modify the lower portion into an acceptable and aesthetically pleasing trail. Ground disturbing activities would require staff time for consultation, clearance, and/or mitigation of impacts to natural and cultural resources. With the implementation of this action, there would be major short-term impacts to operational efficiency. Once the construction and rehabilitation is completed, this action would have a negligible to minor impact on operational efficiency.

A new visitor contact station would be constructed at the north entrance for park orientation and fee collection. This facility would increase the need for both interpretive and fee collection staff. A new facility would result in a major impact to the visual scene at the north

entrance, which would call for short-term requirements of staff in design, construction, and mitigation and long-term requirements for maintenance. This would be a moderate to major adverse impact on park operations.

Visitors would receive orientation before encountering resources via the new contact station at the north entrance and at Sunset Crater Volcano. This would reduce the need for law enforcement patrol for protection purposes, which would have a negligible to moderate adverse impact on operational efficiency.

Specific site interpretation would be provided by park staff, who would be present any time the interpreted sites were open to the public. This would have a moderate to major beneficial impact on operational efficiency by reducing the need for law enforcement patrols for resource protection purposes.

Minimal support facilities, such as minor visitor contact stations and toilet facilities would be needed. Limited maintenance of these facilities would be required, including regular cleaning of the toilet facilities. This would have a minor to moderate impact on operational efficiency.

The existing visitor center would be converted to administrative use and modified for improved curatorial storage/research space. This would have a major beneficial impact on operations, by reducing the operation needs of the visitor center, which would slightly reduce maintenance requirements. This change would not eliminate the need for staff, because they would be providing on-site services at the day-use locations. This would require increased commuting by staff in order to access the day-use locations, resulting in an increase in vehicle needs and costs. Park staff would be scattered in remote locations, requiring an expansion of

communication systems. Closure of the visitor center/museum could have a major adverse impact on the park's cooperating association book sales. The modifications and improvements to this facility would eliminate most of its health and safety issues and dramatically improve operational efficiency.

The rest of the existing facilities at the park, including housing and maintenance areas at the visitor center and at New Heiser developed area, would be retained and used as they are now. This would have a minor to moderate impact on operational efficiency. Because this alternative would require an increase in staff, there would be a necessary increase in the amount of office space and permanent and temporary housing requirements. This would have a negligible to minor impact on park operations. There would continue to be maintenance needs and use of the utility systems, although they would be somewhat reduced. The current problems with the electrical and telephone service, waste removal systems, and water supply would be exacerbated by the increase in staffing numbers. The existing facilities and associated features at Old Heiser would be removed, including all of the associated safety and health issues.

The existing road to Crack-in-Rock would be maintained for escorted four-wheel-drive and/or mountain bike trips that would provide tours to Crack-in-Rock. This would have a minor to moderate impact on park operations. Some minimal road improvement would be needed and would require a higher level of maintenance than currently exists.

Guided tours to Crack-in-Rock would require some minimal support facilities, including backcountry toilets and picnic tables. Limited maintenance of these facilities would be required, including regular cleaning of the toilet facilities.

This would have a minor to moderate impact to operational efficiency.

The Black Falls Crossing Road would be used for interpretive purposes, however, it would not be paved and would continue to be maintained as a vehicle dirt road. Some minimal road improvements would be needed and would require a higher level of maintenance than currently exists, which would have a negligible impact on operational efficiency.

The actions of this alternative would have minor to moderate impacts on the staffing component of operational efficiency.

Personnel and funding previously dedicated to the visitor center would be redirected to on-site interpretation at the existing five day-use areas. Additional staff could possibly be needed to operate the new visitor contact station at the north entrance. Maintenance staff would have an increased workload on roads and trails, including the maintenance and upkeep of minor interpretive facilities at the five day-use sites.

This proposal would also include a limited expansion of park boundaries to the south, which would have a moderate beneficial effect on park operations. The expansion would include within park boundaries all of FR545, immediately south of the park on the west end, eliminating any questions or concerns regarding jurisdiction.

CUMULATIVE EFFECTS

Cumulative effects to operational efficiency under Alternative 2 would be similar to those described for the No-Action Alternative.

CONCLUSION

This alternative would result in minor changes in operational efficiency. The most substantial change would be the

modified use of the existing visitor center and the dispersal of park staff to day-use locations. There would be increased demands on the park infrastructure, including roads and facilities. Proposed boundary expansions coupled with how adjacent land managers propose to manage their land would have a moderate beneficial impact on operational efficiency.

Effects Of Alternative 3 (Preferred): Preserve Sensitive Park Resources While Diversifying The Range Of Visitor Experiences

IMPACT ANALYSIS

The impacts of establishing partnerships with the USFS, the State of Arizona, and private landowners south of the monument are the same as described in the No-Action Alternative.

The impacts of the proposed expansion of the boundaries of the monument into the Coconino Plateau Natural Reserve Lands would be the same as described in the No-Action Alternative.

The impacts resulting from the installation of new wayside and museum exhibits would be the same as described in the No-Action Alternative.

The impacts resulting from increasing the park's ability to accommodate visitors with disabilities would be the same as described in the No-Action Alternative.

The impacts that would occur as a result of addressing health and safety issues would be the same as those described in the No-Action Alternative.

The impacts that would occur with the construction of a new storage facility at the New Heiser maintenance yard would be the same as described in the No-Action Alternative.

The impacts that would occur as a result of restoration of the landscape in the vicinity of Old Heiser would be the same as those described for the No-Action Alternative.

The impacts that would occur as a result of the backcountry closure would be the same as described in the No-Action Alternative.

Many of the impacts identified in the No-Action Alternative for roads and access would continue; however, with the implementation of the actions listed below, some visitor access would be reduced. There would still exist a need for law enforcement patrols for resource protection purposes. Ranch roads within the expanded north boundary and the Black Falls Crossing Road would be maintained for administrative purposes. The effect of these actions would have a negligible to minor impact on operational efficiency.

The spur roads to all of the major interpretive sites (Lomaki/Box Canyon, Citadel/Nalakihu, Doney Mountain picnic area, Wukoki, and Wupatki Pueblo) would be gated at night to prevent access. This would require either the addition of staff or the modification of staff schedules to perform end-of-the-day patrol to escort visitors out of these areas so that the gates could be closed. The effect of these actions would have a minor impact on operational efficiency.

The Wukoki spur road would be realigned to meet FR545 just north of the visitor center. Extensive rehabilitation of the abandoned route would be required. Extensive funding and effort would be required to rehabilitate the road to modify it to an acceptable and aesthetically pleasing trail. Ground-disturbing activities for all construction and rehabilitation would require staff time for consultation, clearance, and/or mitigation of impacts to natural and

cultural resources. With the implementation of these actions, there would be major short-term impacts to operational efficiency. Once construction and rehabilitation have been completed, this action would have a negligible to minor impact on operational efficiency.

Visitors would receive orientation before encountering resources via the new contact station at the north entrance and at the Wupatki visitor center. This would reduce the need for law enforcement actions for resource protection purposes. This action would have a negligible to moderate impact on operational efficiency. Visitors would continue to have the opportunity to participate in guided hikes in the Wupatki area, which would have a negligible impact on operational efficiency.

A new visitor contact station would be constructed at the north entrance for park orientation and fee collection, increasing the need for both interpretive and fee collection staff. Orientation of visitors accessing the park from the north would be enhanced, improving the visitor experience, potentially controlling visitor impacts, and improving resource protection. The new visitor center would result in short-term requirements of staff in design, construction, and mitigation, and long-term requirements for maintenance. These actions would have a moderate adverse impact on park operations. Once the construction has been completed this action would have a negligible to minor impact on operational efficiency.

The existing visitor center and associated housing and maintenance areas at the visitor center and at the New Heiser developed area would be retained and used as they are now. This would have a minor to moderate impact on operational efficiency. The existing visitor center would remain inadequate and obsolete. Major upgrading and

remodeling would be required to protect visitor and staff health and safety. Problems that currently exist with the electrical and telephone service, waste removal systems, and water supply would be exacerbated by the increase in numbers of staff.

Under this alternative, new hiking trails would provide access to (1) the Antelope Prairie grassland near Lomaki Pueblo and (2) Wukoki Pueblo via Deadman Wash, increasing the need for resource preservation and maintenance. Increases in both staffing and funding would be needed. Ground disturbances associated with trail construction would require consultation, clearance and/or mitigation of impacts to cultural and natural resources, which would have a major short-term impact on operational efficiency. Once the trail construction has been completed, this action would have a minor to moderate impact on operational efficiency, which would include the need for trail maintenance, resource monitoring, and law enforcement patrols.

Visitor access would not change dramatically from what currently exists. There would be increased access to previously unvisited archeological sites around Citadel/Nalakihi and Lomaki/Box Canyon. This would increase resource preservation requirements, including resource monitoring and implementation of prescribed preservation treatments, resulting in a minor to moderate impact on operational efficiency.



ENVIRONMENTAL CONSEQUENCES

The actions of this alternative would have minor impacts on the staffing component of operational efficiency. Additional staff could be needed to operate the new visitor contact station at the north entrance. An increase in personnel would require a corresponding increase in office space and permanent and temporary housing. Maintenance staff would have increased workload on roads and trails, including the maintenance and upkeep of new trails at three locations. Administrative needs would be increased, including initiation and execution of personnel actions and purchasing and contracting for supplies, materials, and services. Resources staff would need to direct their attention to a number of natural and cultural resource management concerns, including the monitoring of change in resource condition and the mitigation and treatment of any resource damage in evidence.

CUMULATIVE EFFECTS

Cumulative effects to operational efficiency under the preferred alternative would be similar to those described for the No-Action Alternative.

CONCLUSION

Changes resulting from implementation of this alternative would have an overall beneficial impact on operational efficiency. There would be some short-term moderate impacts as a result of the construction of the new visitor contact facility at the north entrance, new trails, and the realignment of the Wukoki spur road. Once this construction has been completed there would be a minimal to moderate impact to operational efficiency. Most impacts would be in the form of increased staff to operate the new contact station, perform maintenance on the facilities and trails, and see to increased resource preservation needs. The proposed

changes in visitor use would significantly improve and diversify visitor experience; however, there would be increased resource protection and preservation needs. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

Effects Of Alternative 4: Emphasize Integrated Story Between The Parks And Minimize Development

IMPACT ANALYSIS

Many of the impacts identified in the No-Action Alternative (partnerships, boundary expansion, installation of new waysides and museum exhibits, accessibility, construction of a new storage facility, habitat restoration, and backcountry closure) would be the same for this alternative.

The conversion of access within a major portion of the park from 24-hour to day-use only would have a major, beneficial, long-term effect on operational efficiency. It would regulate access into the park and reduce the volume of traffic. Roadway maintenance requirements would be reduced, as would the potential for accidents. There should be a corresponding decrease in the need for patrols and 24-hour emergency response. The regulation of access and the closure of access into the park from a number of locations should reduce the number of incidents of resource damage and loss.

As a result of this change, there would, however, be an increase in the volume of traffic using the segment of FR545 between Wupatki and Sunset Crater Volcano. Such use would have a moderate, adverse, long-term impact on operational efficiency and would increase the need for law enforcement patrols and road maintenance. The potential for

accidents would increase. There would still be a need for 24-hour emergency response; however, the need should be reduced somewhat.

The park access road would have to be improved to accommodate the change of the road from two-way to one-way traffic. This action would have a moderate, long-term, beneficial impact on the efficiency of park operations. There would be short-term problems educating staff and prior visitors and users of the change. Accommodations would be needed to allow authorized park personnel to use the road as a two-way road in emergency situations. Park staff using the road would be required to return to the visitor center via US89 and FR545 through Sunset Crater Volcano, increasing driving distance by approximately 20 to 30 miles and requiring approximately another 30 to 40 minutes. Increased vehicle costs would result.

The Black Falls Crossing Road would be permanently closed and rehabilitated, having a major impact on operational efficiency. Extensive funding and effort would be required to rehabilitate the road. It would eliminate a major administrative road that provides access to the extreme eastern side of the park, which would seriously impact the park's ability to conduct law enforcement patrols for resource protection.

Access to the park via FR787 and FR150 would be eliminated, having a minor impact on operational efficiency. This action would eliminate the unregulated access that currently exists and would reduce the need for law enforcement patrol for resource protection purposes.

The Wukoki spur road would be realigned to meet FR545 just north of the visitor center. Extensive rehabilitation of the abandoned route would be required. Extensive funding and effort would be

required to rehabilitate the road to modify it to an acceptable and aesthetically pleasing trail. Ground-disturbing activities for all construction and rehabilitation would require staff time for consultation, clearance, and/or mitigation of impacts to natural and cultural resources. With the implementation of these actions, there would be major short-term impacts to operational efficiency. Once the construction and rehabilitation has been completed this action would have a negligible to minor impact on operational efficiency.

Ranch roads within the expanded boundaries to the north would be maintained for administrative purposes. The effect of this action would have a negligible impact on operational efficiency, requiring an increase in maintenance and law enforcement patrols.

The existing road to Crack-in-Rock would be maintained for escorted four-wheel-drive and/or mountain bike trips that would provide tours to Crack-in-Rock. This would have a minor to moderate impact on park operations. Road improvements would be needed and would require a higher level of maintenance than currently exists.

Under this alternative, a new hiker trail would provide access to Wukoki Pueblo via Deadman Wash, requiring an increase in the need for resource preservation and maintenance. Increases in both staffing and funding would be needed. Ground disturbances associated with trail construction would require consultation, clearance, and/or mitigation of impacts to cultural and natural resources. Implementation of these actions would have a major short-term impact on operational efficiency. Once the trail construction has been completed, this action would have a minor to moderate impact on operational efficiency, which

ENVIRONMENTAL CONSEQUENCES

would include the need for trail maintenance, resource monitoring, and law enforcement patrols.

All existing housing, maintenance, and administrative facilities at Wupatki would be removed, except one historic structure and the historic portion of the visitor center, which would be retained as a residence and ranger station. Minimal facilities would be maintained at Wupatki Pueblo, including backcountry toilets, drinking fountains, and picnic tables. These actions would have a major effect on operational efficiency. The removal of all but a few of the visitor contact, residential, and maintenance facilities would significantly reduce maintenance and utility costs. Many of the existing staff and visitor health and safety issues would be eliminated. Many issues regarding the existing utilities would be eliminated or dramatically reduced.

Under this alternative, staff would be housed and would work in locations that are a significant distance from the park, resulting in delayed response to emergencies. There would be a major, adverse impact on staff ability to respond to resource protection and visitor needs. There would be greater dependence on radio communication and increased vehicle costs, which would have a major adverse impact on park operations.

A great deal of administrative effort would be involved in the removal of facilities and rehabilitation of the resulting disturbed lands, which would have a major short-term impact on operational efficiency. There would be long-term beneficial impacts to operational efficiency once these actions have been completed. There would be greatly reduced maintenance needs because there would be a significant reduction in the number of park facilities.

This proposal would also include a limited expansion of park boundaries to the south, which would have a moderate beneficial effect on park operations. The expansion would include within park boundaries all of FR545, eliminating any questions or concerns regarding jurisdiction.

CUMULATIVE EFFECTS

Cumulative effects to operational efficiency under the Alternative 4 would be similar to those identified for the No-Action Alternative.

CONCLUSION

This alternative would dramatically change how visitors and staff access the park, and it would substantially remove most of the facilities that support direct park operations. There would be a major, long-term benefit, resulting from more restricted access and the conversion of a major portion of the park from a drive-through, 24-hour use, to day-use only. There would be a major adverse effect to operational efficiency with the removal of many of the existing support facilities and the removal of staff to more distant work locations. There would be a greater need for improved communication, and vehicle cost would increase. Park staff would spend a substantial amount of time commuting between various work locations. The long-term beneficial impacts would include a reduction in overall facility and utility costs. Removal of the facilities would positively affect the cultural landscapes and the park's natural resources. This alternative would dramatically reduce and streamline park operations, but would have a major adverse impact on the effectiveness of park operations. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

Because the identified major adverse impacts are to operational efficiency

rather than to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Wupakti National Monument; (2) key to the natural or cultural integrity of the park or to the opportunities for enjoyment of the park; or (3) identified as a goal in relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Irreversible/Irretrievable Commitments Of Resources

There would be no irreversible or irretrievable commitments of resources.

Loss In Long-Term Availability Or Productivity Of The Resource To Achieve Short-Term Gain

There would be no short-term gains affecting long-term productivity.

Unavoidable Adverse Impacts

Under the No-Action Alternative, most of the major roads providing access to the park would likely see an increase in visitor and commuter traffic, which would result in additional congestion and increased accidents. Maintenance needs would increase. Increased use of all roads leading to the park would increase the difficulties; that already exist in protecting park resources, including accessing of areas of the park that are closed to visitation and intentional and unintentional damage to archeological resources. The effects to facilities, utilities, and staffing would be minor to moderate. Many improvements are needed to protect visitor and staff health and safety. Without improvement to the



facilities or utilities, conditions would worsen. Current staff levels inhibit the park's ability to provide adequate levels of resource protection and preservation, maintenance of existing facilities, and visitor services.

Only Alternative 4 would have adverse effects on park operations. There would be major, adverse effects to operational efficiency with the removal of many of the existing support facilities and the removal of on-site staff to more distant work locations. There would be a greater need for improved communication, and vehicle costs would increase. Park staff would spend a substantial amount of time commuting between various work locations. This alternative would dramatically reduce and streamline park operations but would have a major adverse impact on the effectiveness of park operations.

CONSULTATION AND COORDINATION

HISTORY OF PUBLIC INVOLVEMENT

The notice of intent (NOI) to prepare this EIS was published in the Federal Register May 19, 1997. The NOI indicated availability of newsletter #1, from which comments were accepted until June 30, 1997. The first newsletter described purpose and significance statements for all three parks, as well as identifying preliminary issues. A second newsletter, released February 1998, detailed public response to the first newsletter, described final purpose and significance statements, and explained the preliminary range of management zones. A third newsletter, issued November 1998, described the range of preliminary alternatives developed for all three monuments. The fourth newsletter in May 1999 described the decision to prepare a plan concurrently with the Forest Service Flagstaff Lake Mary Ecosystem Area planning process. All comments received through June 1999 were considered in this EIS. The Purpose of and Need for the Plan, Need for the GMP, and Description of Scoping Process sections describe the issues and concerns raised and sort the responses into several categories.

AGENCY CONSULTATION

A number of meetings were held with staff from the U.S. Forest Service and Arizona Game and Fish Department. These meetings were held to discuss impacts that the alternatives might have on adjacent recreational activities and impacts to wildlife and their movement corridors and to try to ensure that NPS planning would be in support/harmony with their agency planning efforts.

Several of these conversations explored the possibility of joint or comanagement of resources and visitor uses.

TRIBAL CONSULTATION

In keeping with its mandates for tribal consultation, NPS consulted with many American Indian tribes throughout the planning process. Based on ethnographic research efforts and previous consultations conducted for the Flagstaff Area national monuments during the last several years, ten tribes were identified as having potential traditional associations with park lands and resources. They are the Havasupai Tribe, Hopi Tribe, Hualupai Tribe, Navajo Nation, San Juan Southern Paiute Tribe, Tonto Apache Tribe, White Mountain Apache Tribe, Yavapai Apache Nation, Yavapai-Prescott Tribe, and Zuni Tribe. All ten tribes were contacted by letter and telephone, inviting them to attend an introductory meeting in October 1997. Six of the ten tribes participated in the October meeting, and four participated in a December 1997 consultation meeting. As of February 1998 participating tribes included Hopi, Hualupai, Navajo, White Mountain Apache, Yavapai Apache, Yavapai-Prescott, and Zuni.

At the first two consultation meetings the tribes discussed the purpose and significance statements and agreed on language for the final statements. They also discussed tribal involvement in identifying culturally significant and sensitive resources as well as plans for participation throughout the planning process. Early in 1998 the Hopi, Navajo, and Zuni Tribes agreed to conduct further NPS-sponsored research into tribal associations with park lands and

CONSULTATION AND COORDINATION

identify particular sensitive resources and management concerns for the EIS. Representatives from three tribes attended the final tribal consultation meeting in August 1998 and assisted with the development of alternatives. Early in 1999 the Hopi Tribe and Navajo Nation submitted to NPS reports identifying culturally sensitive resources and specific recommendations for the GMP.

All ten tribes originally identified continued to receive newsletters and invitations to consultation meetings throughout the planning process. Tribal interests and concerns were fully considered in the planning process and in the development of alternatives in the GMP.

LIST OF RECIPIENTS

* Indicates response received on draft environmental impact statement

Federal Agencies

Advisory Council on Historic Preservation

Department of Agriculture

Animal Damage Control

Natural Resource and Conservation Service

*Animal and Plant Health Inspection Service

Forest Service

Tonto NF

Prescott NF

USFS Regional Office

Kaibab NF

Coconino NF, Mormon Lake District

Coconino NF, Peaks District

*Coconino NF, Supervisor's Office

Department of Interior

*Fish and Wildlife Service

Arizona Ecological Services

Geological Survey

National Biological Survey

National Park Service

Canyon de Chelly NM

Glen Canyon NRA

Grand Canyon NP

Guadalupe Mountains NP

Hubbell Trading Post NHS

Montezuma Castle NM

Navajo NM

Organ Pipe Cactus NM

Petrified Forest NP

Pipe Springs NM

Rivers and Trails Conservation

Assistance, Intermountain Support

Office, Santa Fe

Southern Arizona Group

Tonto NM

Western Region

Department of the Army, Corps of Engineers

Department of Transportation, Federal Highway Administration

*Environmental Protection Agency, Region IX

U.S. Postal Service

Indian Tribes

Havasupai Tribe

*Hopi Tribe

Cultural Preservation Office

Water Rights Hydrologist

Hualapai Tribe

Navajo Nation

Bodaway/Gap Chapter

Cameron Chapter

Leupp Chapter

Tuba City Chapter

Department of Agriculture

Historic Preservation Department

Forest Section

Division of Economic Development

Division of Natural Resources

Lands Department

Navajo Tribal Ranches

Pueblo of Zuni

Heritage Historic Preservation

San Juan Southern Paiute Tribe

Tonto Apache Tribe
White Mountain Apache Tribe
Yavapai Apache Tribe
 Cultural Preservation
Yavapai Prescott Indian Tribe

State Government

Department of Environmental Quality
 Forest Service
Department of Mines and Minerals
Department of Public Safety
Department of Transportation
 Design Section
 Parkways and Historic Scenic Roads
Department of Water Resources
*Game and Fish Department
Office of the Governor
State Historic Preservation Office
 Arizona State Parks
State Land Department
 Forestry Division
 Urban Planning Division

Local Government

City of Flagstaff
 Chamber of Commerce
 City Council
 Convention and Visitor Bureau
 Fire Department
 Police Department
 Public Library
 Unified Public Schools
 Unified School District
 Utilities
 Visitor Center
Citizens Utilities
City of Sedona
 Public Library
Coconino County
 Attorney
 Board of Supervisors

Department of Community
Development
Highway Department
Parks and Recreation
Sheriff's Department
Supervisors

Doney Park
Fire Department
Water
Kachina Village Fire Department
Mountaineer Fire Department
Northern Arizona Council of
Governments
Timberline-Fernwood Fire Department

Organizations/Businesses

A&S Distributing
A.B.A.T.E.
A5 Adventures
Absolute Bikes
Access Fund
Affordable Housing Coalition
American Motorcyclist Association
Andy's Body Shop
Arizona 4WD Clubs
Arizona Archeological and Historical
Society
Arizona Bowhunters
Arizona Cattlemen's Association
*Arizona Ethnobotanical Research
Association
Arizona Riparian Council
Arizona Rough Riders Four-Wheel Drive
Club
Arizona Snowbowl
Arizona Snowmobile Association
Arizona-Southern California Rocky
Mountain Elk Foundation
Arizona State Association of 4WD Clubs
*Arizona Wilderness Coalition

CONSULTATION AND COORDINATION

Arizona Wildlife Federation
Ascend Arizona
Aspen Sports
B A S S
Babbitt Ranches (Coconino Plateau
Natural Reserve Lands)
Babbitt's Backcountry Outfitters
Bellemont Baha'i School
Big Joes Cycles
Book Nest
Canyon Country Outfitters
CCOEH
Central Arizona Grotto
CO Bar Livestock, LTD
Coconino Sportsmen
Cocopai RC & D
Colorado Plateau Forum
Dames and Moore
Darmstadt Elementary School
DBA Hart Ranch
Diablo Trust
DNA Legal Services
Doney Area Plan Committee
Doney Park Interest Groups
Ducks Unlimited Inc.
Earthlight
ENSR Consulting and Engineering
Environmental Action Coalition
Federal Land Exchange Inc.
First United
Flagstaff Film Commission
Flagstaff Hiking Club
Flagstaff Jeep Tours
Flagstaff KOA
Flagstaff Medical Center
Flagstaff Mountain Guides
Flagstaff Riding Club
Flagstaff RV Sales
Flying Heart Barn
Forest Conservation Council
Forest Guardians
Friends of Walnut Canyon
*Grand Canyon Trust
Grand Canyon Wildlands Council
Greater Arizona Bicycling Association
Hanks Trading Post
Hart Prairie
Hart Ranch
High Desert Investments
Hitchin' Post Stables
Horse Trails Coalition
IMFAM Associates
Kampground Owners' Association
Karan English
Keep Sedona Beautiful Environmental
Quality Committee
Lake Mary Fishing Boat Rentals
Lockett Ranch Inc.
Loose Spoke
Lowell Observatory
Manterola Sheep Company
Maricopa Audubon
McCoy Motors
Michelback Ranch
Monte Vista Marine
Mormon Lake Lodge
Morrison Brother's Ranch
Mountain Man Events
Mountain Mushers
Mountain Sports
Mountain View Pediatrics
Mountaintop Honey
Museum of Northern Arizona
NAHB
National Parks and Conservation
Association

Native Plant and Seed

Northern Arizona University
 Arizona Historic Commission
 College of Engineering
 Department of Anthropology
 Department of Geography
 Department of Geology
 High Altitude Sports Training Complex
 Outdoors
 School of Forestry

Northern Arizona Association of Realtors

Northern Arizona Audubon Society

Northern Arizona Cattle Growers

Northern Arizona Flycasters

Northern Arizona Grotto

Northern Arizona Riding Club

Northern Arizona Trust Lands Inc.

Northland Yamaha-Kawasaki

Peace Surplus Outdoor Store

People for the West

Peterson Lumber Company

Ponderosa Outdoor/Sled Dog Inn

Popular Outdoor Outfitters

Precision Pine and Timber

Prescott Climbers Coalition

Prescott College Environmental Center

RMRS-Flagstaff

Rough Country Bowhunters

Ruff's Sporting Goods

S.E.C.

Salt River Project

Sanderson Ford

Sedona Westerners

Shapins Associates

Shriner's Club

Sierra Club

Grand Canyon Chapter

Legal Defense Fund

Plateau Group

Sinagua Trading Post

Single Track Mountain Bikes

Sky Ranch Development, Inc.

Smith Contracting, Inc.

Southwest Center for Bio Diversity

Southwest Forest Alliance

Southwest Information

Southwest Parks and Monuments
 Association

SWCA, Inc.

Tametic Committee

Teton Mountain Bike Tours

The Arboretum at Flagstaff

The Edge

The Game Plan

The Nature Conservancy

The Wilderness Society

The Wilson Foundation

Total Timber

Trust for Public Land

University of Arizona College of
 Agriculture

Vertical Relief Rock Gym

Voters of Flagstaff

Wildlife Society

Arizona Chapter

Arizona State University Chapter

Windmill Ranch

Individuals

There are more than 900 individuals to whom copies of the EIS were sent. A complete listing of these names is available from the Superintendent, Flagstaff Areas office, 6400 N. Hwy 89, Flagstaff, AZ 86004.

RESPONSES TO COMMENTS ON THE DRAFT PLAN

The National Park Service received 16 comments on the Wupatki National Monument Draft Environmental Impact Statement / Draft General Management Plan. One was from the Hopi Tribe, five were from federal and state agencies, three were from non-governmental organizations and seven comments were received from individuals

The Council on Environmental Quality (1978) guidelines for implementing the National Environmental Policy Act require the National Park Service to respond to "substantive comments." A comment is substantive if it meets any of the following criteria from Director's Order 12, "Conservation Planning, Environmental Impact Analysis, and Decision-Making (NPS 2001).

- It questions, with reasonable basis, the accuracy of information.
- It questions, with reasonable basis, the adequacy of environmental analysis.
- It presented reasonable alternatives other than those proposed in the plan,
- It would cause changes or revisions in the preferred alternative.

Most comments from individuals expressed opinions about the preferred alternative. Three individuals agreed with the preferred. Three additional commentors agreed generally with the preferred but disliked either the construction of a new visitor contact station near Highway 89, the realignment of the road to Wukoki ruin or both. One individual requested clarification on uses within the monument.

Comments from the Hopi Tribe expressed support for Alternative #4, Emphasis the Integrated Story Between the Parks and Minimize Development.

Some of the letters received have ideas that were outside the scope of the general management plan/ environmental impact statement. The National Park Service values this input and, where applicable, it will be taken into account in future plans. However, no response is provided to such comments in the document.

Photocopies of the letters from the agencies follow. Some letters requested minor changes to the document. These letters and the responses to them are provided.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

December 28, 2001

Sam Henderson, Superintendent
Flagstaff Area National Monuments
6400 N. Highway 89
Flagstaff, Arizona 80004

Dear Mr. Henderson:

The Environmental Protection Agency (EPA) has reviewed the Draft General Management Plans/Environmental Impact Statements (DEISs) for **Sunset Crater Volcano, Walnut Canyon, and Wupatki National Monuments** [CEQ #010375-77]. Our review is pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act.

The DEISs analyze alternatives for managing and protecting resources in the three National Monuments. Four, three, and five alternatives (including "no action") are considered for Sunset Crater Volcano, Walnut Canyon, and Wupatki National Monuments, respectively. Alternative 1 has been identified as the preferred alternative for Sunset Crater Volcano National Monument. This alternative seeks to provide increased educational opportunities and diverse visitor experiences both within and outside park boundaries. Alternative 2 has been identified as the preferred alternative for Walnut Canyon National Monument. Alternative 2 would preserve untrailed expanses, unfragmented natural systems, and relatively pristine resource conditions throughout much of the park. Alternative 3 has been identified as the preferred alternative for Wupatki National Monument. This alternative attempts to ensure the preservation of sensitive park resources while providing a greater diversity of visitor experiences and locations.

EPA has no specific environmental concerns associated with the preferred management plans for the National Monuments, and accordingly has assigned a rating of **LO (Lack of Objections)** to each DEIS. For more information about EPA's rating system, please see the enclosed "Summary of EPA Rating Definitions." We appreciate the opportunity to review these DEISs. Please submit a single copy of the Final EISs to this office at the same time they are filed

CONSULTATION AND COORDINATION

with the Office of Federal Activities at EPA Headquarters. If you have questions about this letter, please contact Leonidas Payne of my staff at 415-972-3847, or by email at payne.leonidas@epa.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "Lisa B. Hanf". The signature is written in a cursive, flowing style.

Lisa B. Hanf, Manager
Federal Activities Office

Enclosure: Ratings Summary



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
2-21-02-I-037

November 29, 2001

Memorandum

To: Superintendent, National Park Service, Flagstaff Area National Monuments
From: Field Supervisor
Subject: Draft Environmental Impact Statements/General Management Plans for Walnut Canyon, Sunset Crater Volcano, and Wupatki National Monuments

This responds to your October 9, 2001, request for comments regarding the September 2001 Draft Environmental Impact Statements/General Management Plans for Walnut Canyon, Sunset Crater Volcano, and Wupatki National Monuments in Coconino County, Arizona. These general management plans will guide the management of the Flagstaff Area National Monuments for the next 10 to 15 years.

The comments provided below are organized according to the sections of the Draft Environmental Impact Statements/General Management Plans (DEIS/GMP) for each National Monument, with pages and paragraphs noted as appropriate. Our comments primarily focus on the DEIS/GMP for the Walnut Canyon National Monument due to the presence of the threatened Mexican spotted owl (MSO) (*Strix occidentalis lucida*) and designated critical habitat for the MSO within the monument.

**Draft Environmental Impact Statement/Draft General Management Plan
Walnut Canyon National Monument**

PURPOSE AND NEED FOR THE PLAN

NEED FOR THE GMP

Natural Resource Management Objectives

Species of Special Concern (page 14): The DEIS/GMP states that the National Park Service (NPS) must ensure that management of the monument does not *adversely* (emphasis added) impact the MSO or designated critical habitat. The Endangered Species Act requires section 7 consultation whenever a proposed action may affect the MSO and/or designated critical habitat,

Superintendent, National Park Service, Flagstaff Area Monuments

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even if the effects are not adverse. Consultation may be concluded informally if the NPS finds, and we concur in writing, that the action may affect, but is not likely to adversely affect, the MSO.

Species of Special Concern (page 14): The DEIS/GMP states the NPS will regularly monitor the distribution and status of selected species, including rare or protected species. We recommend that MSO protected activity centers (PACs) be monitored so that 100-acre nest or roost buffers (Ward and Salas 2000) may be established per the Recovery Plan for the Mexican Spotted Owl (USDI 1995). Current recommendations to conserve MSO include delineation of a 100-acre buffer around a nest/roost prior to thinning and burning in the PAC.

Wildland Fire (page 15): The DEIS/GMP states the NPS has maintained an active prescribed fire program at Walnut Canyon National Monument since 1990 and will soon prepare a new fire management plan (FMP) and environmental assessment. The plan would identify the appropriate tactics for suppressing wildfires and the objectives for using management-ignited fire. Aggressive suppression tactics are only proposed when human life, property, and adjacent lands are threatened. We recommend a programmatic section 7 consultation for the FMP due to the presence of MSO PACs and designated critical habitat within the boundaries of the monument. In order to implement the FMP while considering the MSO and designated critical habitat within the monument, the effects of such a plan should be analyzed in consultation with the Service.

Special Use Management Requirements

Land Protection (page 21): The DEIS/GMP states that the current landowner of the 291 acre in-holding within Walnut Canyon National Monument is planning some improvements to facilitate restoring the historic dam and reestablishing a reservoir. The improvements could include a road and water well. We support the NPS's land protection plan which recommends fee acquisition of the in-holding.

ALTERNATIVES

DEVELOPMENT OF ALTERNATIVES

Actions Common to All Alternatives

DESIGNATION OF CRITICAL HABITAT (page 40): The DEIS/GMP states that any proposed developments other than nonconsumptive recreation use will require consultation with the Service under the Endangered Species Act. As stated above, section 7 requires Federal agencies to consult with the Fish and Wildlife Service on any action funded, authorized, or carried out that may affect the MSO and/or designated critical habitat; this may include nonconsumptive recreation.

Superintendent, National Park Service, Flagstaff Area Monuments

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ALTERNATIVE DESCRIPTIONS

Alternative 2 (Preferred): Emphasize Preservation

KEY ACTIONS (page 44): The DEIS/GMP states that visitors would have access to the eastern end of the park via ranger-guided hikes. An existing Forest Service road would be upgraded and used administratively to facilitate these guided activities and a parking area would be established within the monument from which the guided hikes would be staged. This area is not designated critical habitat, but is MSO habitat. We recommend that the NPS evaluate the potential for effects to the MSO and MSO habitat. This evaluation may include conducting MSO surveys according to an established survey protocol.

Table 3: Summary of Major Impacts (page 64): The DEIS/GMP states that, under the preferred alternative, continued NPS operations and visitor activities in the north-central canyon area would have negligible impacts to threatened, endangered, or sensitive species. Since this area is proximate to designated MSO PACs and critical habitat, we recommend section 7 consultation for any actions, proposed or on-going, that may affect listed species or critical habitat.

AFFECTED ENVIRONMENT

THREATENED, ENDANGERED, AND SENSITIVE SPECIES

Park (page 91): The DEIS/GMP states that the NPS is working with the U.S. Fish and Wildlife Service and U.S. Forest Service to implement the management actions identified in the Recovery Plan for the Mexican Spotted Owl (USDI 1995). Specific actions include monitoring nesting activity and breeding success, protecting critical habitat from wildfire, and managing forest vegetation to conserve specific microhabitat attributes. We look forward to working with the NPS through section 7 consultation to achieve these goals.

ENVIRONMENTAL CONSEQUENCES

LONG-TERM INTEGRITY OF NATURAL SYSTEMS AND PROCESSES

Effects of Alternative 2 (Preferred): Emphasize Preservation

IMPACT ANALYSIS (page 143): The DEIS/GMP states that under Alternative 2, visitor access and activity would increase within the proposed Extended Learning Zone along the north-central canyon rim. The NPS determined that visitor use within the proposed Extended Learning Zone would have long-term, minor adverse impacts on natural systems and processes. Since this area is known MSO nesting habitat, we recommend section 7 consultation for any on-going or

Superintendent, National Park Service, Flagstaff Area Monuments

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proposed activities within the boundaries of the monument that may affect the MSO and/or designated critical habitat.

IMPACT ANALYSIS (page 143-144): The DEIS/GMP states that guided hiking activity within the proposed Guided Adventure Zone in the east canyon area would expand visitor use into the canyon floor. The NPS determined that, under Alternative 2, visitor use within the east canyon area would have long-term, moderate adverse impacts to solitary wildlife species unless the area is closed during important breeding and/or migration seasons, and tour frequency and group size are limited. The east canyon area is MSO habitat and we are concerned about the potential impacts of expanded visitor use of this area. Has the NPS surveyed this area for MSO? When were the last surveys conducted? Would this area be closed to visitor use during the MSO breeding season (March 1 - August 31)? We recommend section 7 consultation on the effects of Alternative 2 (Preferred) on the MSO and/or any designated critical habitat.

THREATENED, ENDANGERED, AND SENSITIVE SPECIES

Effects of Alternative 2 (Preferred): Emphasize Preservation

IMPACT ANALYSIS (page 153): The DEIS/GMP states that the NPS would continue to consult with the U.S. Fish and Wildlife Service in order to ensure management actions do not *adversely* (emphasis added) impact the MSO. The NPS would continue to monitor the owl, protect known nesting territories, and preserve specific habitat attributes in accordance with the Recovery Plan for the Mexican Spotted Owl (USDI 1995). As we stated above, this section needs to be modified to state that consultation will occur on actions that *may affect* a listed species or its critical habitat. Increased visitor activity, road improvements to increase access, and the proposed guided hiking area all have the potential to cause harm or harassment to the MSO. The proposed guided hiking area is outside designated critical habitat for the MSO. However, the area does contain MSO habitat and we recommend that any action proposed for this area be reviewed for its potential to affect the MSO.

IMPACT ANALYSIS (page 154): The DEIS/GMP states that approximately 93% of the total area within the monument would be designated a Resource Preservation Zone, and unauthorized entry would be prohibited. Occasional dispersed hiking would continue within the closed area during cultural site preservation projects, resource monitoring studies, scientific research, educational activities, other special uses, and unauthorized hiking. We recommend section 7 consultation for any project that may affect the MSO and/or designated critical habitat.

Loss in Long-Term Availability or Productivity of the Resource to Achieve Short-Term Gain (page 155): The DEIS/GMP states that under Alternatives 1 and 2, road improvements along the northeast canyon rim would provide more convenient access to the east canyon area. "This would increase ambient traffic noise levels and potential disturbance to sensitive wildlife species within the narrow canyon." Activities on Federal lands that may affect the MSO and/or its critical habitat will require section 7 consultation.

Superintendent, National Park Service, Flagstaff Area Monuments

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Unavoidable Adverse Impacts (page 155): The DEIS/GMP states that the trend of increasing visitor numbers and associated vehicle traffic to the north-central canyon rim could eventually have adverse impacts to sensitive wildlife species. Under Alternatives 1 and 2, proposed road improvements, new trails, and new facilities would potentially increase the risk of establishment and dispersal of nonnative, invasive plant species. Expanding visitor access corridors and use areas along the north canyon rim and into the east canyon floor could increase human presence and noise disturbance to sensitive species within the narrow canyon. Activities on Federal lands that may affect the MSO or its critical habitat will require section 7 consultation.

LONG-TERM INTEGRITY OF WETLANDS, FLOODPLAINS, AND RIPARIAN HABITAT

Effects of Alternative 2 (Preferred): Emphasize Preservation

IMPACT ANALYSIS (page 161): The DEIS/GMP states that the impacts from dispersed hiking within approximately 2 miles of riparian habitat along the east canyon floor would be offset by fencing the 1996 boundary and excluding livestock grazing from the east canyon floor. The effects of each action, recreation and grazing, should be analyzed separately. The removal of one activity may not offset the impacts of the other activity. We recommend section 7 consultation for any action that may affect the MSO or its critical habitat.

CONCLUSION (page 161): The DEIS/GMP states that the continued existence of the Santa Fe Dam within the monument would have negligible impacts, as with the No-Action Alternative. However, the DEIS/GMP states (page 21) that the current landowner of the 291 acre in-holding within Walnut Canyon National Monument is planning some improvements to facilitate restoring the historic dam and reestablishing a reservoir. The improvements could include a road and water well. Whether or not such actions are under the discretion of the NPS, such actions should be considered in the EIS when analyzing the affects of NPS management.

Draft Environmental Impact Statement/Draft General Management Plan Sunset Crater Volcano National Monument

AFFECTED ENVIRONMENT

THREATENED, ENDANGERED, AND SENSITIVE SPECIES

Park (page 93): The DEIS/GMP states that "One endangered species, the Mexican spotted owl, is known to occur on nearby U.S. Forest Service lands." The Mexican spotted owl is listed as threatened under the Endangered Species Act.

Draft Environmental Impact Statement/Draft General Management Plan

Superintendent, National Park Service, Flagstaff Area Monuments

6

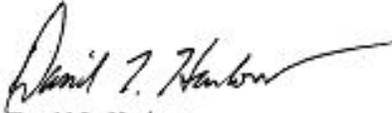
Wupatki National Monument

AFFECTED ENVIRONMENT

THREATENED, ENDANGERED, AND SENSITIVE SPECIES

1 **Region** (page 99): The DEIS/GMP states that "The endangered Mexican spotted owl (*Strix occidentalis lucida*) is found within the region...." The Mexican spotted owl is listed as threatened under the Endangered Species Act.

We look forward to working with the NPS on finalizing the DEIS/GMP for the Flagstaff Area Monuments and we appreciate the opportunity to comment. Thank you for your consideration of the threatened Mexican spotted owl and its habitat. If we can be of further assistance, please contact Shaula Hedwall (92) 226-1811 or Steve Spangle (928) 226-0250.


David L. Harlow

cc: Field Supervisor, U.S. Fish and Wildlife Service, Albuquerque, NM
Regional Director, U.S. Fish and Wildlife Service, Albuquerque, NM (ARD-ES)
John Kennedy, Arizona Game and Fish Department, Phoenix, AZ
Forest Supervisor, Coconino National Forest, Flagstaff, AZ (Attn: Cecelia Overby)

Literature Cited

USDI Fish and Wildlife Service. 1995. Recovery Plan for the Mexican spotted owl: Vol. I. Albuquerque, New Mexico. 172pp.

Ward, J.P. and D. Salas. 2000. Adequacy of roost locations for defining buffers around Mexican spotted owl nests. Wildlife Society Bulletin 28(3):688-698.

DEIS/GPM Comments for Flagstaff Area Monuments SJH:jh

RESPONSE TO COMMENTS

1. The language has been corrected.



United States
Department of
Agriculture

Forest
Service

Coconino
National Forest,
Supervisor's Office

2323 E. Greenlaw Lane
Flagstaff, AZ 86001-1810
Phone: (928) 527-3661
Fax: (928) 527-3620

COPY

File Code: 1950

Date: February 4, 2002

Sam Henderson
Superintendent
Flagstaff Area Monuments
6400 N. Hwy 89
Flagstaff, AZ 86004

Dear Sam:

Enclosed are comments on the Draft Environmental Impact Statements (DEIS's) for General Management Plans for Sunset Crater Volcano, Walnut Canyon and Wupatki National Monuments.

In these comments I refer to the current Memorandum of Understanding that exists between the Coconino National Forest and Sunset Crater and Wupatki National Monuments. I understand the District staff and your staff are initiating an update of the MOU, and that the update will include items related to Walnut Canyon. The MOU is a good tool for capturing some of the more specific roles and responsibilities than are appropriate at the General Management Plan level.

Although most of the comments that follow identify points of disagreement or areas where language changes are desirable, please note that there are many good things in these documents. Many items reflect the spirit of our efforts to look beyond our own boundaries, and be cognizant of the effects of our management on each other. I am pleased to see the level of cooperative management that is identified, including law enforcement, interpretation job sharing, fire protection and suppression, administrative boundary adjustment, and resource management. It is with these successes in mind that I offer the following comments for each of the National Monuments.

POINTS COMMON TO ALL THREE DOCUMENTS

2 Under Actions common to All alternatives under Partnerships and Regional Planning heading in all three DEISs you mention that per FLEA, there *"will be increased emphasis on monitoring the effects of recreation, grazing, and other human uses on these lands; documentation of unacceptable impacts will provide a basis for management changes to control those effects"* Currently the FLEA document reads, *"Continue active monitoring of cultural and historical sites to impacts from recreation, cattle grazing, firewood cutting and other human uses. Changes in management can occur in response to demonstrated (through monitoring) negative impacts to archaeological resources. Take advantage of available Park Service personnel to assist with monitoring."* I hope there are not misconceptions between the two agencies about the level of monitoring we are suggesting here. Perhaps our two staffs' should be given this as a work item



for the MOU, to be clear about what we are able to accomplish between the two agencies with our expected levels of staff and funding.

You state in the beginning of each DEIS that the General Management Plan is a general planning document that does not make site-specific decisions. However, the documents go on to put a location of the visitor centers on the preferred alternative maps. In addition, some effects sections discuss anticipated effects from constructing the visitor centers. I would suggest that the final locations and effects analysis for visitor center locations be discussed in later, site-specific NEPA documents. The question today is whether or not we agree or disagree with the concept of new visitor centers. See the discussion below related to each Monument.

3

We disagree with some of the conclusions about archaeological effects that occur outside the Monuments as described in all three DEISs. Some examples are in the Wupatki document on page 120 it states "*As the population of Flagstaff grows, recreation impacts on USFS lands and resources will continue to increase, resulting in additional degradation of archaeological sites. As archaeological sites are degraded and destroyed outside the park the relative rarity and importance of these archaeological resources within the Monument will increase.*" The implication that our management would allow degradation and destruction of these resources is not accurate. We would never knowingly allow this to happen, as it would be illegal! It is not that we don't recognize impacts occur, but that your document ties illegal activities and unfounded unsupported damage claims directly associated with multiple-use management. When we find damage occurring we pursue prosecution of illegal activities to the fullest extent of the laws, reference the recent Kinnickinick prosecution. Please rewrite these statements so they do not inaccurately portray multiple-use management as illegally managing the archeological resource.

4

In the *Wetlands, Floodplains and Riparian Effects* Sections Under the Cumulative Effects (for No Action) you write "*much of the land within the watershed could eventually be acquired for development by the City of Flagstaff.*" To say that "much" of the watershed could eventually be acquired misrepresents our current trends in land exchange. These documents, overplay the potential for future land trades. A more realistic scenario would be the current language in FLEA and the RLUTP that discusses conservative changes over time, such as pages 31 and 56 of the FLEA Proposed Action. As an introduction to the land use and growth management and open space elements section of the RULTP, it indicates that the Regional Plan is designating growth boundaries that should be adequate for the next 30 years or more. This concept is repeated throughout the document. Since you also say that the cumulative effects for the action alternatives are similar to those described for No Action, I believe it is important to make this adjustment.

Under the Heading *Methodology* (for the Environmental Consequences Chapter) in all three DEISs you state "*All alternatives were also evaluated based on external factors that, together with the actions of each NPS alternative, could have cumulative impacts. In order to determine cumulative impacts, a cumulative scenario was developed. That scenario included the following actions: On FS lands, there will be some reduction in roads. Monitoring of impacts will increase, but existing activities will continue unless monitoring shows problems. Forest closures/increased restrictions (including those related to fire hazard conditions) may transfer*

some pressure to parks. Increased access to different locations on USFS lands may affect park eligible resources. The FS is currently managing areas next to the City as open space, but would rather exchanges such areas in accordance with regional land use plans. The urban boundary would then move closer to the parks. The FS "Company's Coming" program could affect all three parks.

5

There are many points within this paragraph that don't ring true for me: 1) I am not aware that current trends are for increased access. The ROS objectives and the road management criteria in the FLEA Proposed Action show our intentions for reducing or eliminating roads at the rim's edge, and achieving a well-designed system of roads and trails in the larger watershed; 2) Park eligible resources are not necessarily degraded as a result of increased access. Well-managed use can protect and maintain resources. Our experience to date is that much of the Walnut Canyon has been maintained over the past few years, in spite of increased use of Forest Service trails in the area; 3) There are a few parcels of NF lands within the Urban Growth boundary as proposed in the RLUTP that FLEA suggests ultimately exchanging to the City for community purposes. However, even if these parcels are exchanged, because of their location they do not bring Urban development any "closer" to the Monuments; 4) I agree that FS actions may transfer some recreation pressure to the Monument; 5) The Company's Coming strategy was to increase our ability to respond to increasing recreation demands that are already occurring – not to draw more visitors to areas. In this regard we share the impacts of Company's coming. As written the concept is misrepresented, indicating we are actively pursuing recreational user increases and that this activity will affect park management. Conversely, the concept identifies that we recognize increased pressure whether it is invited or not and the strategy is to be responsive to that inevitable situation.

Under the Decision Points section you mention "Important park goals are to ensure adequate visitor orientation and education and to minimize use impacts. We need to decide whether to accomplish this by increasing facilities and service or by limiting entrance points and visitor circulation." I appreciate the challenge described here. This is a well written decision point that can also be applied to many of the popular sites on the National Forest.

6

On P179 in Walnut, P213 in Wupatki and P182 in Sunset -Under the Effects of the No Action Alternative (existing conditions) – the paragraph that describes the activities considered in the FLEA analysis is outdated. Some of the activities described such as snowplay, motocross, and mineral withdrawal have been removed from the FLEA analysis and are proceeding under separate analysis, are complete, or have been dropped. You might also consider listing other Forest Plan amendment proposals in your effect sections such as the 3-Forest noxious weed strategy and the 5-Forest OHV Amendment. See the FLEA PA for a description and contact person for these projects.

WALNUT CANYON

Major Points

P3 Under the heading Park Mission - You mention that NPS has ownership of the entrance road via Public Law 104-333 approved in 1996. We have received your letter describing a solicitor's review of the law. However, as we understand it, the ownership status of this road is still in question. Until that is resolved we suggest changing this language from "added" to "identified".

On P38 You indicate that there are three reasons why you would consider a boundary expansion. The third is "...a change in land use or the sale or exchange of State Trust lands that would result in residential or commercial development of these adjacent lands." However, you fail to indicate anywhere previous to this section that the City is currently creating a petition to the State Land Department requesting that these lands be classified for conservation needs under the Arizona Preserve Initiative. This would remove these lands from the possibility of development.

P43 Under the heading Key Actions (for Alternative 2 Preferred) you describe a "new fully accessible visitor center and parking area would be built near I-40 at the park entrance. I agree with the concept of a new visitor center. The specific location would be determined through another NEPA analysis and decision and a Special Use Permit would be required from the Forest Service (please make this note in the Final EIS). The I-40 location could be one alternative, however, as we enter into the site-specific analysis, I would like to explore additional alternatives near the Monument.

P44 Under the heading Key Actions (for Alternative 2 Preferred) you describe three gates located along the entrance road: one near the I-40 exit and one on each side of FR303. I agree with the concepts of gating the entrance road between the final visitor center location and the Monument. However, I ask that these gates be contingent upon the final location of the Visitor Center and not a stand-alone item. This will ensure that we coordinate access with the Visitor Center location and limit unnecessary changes in public access.

Minor editorial comments

P12 Under the heading Water Resources – You mention that a settlement about water impoundments in Lake Mary is anticipated in the near future. I would strike the wording "near future" unless you have heard something different than us concerning this settlement. Our understanding of status would indicate that "near" might be misleading or overly optimistic.

P20 The Centennial Forest is not listed as a cooperator and you might add them if you feel that is appropriate.

WUPATKI

Major Points

P40 – Under the heading Boundary Criteria – This section describes resources outside of the Monument on National Forest lands that would be desirable to have in NPS ownership – and goes on to say *“The USFS is not supportive of any expansion or modification of Monument boundaries onto FS lands at Wupatki. Because of this, no boundary expansions were presented in Alternative 3, the preferred alternative”*. I agree with this statement. I believe a boundary expansion to the south of Wupatki is not warranted and look forward to continued cooperative efforts in this area.

Under Alternatives Considered but Eliminated – the Basis for Rejection of a Boundary Expansion (to the south of the Monument) was *“This alternative was considered and rejected in light of the current planning efforts of the Coconino NF and their desire to work cooperatively with NPS in managing the resources on lands south of Wupatki. The FS expressed desires to work with NPS to increase efforts to preserve natural and cultural resources and to provide for public uses that would help sustain the integrity of those resources. With participation from both agencies, integrated programs could accomplish resource preservation and visitor use and education without a major boundary expansion.”* You have accurately depicted our position. I encourage my staff and yours to continue work on the FLEA process to outline Forest Plan language changes if needed to continue to meet desired conditions in this area. I also encourage our staff to continue to work on an update of the MOU to outline specific roles, responsibilities and tasks.

P98 – Under the heading Affected Environment you state that the *“NPS remains concerned that USFS management of lands south of the monument is adversely affecting the condition of large watersheds that drain through the monument and leading to instances of poaching... woodcutting, Off road vehicle use, and unauthorized access within the closed area of the Monument. The NPS hopes to alleviate these concerns through increased communication, monitoring ecosystem conditions and better participation in the UFFS planning process. If successful, these efforts could mitigate certain adjacent land use impacts upon resources within the monument.”* I do not see our management of these watersheds as having adverse effects.

For example “Poaching” is not a FS management action, although we actively manage against that activity, and work with the Game and Fish Department to take management actions in response to this illegal activity. Woodcutting is regulated thru permit, which specifies amounts, species, and strictly describes types of wood legal to cut. Fuelwood cutting is further managed by area (there is a large portion of the subject area where woodcutting is not permitted. We manage the woodcutting program and would not allow this activity if we determined it was causing resource damages. It has been our experience that removing the dead material of an invasive species (at least where PJ is encroaching into grasslands, see P. 95) is not an adverse affect on watershed. Once Pinyon-Juniper has been removed grasses and forbs come in and occupy those sites. Off road driving is managed by area. A large portion of the area south of the monument is closed to all off road driving where we have made determinations that it is an inappropriate or conflicting use or that resource damage could occur. Off road laws farther

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manage driving and regulations and becomes an illegal activity when done in such a manner as to cause adverse effects on the watershed. Not all off road driving adversely affects watershed conditions. There are instances where off road driving causes resource damage, which under our laws and regulations are clearly illegal activities. Making the connection of unauthorized entry into the closed area of the monuments and FS management adversely affecting large watersheds does not seem connected. In any case we would tend to disagree that FS management leads to unauthorized access. It is inaccurate to connect FS management to illegal trespass on the monument when we neither condone nor accept this illegal activity. It is acknowledged that all of these activities occur, it is the wording and implication that is difficult for us to accept. Please, rewrite this paragraph in its entirety and eliminate the connection of FS management and adverse watershed condition.

7

P110 Park Under the Affected Environment for Park Neighbors... You mention that *"hiking, hunting, woodcutting, climbing, mountain biking, horseback riding and shooting activities within the area are for the most part not regulated and often result in physical intrusion onto the Monument"* I do not agree with the statement, "FS lands are unregulated" We have adequate regulations. These regulations govern when these activities become unacceptable. The mere fact that we allow these activities does not mean they are unregulated.

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P153 Under the Heading Effects of No Action Alternative (to Long Term Integrity of Natural Systems and Processes) - I agree with your emphasis on the control of noxious weeds. I request that my staff and yours continue these efforts and consider noxious weed control as a topic for the revised MOU.

P192 – You mention spring flows at three springs and state that NPS is *"participating in the local planning process for CNF to address land uses and vegetation conditions that may adversely affect spring flows"*. The concept of spring flows at Wupatki was not discussed earlier in the FLEA process and is not currently mentioned in the Proposed Action. My staff will need to assess whether or not this is outside the scope of the FLEA analysis, or if it should be a separate planning process. I look forward to more discussion between our staffs' related to this topic.

SUNSET CRATER VOLCANO

Major points

In the Preferred Alternative 1 description you state *"NPS and FS would jointly construct and operate a new VC near the intersection of FR545 and 89. Before the specific location is determined additional environmental analysis and coordination with the FS would be necessary. The new VC would provide visitor orientation for both park and forest visitors before they encounter sensitive resources. The existing housing and maintenance area would be retained; the maintenance area would be rehabilitated."* I agree with all of these concepts. Our staffs might consider language in the revised MOU that streamlines future planning for the Visitor Center location. Again please mention that a Special Use Permit from the FS is required.

Preferred Alternative 1 Boundaries – map – Our informal comments previously sent to you included a different boundary adjustment than the one shown for the preferred alternative. Please see the attached map for our current opinion about the Sunset Crater Volcano boundary. I do not agree with some of the boundary adjustments and I agree with others. My intent is that the Monument should include those major land features that are currently part way in and part way out of the Monument i.e. Lenox Crater and the un-named crater on the northeast corner of the Monument. My intent is also that boundary changes be considered that improve management efficiency. I have recently changed my position about the administrative site, which currently holds the Visitor Center, housing and maintenance area. Because the land is owned by the FS and administered by the NPS there has been confusion and time consuming waiting periods for completing NEPA decisions for even the smallest of activities. The administrative site changing to NPS ownership would achieve a more efficient use of our staff time. The boundary you propose is greater than what is necessary to improve management efficiency and I would appreciate your consideration of the attached map.

P37 Administrative Boundary Expansion (Alternative 1) you state that the expansion would also eliminate a number of forest roads that cross in and out of the monument boundaries and place them entirely within Forest Service ownership. The boundary expansion you propose places more, not less roads in the situation of crossing in and out of NPS boundaries. The FS would request administrative and in some cases public access on FR776, FR546 and the O'Leary Peak Road.

P42 Under the Heading Alternative 1 (Preferred) Key Actions – There is not a mention of the O'Leary Road. However, in one of the alternatives considered but eliminated from detailed study it is mentioned that the *O'Leary Road may be closed to motorized access and promoted as a hiking opportunity. Off-trail backcountry hiking would not be permitted.* I would like our staffs to consider this as an option for the preferred alternative. Please make a note that this change requires additional consultation with the Hopi and Navajo Tribes. Discussions should also include the concepts displayed in the FLEA proposed action of smaller loop trails at the base of O'Leary Peak adjacent to the O'Leary Group site (see FLEA Proposed Action p51). By providing other trails near the campground we may lessen the number of hikers on the road. Our staffs should work on clear direction related to how much 'promotion' of the trail occurs. In addition, I would also like both FLEA and the NPS GMPs to re-iterate that permits and existing

uses would be maintained on O'Leary Peak and that administrative use by FS and electronics site permittees are permissible uses.

P39 Under the Heading *Actions Common to All Alternatives C. Campground Expansion* – you state that the USFS has agreed that the campground will remain in its current location no longer than the life of this general management plan. Our position is that we will not make a decision today about the future of the Bonito Campground. Rather we leave that discussion and decision to future FS staff. Our actions neither set precedent for nor preclude this discussion in the future. There is not a pressing reason today for moving or closing the campground. Please remove this statement.

P.36 Under the Heading *Boundary Expansion Criteria* you state "*the ability of visitors to understand the full story of Sunset Crater is hampered because visitors are unable to access primary resources related to Park significance, particularly the fissure area and Gyp Crater to the southeast. Current OHV use in the Cinder Hills OHV area precludes park visitors from hiking in this area for safety reasons*". I understand the conflicts that arise with having an OHV area within sight and sound of the Monument, and the associated visual and noise impacts and concerns that are accurately described here. However, the assertion that visitors are unable to access Gyp Crater and the fissure area is inaccurate. There are no restrictions to hiking, horse riding or driving a vehicle except for vehicle restrictions in Gyp Crater itself. Access, for the purpose of seeing these geologic features, is not restricted.

On P37 Under the Heading *Boundary Expansion Criteria* you state "*continued use the OHV area will contribute to this acceleration of erosion and damage to the geologic features on the Cinder cones*" This statement is correct to some extent, however, we are taking steps to more actively manage the OHV area to limit this occurrence. Per the FLEA PA we propose to implement actions in the area of the fissure with vehicle slope closures, designated trails 'vehicle slow' zones, and changes in camping. In addition, the Cinder Hills Implementation Schedule lists many of the specific actions that are not described in the FLEA PA. I encourage our staffs to continue to review and update the Implementation Schedule as needed and include specific items in the MOU update. FLEA also adds to Forest Plan language for the Cinder cones located outside of the OHV area, with an emphasis of maintaining un-tracked appearance and cinder-adapted species.

On P48 of the Sunset Crater DEIS Regional planning consideration, General Concept: This section states that "NPS has de facto management by virtue of proximity and presence" of the land located between Sunset Crater Volcano and Wupatki National Monuments. We do not agree. This is managed by the Forest Service. In addition, the Arizona Game and Fish Department manages the wildlife and surveys the area.

CONSULTATION AND COORDINATION

Minor editorial comments

P101 states that Land Management plans exist for some of the areas surrounding the monument. This is incorrect, as land management plans exist for ALL of the areas surrounding the monument.

Sincerely,


JIM GOLDEN
Forest Supervisor

cc:

Ronald Eberhart, National Park Service, Denver, Colorado
Ron Sieg, Game & Fish, Flagstaff

RESPONSE TO COMMENTS

- 2) Language has been changed.
- 3) No action taken. General Management Plans locate facilities in areas and base effects on known information for those areas. More detailed studies and alternatives within areas are considered in future studies.
- 4) Language has been changed.
- 5) Language has been changed.
- 6) Language has been changed.
- 7) Language has been changed.
- 8) Language has been changed.

CONSULTATION AND COORDINATION



United States
Department of
Agriculture

Animal and
Plant Health
Inspection
Service

Wildlife Services

REC V
10-26-01
2224 W. Desert Cove Ave.
Suite 209
Phoenix, AZ 85029
(602) 870-2081

October 22, 2001

Sam Henderson
Superintendent
Flagstaff Area National Monuments
National Park Service
6400 N. Highway 89
Flagstaff, AZ 86004

Dear Mr. Henderson:

The US Department of Agriculture/Animal and Plant Health Inspection Service/Wildlife Services, Arizona Program recently received copies of draft "General Management Plans/Environmental Impact Statements for Sunset Crater Volcano, Walnut Canyon, and Wupatki National Monuments" created by the National Park Service (NPS). The Arizona Program is providing the following comments:

- 9
- The Flagstaff area monuments are in the heart of plague country. The plans did not address how the NPS would address an outbreak of plague for the protection of human health and safety and to protect native wildlife.
 - The Flagstaff area monuments have had bat rabies documented on site. The monuments are also near the recent outbreak of bat rabies in skunks that occurred in Flagstaff this year. The plans do not address how the NPS would respond to additional rabies outbreaks for the protection on human health and safety and native wildlife.
 - Reference is made to the potential impacts of feral cats and dogs. What options does the NPS intend to use to manage invasive vertebrate species including feral cats and dogs?
 - In reference to threatened and sensitive species, the document relies heavily on continual monitoring of the listed species and closure of areas to protect threatened and sensitive species. What additional options does the NPS intend to use to maintain or increase threatened and sensitive species, especially vertebrate species?
 - The Arizona Program would like to continue to be included on the NPS's mailing list for the aforementioned plans as well as for additional information sent out by the NPS.

If you have any questions pertaining to my response, then do not hesitate to contact me at Area Code (602) 870-2081.

Sincerely,

David Bergman
State Director



APHIS - Protecting American Agriculture

RESPONSE TO COMMENTS

9) This level of detail is beyond the scope of general management plans. The rabies issue is more appropriate to the park's Integrated Pest Management Plan, last updated in 1996. This input will be taken into account in future plans

THE HOPI TRIBE



Wayne Taylor, Jr.
CHAIRMAN

Phillip R. Quochoytewa, Sr.
VICE-CHAIRMAN

December 28, 2001

Sam R. Henderson, Superintendent
Wupatki-Sunset Crater Volcano-Walnut Canyon National Monuments
6400 North Highway 89
Flagstaff, Arizona 86004

Dear Superintendent Henderson,

Thank you for your correspondence regarding the Flagstaff Areas National Monuments' enclosed draft General Management Plans/Environmental Impact Statements for Wupatki, Sunset Crater Volcano, and Walnut Canyon National Monuments. The Hopi Tribe appreciates your continuing solicitation of our input and your efforts to address our concerns.

After centuries of migrations, our ancestors, *Hisatsinom*, People of Long Ago, left their ancient villages at Walnut Canyon, Wupatki, Elden Pueblo, and other sites around Flagstaff and throughout the Southwest, to complete their migrations by arriving at *Tuwanasavi*, the Center of the Universe, in fulfillment of a covenant with *Ma'saw*, the Earth Guardian. The Hopi Tribe considers our ancestral villages at Walnut Canyon and Wupatki, referred to as archaeological sites, to be Hopi Traditional Cultural Places. Other Hopi Traditional Cultural Places associated with our ancestral and modern Villages include shrines, trails, rock markings, and traditional gathering places. Hopi people consider prehistoric archaeological sites and isolated occurrences to be the "footprints" of our ancestors, and we do not consider our ancestral sites to be "abandoned." Wupatki, Walnut Canyon, and Sunset Crater are Traditional Cultural Places of the Hopi Tribe. Therefore, the Hopi Cultural Preservation Office supports the identification and avoidance of prehistoric sites.

The Hopi Cultural Preservation Office has reviewed the draft General Management Plans/Environmental Impact Statement for Wupatki National Monument, and we offer the following questions and comments.

We appreciate the Park Mission purpose statement, "to preserve, protect, care for, and manage Hopi ancestral sites..." which is consistent with the enabling legislation for the Monument. We also appreciate the significance statement, "Historic material reveals a rich record of human endeavor left by Navajo families over a period of 150 years..." and the statement in the Outstanding Park Values and Resource Concerns section, "Wupatki is primarily

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Cultural Preserv

02

Sam R. Henderson
 December 28, 2001
 Page 2

a place inhabited by people of the Ancestral Puebloan cultural tradition."

We note that the Relations with Park Neighbors and Other Agencies section does not include the Hopi Tribe or Hopi Cultural Preservation Office, and that in the Ethnographic Resource section and throughout the documents general references are made to culturally affiliated tribes. How can the Flagstaff Areas accomplish its mission, "to preserve, protect, care for, and manage Hopi ancestral sites..." without the Hopi Tribe and the Hopi Cultural Preservation Office?

The Outstanding Park Values and Resource Concerns section states:

The archaeological sites that Wupatki National Monument was created to protect are considered to be the ancestral homes of modern day Hopi, Zuni and other Puebloan people. Certain Navajo clans also claim affiliation to the prehistoric pueblo remains...

The Hopi Tribe does not dispute that certain Navajo clans claim association to prehistoric pueblo sites, landmarks or ruins. However, the Hopi Cultural Preservation Office has reiterated the position of the Hopi Tribe that geographical association to an area does not constitute cultural affiliation to human remains as defined by the Native American Graves Protection and Repatriation Act.

The Hopi Cultural Preservation Office generally supports Alternative 4 in the Wupatki draft Plan: Emphasize Integrated Story Between the Parks and Minimize Development, because this alternative "would have a major beneficial effect for most archaeological resources," and

would provide a beneficial effect on tribal cultural values and would provide the greatest protection to ethnographic resources of all the proposed alternatives.

This alternative "would preserve and enhance the minimally altered prehistoric cultural landscape."

However, we do not see the necessity of removing the existing visitor center and museum as proposed in Alternative 4. Perhaps removal of the visitor center/museum in this alternative is intended to enhance the preferred alternative, Alternative 3, which focuses on diversifying the range of visitor experiences.

The Hopi Cultural Preservation Office has reviewed the draft General Management Plans/Environmental Impact Statement for Walnut Canyon National Monument, and we offer the following questions and comments.

The archaeological sites in Walnut Canyon are Hopi ancestral sites. To the Hopi

Sam R. Henderson
December 28, 2001
Page 3

people, Walnut Canyon, is *Wupatki*, Long Canyon, and is an ancestral home of the Bearstrap and Bluebird Clans. *Sonyona*, Bat Spring, is a Hopi Traditional Cultural Place.

In the Index, Hopi is listed on page 99, which contains a reference to Nava-Hopi Tours.

The Hopi Cultural Preservation Office generally supports Alternative 2 in the Walnut Canyon draft Plan: Emphasize Preservation. However, we do not see the necessity of a new visitor center as proposed in this alternative. Perhaps the new visitor center in this alternative is intended to enhance the preferred alternative, which is intended to emphasize preservation, in contrast to Alternative 2, which is intended to diversity opportunities for visitor use.

The Hopi Cultural Preservation Office has reviewed the draft General Management Plans/Environmental Impact Statement for Sunset Crater Volcano National Monument, and we offer the following questions and comments.

The Hopi Cultural Advisory Task Team has expressed concerns regarding the checkerboarding of the Cinder Hills for various commercial and recreational purposes, including mining and off road vehicle use. Sunset Crater and the Cinders Hills are a Hopi calendar and a Hopi Traditional Cultural Landscape. Sunset Crater and the Cinder Hills are the home of certain *katsinas*, and are central to numerous clan traditions. The *katsinas* return to the San Francisco Peaks after the Home Dance, *Nimankatsina*, through Bonito Park.

Page 1 states, "Wupatki is currently operating under a Master Plan approved in June 1982."

On page 28, please use paragraphs to separate the Hopi shrine and oral tradition references from "Several contemporary American Indian tribes..." and "The Navajos and Apaches..."

In the Index, Hopi is listed, "22, 28, 29, 36, 82, 84, 86, 99, 100, 101, 127, 185, 203, 204." We find no references to Hopi on pages 29, 82 (which is blank), 99, 100, 127, 185, 203, or 204. These references are apparently to Sunset Crater or American Indian tribes.

The Hopi Cultural Preservation Office generally supports Alternative 3, Expand Park Boundaries to Preserve Park Related Resources in the Sunset Crater draft Plan.

Sam R. Henderson
December 28, 2001
Page 4

We note that the Relations with Park Neighbors and Other Agencies sections in all three Plans do not include the Hopi Tribe or Hopi Cultural Preservation Office, and that in the Ethnographic Resources sections and throughout the documents, general references are made to culturally affiliated tribes.

How can the Flagstaff Areas accomplish its mission at Wupatki National Monument without the Hopi Tribe and the Hopi Cultural Preservation Office?

The Ethnographic Resources sections in all three Plans state a Desired Condition:

All agencies shall accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and avoid adversely affecting the physical integrity of these sacred sites.

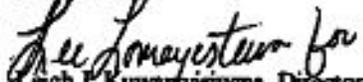
Wupatki, Sunset Crater, and Walnut Canyon are traditional gathering places for certain Hopi Clans. This Desired Condition appears to us to be inconsistent with the Flagstaff Areas past position on Hopi traditional ceremonial use.

Although these Plans address the long term integrity of archaeological and ethnographic resources generally, they demonstrate that there is a continuing lack of recognition and integration by the Flagstaff Areas of specific contemporary Hopi traditional values that are ascribed to our ancestral sites at Wuptaki, Walnut Canyon, and Sunset Crater National Monuments.

The Flagstaff Areas' consultation in practice, as demonstrated by the Walnut Canyon new lands survey proposal, consists of notification. Therefore, the Hopi Cultural Preservation Office suggests that each of these Plans include development of Cooperative Agreements between the Flagstaff Areas and the Hopi Tribe. And therefore, the Hopi Cultural Preservation Office requests additional consultation on these Plans.

We reiterate our invitation to you and your staff to our January 23, 2002, administrative meetings, as stated in our letters dated December 12 and 26, 2001. At that time, we can address our comments on these General Management Plans, and the Walnut Canyon new lands survey and fuels reduction projects.

Respectfully


Leigh J. Kuwanwisirwma, Director
Cultural Preservation Office

cc: Office of the Chairman
Kurt Doseppski, Clay Hamilton, HCPO

RESPONSE TO COMMENTS

10) Tribal Consultation in preparation of the general management plan was extensive and is addressed in the section *Consultation and Coordination*. An additional heading has been added for clarification.



THE STATE OF ARIZONA
GAME AND FISH DEPARTMENT

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Flagstaff Office, 3500 South Lake Mary Road, Flagstaff, AZ 86001-1043

January 29, 2002

Mr. Sam Henderson, Superintendent
Flagstaff Area National Monuments
National Park Service
6400 N. Highway 89
Flagstaff, Arizona 86004

Re: Draft General Management Plans/Environmental Impact Statements
Sunset Crater Volcano, Walnut Canyon and Wupatki National Monuments

Dear Sam:

The Arizona Game and Fish Department (Department) appreciates the opportunity to review the subject projects. It is obvious that production of these documents required an enormous amount of time and effort. We commend the National Park Service, and especially the Flagstaff Area National Monuments staff, on this endeavor.

We are pleased that the National Park Service is committed to cooperating with other state and federal agencies regarding resource management on lands adjacent to the monuments. We are also pleased that the management plan for Walnut Canyon National Monument and the Flagstaff Area Regional Land Use and Transportation Plan are in agreement with respect to expansion. Additional comments are provided in the attached documents, which are specific for each monument.

We look forward to working with you to finalize these documents and implement specific actions. If you have any questions or require additional information, please contact me at 774-5045.

Sincerely,

Debra C. Wright
Habitat Specialist

:dw

cc: Bob Barsch, Wildlife Manager
Carl Lutch, Wildlife Manager
Larry Phoenix, Sector Supervisor
Jim Golden, Supervisor, Coconino National Forest
Kath Farr, Coconino National Forest

Enclosures

COMMENTS TO THE DRAFT ENVIRONMENTAL IMPACT STATEMENT
AND DRAFT GENERAL MANAGEMENT PLAN
WUPATKI NATIONAL MONUMENT
Arizona Game and Fish Department
January 29, 2002

General	The Department generally supports the selection of Alternative 3 for the management of Wupatki National Monument, subject to the following comments:
Page 15 11	<p>Wildland Fire: This section states that a fire management plan will be prepared for Wupatki NM. We support the development of this plan and recommend that this document be finalized as soon as possible. Much of the grassland habitat on the monument would benefit from removing encroaching pinyon and juniper vegetation. We also recommend that this information be provided as an Action Common to All Alternatives on page 41.</p>
Page 40 12	<p>Administrative Boundary Expansion to the South (Alternatives 1, 2, and 4): We have stated during several meetings and in correspondence that we do not support expansion of National Monuments unless resource values can not be adequately managed by the adjacent land management agency (in this case, the U.S. Forest Service). We remain committed to this position and therefore, do not support proposed boundary expansions to the south, proposed in Alternative 1, 2 and 4 (page 44-49).</p>
Page 40 13	<p>Boundary Expansion to the North, Involving State and Private Lands (All Alternatives): As previously stated, the Department is not generally supportive of boundary expansions. In addition, because of the size of this proposed boundary expansion (23,000 acres), we are concerned about the potential loss of wildlife related recreational opportunities on these lands.</p> <p>However, we understand that a representative of the C O Bar Ranch has approached the National Park Service regarding their interest in selling, donating, exchanging, establishing a conservation easement, or developing a cooperative management agreement for this land north of the monument. If this expansion occurs, we recommend that all unnecessary boundary fencing be removed when new boundary fencing is constructed. We also recommend that any new fencing be constructed to meet the Department's Game Fence Specifications and/or the installation of "goat bars".</p>
Page 45-48 14	<p>Alternative 1: and Alternative 3 (Preferred): Both of these alternatives include development of a Lomaki/Box Canyon Extended Learning Zone. The Department is concerned that this action may result in negative impacts to pronghorn utilizing this area. As stated in this document (page 157), this area is in the geographic center of the grassland, which is utilized by a significant number of pronghorn year- round. Up to 300 pronghorn have been observed between the Navajo Nation and I-40 during recent aerial surveys, many of which inhabit or move through the monument during some time of the year. While pronghorn may tolerate vehicular travel through their habitat, research has shown that they are especially wary of vehicles slowing to a stop and of people on the ground. In addition, the zone of</p>

influence may extend approximately ¼ mile beyond the boundary of the activity. Therefore, the Department recommends that if Alternative 1 or 3 is chosen, this Extended Learning Zone be as small as possible, such as that proposed for Alternative 2 and 4. In addition, we recommend that this action be mitigated if an Extended Learning Zone is established at Lomaki/Box Canyon.

Mitigation for disturbance to pronghorn habitat could include repair of Tank 8 northwest of Sunset Crater Volcano National Monument, grassland habitat enhancement through removal of pine encroachment in Bonito Park, and/or fencing modifications along FR545e near Sunset Crater Volcano National Monument to meet the Department's Game Fence Specifications. If these activities on adjacent Forest Service land would not be possible, we recommend that mitigation measures occur on Sunset Crater Volcano and/or Wupatki National Monuments. These activities could include grassland habitat enhancement by removing pine or pinyon/juniper invasion at various sites on Wupatki National Monument, timely restoration of Heiser Spring surface water for wildlife utilization, fencing modifications on either monument to meet the Department's Game Fence Specifications, and/or installation of "goat bars" on monument fences to encourage pronghorn movement. The Department recommends that specific mitigation measures be identified and analyzed subsequent to a formal decision on the General Management Plan or during the project-specific NEPA process. At that time, actions, methods, and timelines can be mutually developed.

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Page 46-47

Alternative 2: and Alternative 3 (Preferred): These alternatives include the development of a new contact station and associated wayside exhibits at the north entrance on US 89. As you know, a significant number of pronghorn utilize the east side of US 89, in addition to another herd on the west side of the highway. Radio telemetry research on pronghorn utilizing Wupatki National Monument conducted between 1992 and 1994 showed an abundance of locations within approximately 5 miles of US 89, including at the north entrance road. Therefore, we are concerned about the potential impacts of additional human disturbance to pronghorn in this area.

Although only about 3 acres of land would be cleared of vegetation, human disturbance would affect pronghorn in a larger perimeter. In addition, while the pronghorn utilizing this area may have become habituated to the heavy highway traffic noise on US 89 (page 160 & 164), this should not be extrapolated to assume that they are habituated to human disturbance and noise. Research has shown that pronghorn are especially wary of vehicles slowing to a stop and of people on the ground. Therefore, the Department recommends that, if Alternatives 2 or 3 is selected, specific measures be implemented to mitigate these impacts as discussed above. Another suggestion for mitigation would be to cooperate with Arizona Department of Transportation to remove additional Right-of-Way fence on both sides of US 89, which would allow pronghorn to move freely between the east and west herds.

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Page 48

Alternative 3 (Preferred): Key Actions: This alternative provides for a new trail to be constructed into the grassland ecosystem on Antelope Prairie. However, this trail is not delineated on the Alternative 3 map. We recommend that this trail be indicated on the map.

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In addition, we are concerned about the potential impacts from a new trail into the grassland habitat, which is important to the pronghorn utilizing that area (see above). The potential impacts to pronghorn from this proposed trail will be exacerbated by the utilization of the northern road to Crack-in-Rock (Alternatives 2-4), the proposed contact station at US 89 (Alternatives 2 & 3), and the Lomaki/Box Canyon Extended Learning Zone (Alternatives 1-4). All of these actions are proposed to occur within 5 miles of US 89, which research has shown to be the most heavily utilized area of the monument by pronghorn (see above). The combination of these actions along with the resulting increase in human activity and recreation in this area will restrict the usable pronghorn habitat to a corridor between the Lomaki/Box Canyon area and the visitor contact station and another corridor between the Lomaki/Box Canyon area and the Doney Mountain area. In addition, this usable habitat will be bisected by utilization of the northern road to Crack-in-Rock (Alternatives 2-4).

These four actions will result in further fragmentation of the grassland ecosystem and pronghorn habitat in this area. Habitat fragmentation, in addition to human disturbance and loss of habitat has been shown to be highly detrimental to the long-term viability of pronghorn. Therefore, the Department is very concerned about the cumulative effects of these four actions on this species. We recommend that, if these actions occur singly or in combination, specific measures be implemented to mitigate these impacts (see above). Another mitigation action could include cooperating with the Arizona Department of Transportation to remove additional Right-of-Way fence along US 89, which would allow pronghorn to move freely between the east and west herds. The Department recommends that specific mitigation measures be identified and analyzed subsequent to a formal decision on the General Management Plan or during the project-specific NEPA process. At that time, actions, methods, and timelines can be mutually developed.

Page 54

MITIGATING MEASURES: The Department is supportive of all listed mitigating measures. However, we recommend additional mitigation measures dependent on the chosen alternative or action (see above).

Page 101
 17

Park, 2nd column: Burrowing owls are not restricted to inhabiting only prairie dog towns or burrows. They will utilize burrows constructed by many mammals. Therefore, the lack of prairie dog towns does not directly equate to the lack of burrowing owls. We recommend that this information be corrected.

Page 102

Park, 1st column: The Department supports proactively closing the Citadel Pueblo to visitors during the breeding season for golden eagles.

Comments to DEIS/General Management Plan
 Wupatki National Monument
 Page 4

Arizona Game and Fish Department
 January 29, 2002

Page 105 **Park, 1st column:** The Department supports the National Park Service's planning to restore Heiser Spring to as natural conditions as possible. Because pronghorn rely heavily on surface water, especially during lactation, and reliable surface water is very scarce on the monument, the Department encourages this restoration take place as soon as possible, either as mitigation or as an independent project. We would be willing to assist the National Park Service with investigating funding opportunities for this project.

Page 158 **Effects of Alternative 1: first column:** We agree that placing a campground and an Extended Learning Zone in an area which has already been heavily disturbed would generally result in little or no negative impact to wildlife. However, in this situation, placing a campground at Old Heiser would interfere with restoration of the riparian habitat and surface water source for wildlife at Heiser Spring. Because of the importance of surface water for pronghorn and of riparian vegetation for many other species of wildlife, we recommend that the campground and Extended Learning Zone be eliminated from the Heiser Spring area, if Alternative 1 is chosen.

18

Page 173 **Effects of the No-Action Alternative; 2nd column:** The Department supports the restoration of historically impacted caves or other karst features. We would recommend that this proposed action be included in all alternatives. We would also be eager to investigate the possibility of assisting with this activity, either financially or with labor.

RESPONSE TO COMMENTS

11) Language has been added.

12) No action required. Alternative #3, the preferred alternative does not proposed expansion to the south.

13) No action required. Fencing recommendations will be considered in future implementation planning.

14) No action required. The extended learning zone is intended to provide visitors opportunities to learn about resources. As stated on page 37, these areas would be managed "to ensure resource protection"and "...intimate interaction with resource would be offered where possible without undue resource impacts." During implementation planning, methods/actions to avoid the possible impacts you mentioned will be evaluated. If effects are unavoidable, the recommended mitigation measures will be considered at that time.

15) No action required. During implementation planning, methods/action to avoid the possible impacts you mentioned will be evaluated. If effects are unavoidable, the recommended mitigation measures will be considered at that time.

16) No action required. The guided adventure zone is intended to appear pristine. As described on page 37, this area "would usually be untrailed and free from developments." Primitive trails are allowed" if deemed necessary for resource protection." The Crack-in-Rock road is for administrative use only and is an existing use. See above for the discuss of the Lomaki/Box Canyon area and visitor contact station. During implementation planning, methods/action to avoid the possible impacts will be evaluated. If effects are unavoidable, the recommended mitigation measures will be considered at that time.

17) Language has been corrected.

18) No action required. Preferred alternative is Alternative #3.

G R A N D C A N Y O N T R U S T



December 28, 2001

Sam Henderson
 Superintendent
 Flagstaff Area National Monuments
 6400 N. Hwy 89
 Flagstaff, AZ 80004

Dear Mr. Henderson,

Thank you for the opportunity to comment on the Draft Environmental Impact Statements/Draft General Management Plans for Wapatki, Sunset Crater Volcano and Walnut Canyon National Monuments (DEIS/GMP). The Grand Canyon Trust is dedicated to protecting and restoring the canyon country of the Colorado Plateau. We are ardent supporters of the mission of the National Park Service (NPS) and the preservation of the cultural and ecological resources of the Flagstaff Area National Monuments.

We are encouraged by your plans to seek boundary expansions for all three monuments, however the extent of these expansions does not insure that all resources of significance to the Monuments are protected. Many important cultural, biological and geological features lie just outside the current and proposed boundaries of the Monuments. The DEIS/GMP documents identify these resources, as well as reasons that they deserve the full protection of National Monument status, as follows:

- The vast majority of the 5,000 archeological sites of the Wapatki prehistoric settlement system lie in the area between Sunset Crater Volcano and Wapatki National Monuments and outside of their borders (WNM- DEIS/GMP, pg 30).
- 51,100 Acres of land adjacent to Wapatki contain significant environmental and cultural features important to the Wapatki story (WNM- DEIS/GMP, pg 39).
- The archeological and landscape resources outside of Wapatki N. M. are comparable in quality, density and diversity as those protected within the monument (WNM- DEIS/GMP, pg 39).
- The lands between Wapatki and Sunset Crater Volcano National Monuments are generally viewed by visitors as part of the Monuments and are a popular part of the public's experience and essential to the Monuments interpretive experience (WNM- DEIS/GMP, pg 43).
- Peshlaki, Heiser and Wapatki springs are dependent on a perched aquifer that underlies Forest Service lands between the Monuments. Land use and vegetation condition are thought to be factors that affect spring flows and are described as "perhaps the most severely impacted resources within the monument (Wapatki)". (WNM- DEIS/GMP, pgs 43, 105).

*"The Homestead," 2601 N. Fort Valley Rd., Flagstaff, Arizona 86001 (520) 774-7488 FAX (520) 774-7570
www.grandcanyontrust.org*

1



- New information since the creation of Sunset Crater Volcano N.M. has revealed that features (Kana-A lava flow and evidences of the fissure system that produced Sunset Crater) that are important to the overall geological history of the area lie outside of the National Monument (SCVNM- DEIS/GMP, pg 35).
- Grasslands, which are important habitat to pronghorn, burrowing owls, prairie dogs, ferruginous hawks, golden eagles and other species of concern, are abundant in this region, but have little protection from the impacts of development and land use activities¹ (WNM-DEIS/GMP, pgs 101).

Alternatives that would have expanded the boundaries to include protections for these resources were rejected for analysis. Justification for not conducting this analysis was based on the premise that cooperative planning with the Forest Service (USFS) could serve this purpose without an administrative land exchange. Closer examination reveals, however, that this premise may be flawed.

Despite their undoubtedly good intentions, we are concerned that Forest Service's multiple use goals may not accommodate the Park Service's preservation goals for those resources important to the integrity of the Monuments, but located outside current boundaries. Budgetary constraints and political pressures can be expected to continue to drive management priorities, and without the higher standard of protection provided by National Monument status, these important resources may not be afforded the long-term protections from recreation, grazing, and other uses necessary to fulfill NPS preservation goals under USFS administration.

19

Additionally, our review of the Coconino National Forest's Flagstaff/Lake Mary Ecosystem Analysis Proposed Action (FLEA) reveals little USFS commitment toward the management of the lands surrounding the Flagstaff Area National Monuments for the expressed purpose of protecting the Monuments themselves. The elimination of multiple uses and roads, two key outcomes of cooperative regional planning described in the 1998 newsletter (NPS 1998, pg 15), are not included in the proposed action. Other than measures to more intensively manage the Cinder Hills OHV area, FLEA makes no binding commitments of the USFS and makes little mention of issues raised in any of the DEIS/GMP documents. It proposes "no additional goals or objectives for coordination with the NPS", other than updating the current MOU with items such as boundary management, fire management, interpretation and law enforcement (FLEA, pg 38). There is no mention in FLEA of a special management designation for these lands or restrictions on extractive uses of them, as would be necessary to guarantee the necessary protections under USFS administration. Also, what specific commitment that the NPS seeks from the USFS to insure that these resources are protected is not described in your analyses'.

18

It is imperative that a full analysis of these and any other issues associated with a boundary expansion that includes the entire area between Wapatki and Sunset Crater Volcano National Monuments (area of regional planning considerations) be conducted. We feel that your analysis is incomplete without doing so.

¹ The 1999 Arizona GAP Analysis reveals that less than 5% of plains grassland is protected in the Greater Grand Canyon region.

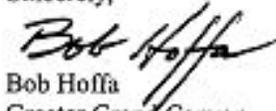
In addition, we suggest a special land use designation that strongly curtails multiple-use needs to be created in partnership with the USFS to protect Walnut Canyon National Monument from the impacts of adjacent land use activities. Protecting the health of tributary drainages, wildlife movement corridors, controlling invasive species, and serving as a buffer from urban growth should be important management goals in this agreement. The level of commitment, on the part of each agency, to pursue a detailed management agreement should be explicitly defined in both the EIS/GMP's and FLEA.

Continued impacts to lands surrounding the Monuments will jeopardize thousands of archeological resources; continue to degrade the fragile cinder hills and other features important to the geological story of the Sunset Crater eruption; threaten a critical watershed that feeds springs within Waputki N.M.; and degrade ecologically sensitive habitats of Walnut Canyon. These fragile cultural resources and important biological features deserve the full protection that National Monument status offers.

We urge you to reconsider your decision to rely solely upon the existing MOU and to conduct a full analysis of a much larger boundary expansion. We further suggest seeking a comprehensive agreement with the USFS in which they commit to using all avenues at their disposal to ensure the protection of the Monuments, both within and outside of their boundaries. This is critical for long-term integrity of the Flagstaff Area National Monuments.

We appreciate your time and consideration. If you would like to discuss these comments, please feel free to contact me at your convenience.

Sincerely,


 Bob Hoffa
 Greater Grand Canyon
 Program Associate

cc: Debbie Kill, Coconino National Forest

Documents Referenced

(FLEA) USDA Forest Service. September 2001. *Proposed Action to Amend the Coconino Forest Plan: Flagstaff/Lake Mary Ecosystem Analysis, Coconino National Forest.*

(SCVNM-DEIS/GMP). USDI National Park Service. September 2001. *Draft Environmental Impact Statement/Draft General Management Plan: Sunset Crater Volcano National Monument.*

(NPS) USDI National Park Service. November 1998. *Walnut Canyon, Sunset Crater Volcano, Waputki National Monuments: General Management Plans Newsletter #3.*

(WCNM-DEIS/GMP) USDI National Park Service. September 2001. *Draft Environmental Impact Statement/Draft General Management Plan: Walnut Canyon National Monument.*

(WNM-DEIS/GMP). USDI National Park Service. September 2001. *Draft Environmental Impact Statement/Draft General Management Plan: Waputki National Monument.*

RESPONSE TO COMMENTS

19) No action taken. As stated, the boundary expansion to the south of Wupatki was rejected in light of current planning efforts of the Coconino National Forest and their desire to work cooperatively with NPS in managing resources on those lands. Although the U.S. Forest Service and National Park Service have different mission, both are tasked with protection of resources by legal mandates. Both agencies are guided by the National Historic Preservation Act, Archeological and Historic Preservation Act, the American Indian Religious Freedom Act, and the American Indian Graves Protection and Repatriation Act. We have no evidence that recreation, grazing, and other uses occurring on the USFS land are causing impacts outside of these legal mandates.



Superintendent
Flagstaff Area National Monuments
6400 N. Hwy 89
Flagstaff, AZ

December 28, 1991

Dear Superintendent,

The Arizona Wilderness Coalition believes that the first Mission Goal stated in the Wupatki Draft EIS (page 4), that the "[n]atural and cultural resources and associated values within the three Flagstaff Area monuments are protected...within their broader ecosystem and cultural contexts" provides the fundamental purpose of NPS management. With this imperative in mind, we urge the Park Service to revisit the wilderness suitability of each monument.

The 1971 Wilderness Recommendation for Wupatki erroneously concluded that

[l]ands in Wupatki were unsuitable [for wilderness] due to the existence of livestock grazing throughout the monument, and also to the fact that the monument is essentially an area of prehistoric ruins and relics, with basically different purposes, uses, and management concepts from those of wilderness.

It is not clear from reading the Draft EIS whether or not grazing is still conducted in the Monuments. In any event, the National Park Service Reference Manual RM-41: Wilderness Preservation and Management, Section 6.4.6, states

[c]ommercial grazing or driving of livestock in park wilderness will be allowed only as specifically authorized by Congress. Where these activities are authorized, they will be managed under conditions and requirements identified with the approved wilderness management plans.

Nowhere does NPS policy (or the Wilderness Act) preclude wilderness designation in NPS units because of grazing.

Wilderness designation would provide substantial long-term protection of the "[n]atural and cultural resources and associated values within the three Flagstaff Area monuments...." As pointed out in Director's Order #41, Section 4,

{i}t is important to recognize that laws, such as the National Protection Act (ARPA), American Indian Religious Freedom Act (AIRFA) and the Native American Graves Protection and Repatriation act (NAGPRA), as well as others, intended to preserve our cultural heritage, are applicable in wilderness.

Given the inadequacy of the original wilderness recommendation, the Arizona Wilderness Coalition urges the National Park Service to revisit the wilderness suitability issue for the Flagstaff monuments. This analysis should be conducted in coordination with other agencies, particularly the Forest Service, within an ecosystem approach to conservation as recommended in Section 3 of Director's Order #41.

20

Thank you for the opportunity to comment.



Kim Crumbo, Northern Representative
Arizona Wilderness Coalition
P.O. Box 1033
Grand Canyon, AZ 86023

RESPONSE TO COMMENTS

20) A wilderness study is beyond the scope of the general management plan.

ARIZONA ETHNOBOTANICAL RESEARCH ASSOCIATION
107 NORTH SAN FRANCISCO STREET, SUITE 1
FLAGSTAFF, ARIZONA 86001
PH: (520) 774-2884

5 January 1998

Flagstaff Areas Planning Team
National Park Service
Denver Service Center, LA, Urbanowski
P.O. Box 25287
Denver, CO 80225-9901

To Whom It May Concern:

This letter is to comment on the GMP for Walnut Canyon, Sunset Crater Volcano, and Wupatki National Monument in Flagstaff, Arizona. We would like to applaud Sam Henderson for his exceptional work over the years as the Superintendent of the three parks. His continuous effort to involve the lay and scientific communities in the activities concerning the three monuments has been outstanding.

We appreciate the opportunity to participate in the General Management Planning process. We will not address each alternative individually as on the comment sheets but will highlight our main concerns regarding the concepts and specific activities of each park.

WALNUT CANYON—We support parts of alternative #2 for this park because it emphasizes preservation and maintaining a pristine environment for wildlife and cultural sites. However, our main concern is that the proposed rim drive along Walnut Canyon. This proposal is absurd, especially because of the unique environment provided to wildlife here. The Arizona Game and Fish Department has commented on this unique environment that still supports bear, mountain lions, peregrine falcons, bald eagles, and goshawks.

Although this issue is not addressed, there should be an open policy for Navajo and Hopi people to pick pinyons and in addition, a parking area should be available.

SUNSET CRATER—We support parts of alternative #1 for this park: keeping the existing roads, walking trails, keeping the existing campgrounds, night road access, boundary expansion, and a new visitor center on Highway 89. The concept of alternative #1, to encourage motorized sightseeing between Wupatki and Sunset Crater, is definitely preferred over alternative #2. Access from both entrances should remain because makes a lovely sightseeing experience for tourists with little time. However, our main concern for this monument is that no new trails become established around Bonito Park because this area is extremely sacred to the Hopi people.

Although gathering of traditional medicinal plants is not mentioned in this General Management Plan, we highly recommend that the NPS keep the open policy for traditional Native American elders to pick their medicines.

21 WUPATKI--As combined presently, we do not support either alternative at this park. We do support the concept to emphasize motorized sightseeing because the loop road from Wupatki to Sunset Crater provides an excellent opportunity for tourists to explore this area. However, our two main concerns are access to Crack-In-Rock and closure of the loop road (one-way or completely). Crack-In-Rock is presently visited by lottery and guided NPS tours and should remain so. We also recommend more sensory detective devices around the more sensitive sites. We recommend that the road remain as it is because it is a favorite biking and driving road for Flagstaff residents.

22 Although it is not addressed on any of the alternatives, we strongly advise the National Park Service to allow Native Americans to have vender stands near or on the monuments. This gives the people a chance to feel pride in the monument and to feel like it belongs to them and it gives them an outlet for extra income. There is a model for this that is being implemented now by Native American for community action in Flagstaff where vendors are allowed through a lottery to sell at the Oak Creek Canyon Overlook.

23 We also advise that three additional full-time (preferably Native American) interpretive staff for each monument instead of new construction at the monuments.

Thank you,



Phyllis Hogan, Executive Director
 Kristin Huisinga, Intern

cc: Sam Henderson
 Helen Farley
 Steve Mitchelson

RESPONSE TO COMMENTS

21) No Action Required. The preferred alternative would retain two-way traffic on the loop road. Crack-in-the-Rock would be located in the Guided Adventure in which visitors would explore park resources as part of a guided group. [[need also to say why no sensory devices]]

22) The appropriateness of vendor stands is an issues better addressed in a commercial services plan, not the general management plan.

23) Specific staffing recommendations are beyond the scope of this general management plan.

APPENDIXES/REFERENCES

APPENDIX A: LEGISLATION

PUBLIC LAW 110 STAT 4093
104-333

SEC. 207. WUPATKI NATIONAL MONUMENT BOUNDARY ADJUSTMENT.

The boundaries of the Wupatki National Monument, Arizona, are hereby revised to include the lands and interests in lands within the area generally depicted as 'Proposed Addition 168.89 Acres' on the map entitled 'Boundary--Wupatki and Sunset Crater National Monuments, Arizona', numbered 322-80,021, and dated April 1989. The map shall be on file and available for public inspection in the Office of the National Park Service, Department of the Interior. Subject to valid existing rights, Federal lands and interests therein within the area added to the monument by this section are hereby transferred without monetary consideration or reimbursement to the administrative jurisdiction of the National Park Service, to be administered as part of the monument in accordance with the laws and regulations applicable thereto.

(a) PURPOSE- The purpose of this section is to modify the boundaries of the Walnut Canyon National Monument (hereafter in this section referred to as the 'national monument') to improve management of the national monument and associated resources.

(b) BOUNDARY MODIFICATION- Effective on the date of enactment of this Act, the boundaries of the national monument shall be modified as depicted on the map entitled 'Boundary Proposal--Walnut Canyon National Monument, Coconino County, Arizona', numbered 360/80,010, and dated September 1994. Such map shall be on file and available for public inspection in the offices of the Director of the National Park Service, Department of the Interior. The Secretary of the Interior, in consultation with the Secretary of Agriculture, is authorized to make technical and clerical corrections to such map.

(c) ACQUISITION AND TRANSFER OF PROPERTY- The Secretary of the Interior is authorized to acquire lands and interest in lands within the national monument, by donation, purchase with donated or appropriated funds, or exchange. Federal property within the boundaries of the national monument (as modified by this section) is hereby transferred to the administrative jurisdiction of the Secretary of the Interior for management as part of the national monument. Federal property excluded from the monument pursuant to the boundary modification under subsection (b) is hereby transferred to the administrative jurisdiction of the Secretary of Agriculture to be managed as a part of the Coconino National Forest.

(d) ADMINISTRATION- The Secretary of the Interior, acting through the Director of the National Park Service, shall manage the national monument in accordance with this title and the provisions of law generally applicable to units of the National Park Service, including 'An Act to establish a National Park Service, and for other purposes' approved August 25, 1916 (39 Stat. 535; 16 U.S.C. 1, 2-4).

(e) AUTHORIZATION OF APPROPRIATIONS- There are hereby authorized to be appropriated such sums as may be necessary to carry out this section.

APPENDIXES/REFERENCES

TRANSFER OF ADMINISTRATIVE JURISDICTION, WUPATKI NATIONAL MONUMENT

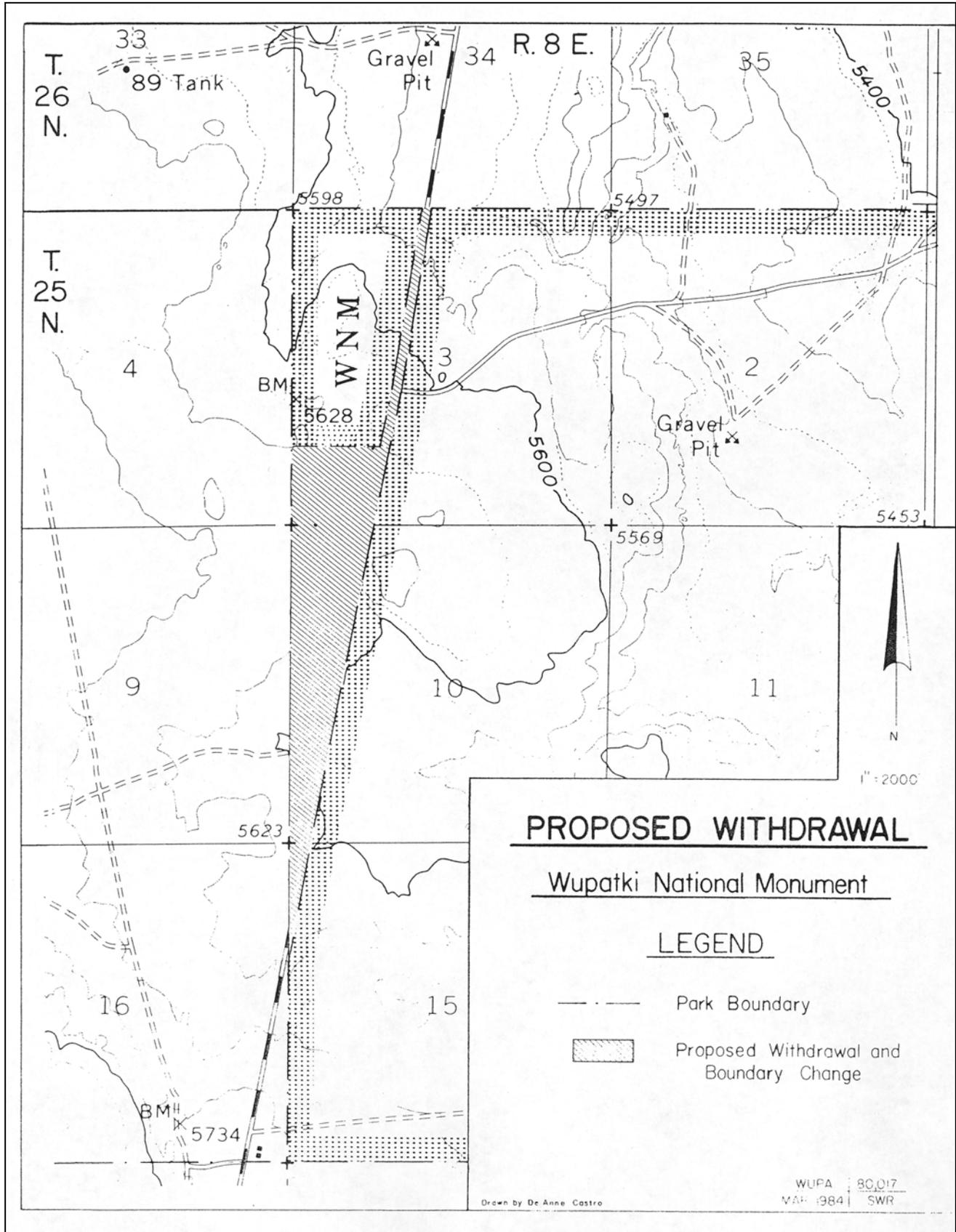
The Bureau of Land Management had administrative jurisdiction over certain lands and/or interests therein within the area generally depicted as "Proposed Addition 168.89 Acres" on the map entitled "Boundary - Wupatki and Sunset Crater National Monuments, Arizona", numbered 322-80,021, and dated April 1989. Notice is hereby given that, pursuant to the provisions of Section 207 of Public Law 104-333, 110 Stat. 4093, administrative jurisdiction is now in the National Park Service, subject to prior existing rights and applicable laws and regulations.

The lands and/or interests therein, subject to this notice include 168.89 acres of both surface and mineral interests.

Maps and other documents associated with the transfer of the lands and minerals within the proposed addition to Wupatki National Monument may be reviewed at the Intermountain Land Resources Program Center, 1220 South St. Francis Drive, Santa Fe, New Mexico 87504, and at Wupatki National Monument Headquarters, 6400 N. Highway 89, Flagstaff, Arizona 86004.

Dated:

Denise P. Meridith, State Director
Bureau of Land Management, Arizona State Office



APPENDIX B

Table 5: Resource Attributes For Visitor Use, Wupatki NM

Resource Experience Opportunity Areas	Size/Extent of Resource (%)	Relative Commonness of Resource		Ability of Resource to Conceal Use	Potential Interest of Resource to Visitor	Ability of Resource to Withstand Use	Relative Importance of Area to Purpose, Significance, and Interpretive Themes	Sites or Features of Critical Importance to Purpose, Significance, and Interpretive Themes
		In Park	Out of Park					
Painted Desert	2	2	4	3	Vista 5	2	1	Critical vista experience
Lower Colorado River Floodplain	2	1	4	2	2	4	2	
Washes	5	3	4	4	3	2	3	
Lava Flows	10	3	4	2	2	2	2	
Wupatki Basin	30	4	4	4	4	1	4	
Tilted Benches	5	2	2	3	5	1	4	
Doney Cliffs	5	1	2	3	2	2	3	
Canyons	2	2	4	5	2	2	2	
Cinder Cones	1	1	5	1	2	1	1	
Shallow Valley	5	2	4	3	4	1	4	Large, visible archeological features
Basalt Mesas	5	3	4	2	5	1	4	
Cinder Dunes	2	2	4	2	2	1	1	
Flat Grassland	25	4	5	1	2	2	5	
Rolling Grassland	20	4	5	3	2	2	5	
Juniper Woodland	15	4	5	5	2	1	5	
		1 - Unique 2 - Rare 3 - Uncommon 4 - Common 5 - Abundant		1 - Very Low 2 - Low 3 - Moderate 4 - High 5 - Very High				

APPENDIX C: CHOOSING BY ADVANTAGES AND COSTS

Alternative #1				Alternative #2			
Description	Qty.	Cost/Unit	Net Cost	Description	Qty.	Cost/Unit	Net Cost
New Trail (to Wukoki)	0.5	\$53,000	\$26,500	New Visitor Orientation*	1000	\$265	\$265,000
Obliterate portion of road	0.5	\$155,000	\$77,500	New V.O. Exhibits	500	\$100	\$50,000
New Road alignment (Wukoki)	0.2	\$873,000	\$174,600	New Parking / Orientation (10 cars, 1 RV)	10	\$2,200	\$22,000
Parking (20 cars) (Wukoki)	20	\$2,200	\$44,000	RV's	1	\$6,400	\$6,400
Adapt House	3000	\$100	\$300,000	Improve Existing Road (Crack-In-Rock)	12.5	\$240,000	\$3,000,000
New V.C. Exhibits	6000	\$100	\$600,000	Backcountry Sites (toilets/tables)*	2	\$10,000	\$20,000
New Wayside	20	\$5,000	\$100,000	Adapt Visitor Center	6000	\$100	\$600,000
Additional Staff	1.5	\$50,000	\$0	New Wayside	20	\$5,000	\$100,000
Primitive campground- Convert road to primitive	5	10000	\$50,000				
TOTAL \$1,372,600				TOTAL \$ 4,063,400			

Note: All estimates in FY 2000 dollars.

APPENDIXES/REFERENCES

Alternative #3			
Description	Qty.	Cost/Unit	Net Cost
New Visitor Orientation	1000	\$265	\$265,000
New V.O. Exhibits	500	\$100	\$50,000
New Parking / Orientation (10 cars, 1 RV)	10	\$2,200	\$22,000
RV's	1	\$6,400	\$6,400
Adapt Visitor Center	3000	\$100	\$300,000
New Road alignment (Wukoki)	0.2	\$873,000	\$174,600
New V.C. Exhibits	6000	\$100	\$600,000
New Wayside	20	\$5,000	\$100,000
New Trail (grasslands)	1	\$53,000	\$53,000
New Trail (Wukoki)	2.8	\$53,000	\$148,400
New Trail (Wukoki)	0.5	\$53,000	\$26,500
Obliterate portion of road	0.5	\$155,000	\$77,500
Parking (10 Cars)	10	\$2,200	\$22,000
TOTAL \$1,845,400			

Alternative #4			
Description	Qty.	Cost/Unit	Net Cost
Obliterate/rehab Black Fall Crossing	5.5	\$155,000	\$852,500
Demolish housing, maintenance, and admin buildings	5000	\$5	\$25,000
Remove mission 66 portion of V.C.	2000	\$5	\$10,000
New V.C. Exhibits	1000	\$100	\$100,000
New Trail (Wukoki)	0.5	\$53,000	\$26,500
Obliterate portion of road	0.5	\$155,000	\$77,500
Parking (10 cars) (Wukoki)	10	\$2,200	\$22,000
New Road alignment (Wukoki)	0.2	\$873,000	\$174,600
New Trail (Wukoki)	2.8	\$53,000	\$148,400
TOTAL \$ 1,436,500			

Note: This alternative is to be combined with Sunset Crater Alternative #2 and its associated costs

Project/Location: Wupatki - General Mangement Plan

5/31/00 (FY 2000 Dollars)

Subject: Functional Component

Description:

Project Life Cycle = **25 Years**

Discount Rate = **7.00%**

Present Time = **Current Date**

			Alternative 1		Alternative 2		Alternative 3		Alternative 4	
INITIAL COSTS	Quantity UM	Unit Price	Est.	PW	Est.	PW	Est.	PW	Est.	PW
Construction Costs										
A.		\$0.00	1,372,600	1,372,600	4,063,400	4,063,400	1,845,000	1,845,000	1,436,500	1,436,500
B.		\$0.00		0		0		0		0
C.		\$0.00		0		0		0		0
D.		\$0.00		0		0		0		0
E.		\$0.00		0		0		0		0
F.		\$0.00		0		0		0		0
G.		\$0.00		0		0		0		0
Total Initial Cost				1,372,600		4,063,400		1,845,000		1,436,500
Initial Cost PW Savings (Compared to Alt. 1)						(2,690,800)		(472,400)		(63,900)
REPLACEMENT COST/ SALVAGE VALUE										
Description	Year	PW Factor								
A. Visitor Orientation Replacen	5	0.7130		0	53,000	37,788	53,000	37,788		0
B. Visitor Orientation Replacen	10	0.5083		0	53,000	26,942	53,000	26,942		0
B. Visitor Orientation Replacen	15	0.3624		0	53,000	19,209	53,000	19,209		0
B. Visitor Orientation Replacen	20	0.2584		0	53,000	13,696	53,000	13,696		0
C.	0	1.0000		0		0		0		0
D.	0	1.0000		0		0		0		0
E.	0	1.0000		0		0		0		0
Total Replacement/Salvage Costs				0		97,635		97,635		0
ANNUAL COSTS										
Description	Escl. %	PWA								
A. Maintenance	0.000%	11.654		0		0		0		0
B. Operations	0.000%	11.654		0		0		0		0
C. Staffing	0.000%	11.654	106,000	1,235,280	238,500	2,779,380	106,000	1,235,280	53,000	617,640
D. Guided Tours	0.000%	11.654	100,000	1,165,358	100,000	1,165,358		0	100,000	1,165,358
E. Seminars	0.000%	11.654	50,000	582,679		0		0		0
F.	0.000%	11.654		0		0		0		0
Total Annual Costs (Present Worth)				2,983,317		3,944,738		1,235,280		1,782,998
Total Life Cycle Costs (Present Worth)				4,355,917		8,105,773		3,177,915		3,219,498
Life Cycle Savings (Compared to Alt. 1)						(3,749,856)		1,178,002		1,136,419

GLOSSARY

Advisory Council on Historic Preservation (ACHP). An independent federal agency with statutory authority to review and comment on federal actions affecting properties listed in or eligible for listing in the National Register of Historic Places.

air quality. A measure of the health-related and visual characteristics of the air often derived from quantitative measurements of the concentrations of specific injurious or contaminating substances.

air quality class II areas. Regions in attainment areas where maintenance of existing good air quality is of high priority. Class II areas permit moderate deterioration of existing air quality.

alternative. One of at least two proposed means of accomplishing planning objectives.

archeological resource. Any material remains or physical evidence of past human life or activities that are of archeological interest, including the record of the effects of human activities on the environment. They are capable of revealing scientific or humanistic information through archeological research.

backcountry. All nondeveloped areas within the park. Generally considered to be all areas beyond developed facilities and visitor use areas, (operational areas, campgrounds, picnic areas, visitor centers, visitor contact stations), developed interpretive areas (view points, wayside orientation exhibits, developed archeological resources with designated trails), and designated trails, trailheads, and roads.

cultural landscape. A geographic area, including both cultural and natural

resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values.

cultural landscape inventory (CLI). The CLI is a computerized, evaluated inventory of all cultural landscapes in which NPS has or plans to acquire any legal interest. Its purpose is to identify cultural landscapes in the system and provide information on their location, historical development, character-defining features, and management. The CLI assists park managers in planning, programming, and recording treatment and management decisions. CLI forms, including maps, drawings, and photographs, are completed and maintained at the regional offices, with copies provided to the parks.

cultural resources. An aspect of a cultural system that is valued by or significantly representative of a culture or that contains significant information about a culture. A cultural resource can be a tangible entity or a cultural practice.

cumulative effects. The culmination of a proposed action when added to past, present, and reasonably foreseeable future actions; action can be taken by anyone and can occur inside or outside the park.

ecosystem. A system made up of a community of animals, plants, and bacteria and its interrelated physical and chemical environment.

endangered species. Any species that is in danger of extinction throughout all or a significant portion of its range [16 USC §1532(6)].

environmental impact statement (EIS). Required by the National Environmental Policy Act to examine a range of federal actions and their

potential effects on the human environment.

ethnographic landscape. Areas containing a variety of natural and cultural resources that associated people define as heritage resources.

ethnographic resource. A site, structure, 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.

floodplain. A plain along a river, formed from sediment deposited by floods.

four-wheel-drive. Four-wheel-drive, differential transfer case disperses 50/50 front and rear displacement. Trucks, cars, buses, or sports utility vehicles with high clearance and the ability to operate off-pavement as well as on highways.

front country. Areas within the park that contain development for visitor use and park operations. Generally considered to be all areas with developed facilities and visitor use areas, (operational areas, campgrounds, picnic areas, visitor centers, visitor contact stations), developed interpretive areas (view points, wayside orientation exhibits, developed/stabilized archeological resources with designated trails), and designated trailheads, trails, and roads.

full-time equivalents (FTEs). Staff positions that include 40 hours of work per week all year.

habitat. A specific set of physical conditions in a geographic area that surrounds a single species, a group of species, or a large community. In wildlife management, the major components of habitat are food, water, cover, and living space.

integrity. The authenticity of a property's historic identity, evidenced by the survival of physical characteristics that existed during its historic or prehistoric period; the extent to which a property retains its historic appearance.

interpretation. A communication process designed to reveal meanings and relationships of our cultural and natural heritage to the public through firsthand experiences with objects, artifacts, landscapes, or sites; facilitating a connection between the interests of the visitor and the meaning of the park by explaining the park's purpose and significance; usually a single contact with a group or individual.

mitigating measures. Constraints, requirements, or conditions imposed to reduce the significance of or eliminate an anticipated impact to environmental, socioeconomic, or other resource value from a proposed land use.

National Register of Historic Places (NRHP). The comprehensive list of districts, sites, buildings, structures, and objects of national, regional, state, and local significance in American history, architecture, archeology, engineering, and culture kept by NPS under authority of the National Historic Preservation Act of 1966.

natural soundscapes. The total ambient acoustic environment associated with a given environment (sonic environment) in an area such as a national park or the total ambient sound level for the park. In a national park setting, this soundscape is usually composed of both ambient sounds and a variety of human-made sounds. This sonic environment is an important resource of many parks; there can also be important relationships between how this environment is perceived and understood by individuals and society.

riparian areas. Zones of transition from aquatic to terrestrial ecosystems,

dependent on surface and/or subsurface water for existence and which manifest the influence of that water.

scoping. Planning process that solicits people's opinions on the value of a park, issues facing a park, and the future of a park.

sensitive species. Those plant and animal species for which population viability is a concern.

State Historic Preservation Officer (SHPO). An official within each state appointed by the governor to administer the state historic preservation program and carry out certain responsibilities relating to federal undertakings within the state.

threatened and endangered species. Any species of fish, wildlife, or plant that is listed as threatened or endangered by the U.S. Fish and Wildlife Service.

traditional cultural property (TCP). A property associated with cultural practices or beliefs of a living community that are rooted in that community's

history or are important in maintaining its cultural identity. Traditional cultural properties are ethnographic resources eligible for listing in the National Register of Historic Places.

U.S.C. United States Code. Contains the general and permanent laws of the United States.

visitor use. Visitor use of a resource for inspiration, stimulation, solitude, relaxation, education, pleasure, or satisfaction.

wetlands. Lands including swamps, marshes, bogs, and similar areas, such as wet meadows, river overflows, mud flats, and natural ponds.

wilderness area. An area officially designated as wilderness by Congress. Wilderness areas will be managed to preserve wilderness characteristics and shall be devoted to "the public purposes of recreation, scenic, scientific, educational, conservation, and historical use."

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