Sewage Lagoon Expansion
Walnut Canyon National Monument
Coconino County, Arizona

Environmental Assessment / Assessment of Effect

February 2006

Note to Reviewers and Respondents

If you wish to comment on the environmental assessment, you may mail comments to the name and address below or you may send electronic submissions to http://parkplanning.nps.gov. Our practice is to make comments, including names and home addresses of respondents, available for public review during regular business hours. Individual respondents may request that we withhold their home address from the record, which we will honor to the extent allowable by law. There also may be circumstances in which we would withhold from the record a respondent's identity, as allowable by law. **If you wish us to withhold your name and/or address, you must state this prominently at the beginning of your comment.** We will make all submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, available for public inspection in their entirety.

Please Address Comments to:

Flagstaff Area National Monuments
Attn: Palma Wilson, Superintendent
6400 N. Hwy 89
Flagstaff, Arizona 86004

Summary

The National Park Service (NPS) is in the initial stages of planning for the expansion of the sewage lagoon at Walnut Canyon National Monument. This project is located along the northern boundary of the monument property. The purpose of the proposed sewage lagoons at Walnut Canyon National Monument is to handle and process sewage effluent produced by the monument's visitors and employees. The expansion is based on review and analysis of current effluent flows, visitor use and weather factors, including ice cover estimates.

In 1915, portions of Walnut Canyon east of Flagstaff, Arizona were proclaimed a national monument. Visitation to the monument has increased steadily over the past 90+ years—during which, wastewater or sewage systems have evolved incrementally to accommodate the increased visitor use.

The first sewer system at Walnut Canyon National Monument was a septic tank and leech field located east of the visitor center along the Rim Trail. The septic system was replaced by lagoons in the 1970s that were again reconstructed in 1992. The lagoons reached and exceeded their capacity at least several times between 1993 and March of 2005. Pumping was required in 1994 and again in February of 2005, to prevent an uncontrolled overflow. In February 2005, 94,000 gallons were pumped from the lagoons and hauled to the Flagstaff wastewater treatment plant. Pumping, despite its effectiveness, is impractical during periods of heavy snow or rain and can often be impossible and result in a spill and or complete failure or breech of the lagoon levees.

This Environmental Assessment/Assessment of Effect (EA/AEF) analyzes the impacts of two alternatives: 1) no action and 2) expansion of the existing sewage lagoon. Impacts to geology/soils, vegetation, wildlife, special status species, cultural resources, and visual quality are described in this document.

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Chapter 1

Purpose and Need for Action

Introduction

This EA/AEF provides disclosure of the planning and decision-making process and potential environmental consequences of expanding the sewage lagoon at Walnut Canyon National Monument. This document also contains the information needed for consultation with the State Historic Preservation Office under Section 106 of the National Historic Preservation Act. The analysis of environmental consequences was based on a need to involve the public and other agencies in the decision-making process and to adequately analyze the consequences of the impacts related to the proposed action. In implementing this proposal, the NPS would comply with all applicable laws and executive orders.

Purpose And Need

The purpose of the proposed expansion of the sewage lagoon at Walnut Canyon National Monument is to handle and process sewage effluent produced by the monument's current and reasonably foreseeable future visitors and employees. The expansion is based on review and analysis of current effluent flows, visitor use and weather factors, including ice cover estimates.

Project Objectives

Three objectives have been identified:

1. Design a sewage lagoon that will efficiently and effectively handle wastewater for existing and future visitation estimates without uncontrolled overflow in the system or the need to pump the lagoons and haul wastewater to the Flagstaff wastewater treatment plant.

2. Provide an enjoyable and safe experience for park visitors.

3. Construct and expand lagoons in a way that minimizes impacts to visitor enjoyment, cultural resources, and the natural environment.

In 1915, portions of Walnut Canyon east of Flagstaff, Arizona were proclaimed a national monument. Visitation to the monument has increased steadily over the past 90+ years—during which, wastewater or sewage systems have evolved incrementally to accommodate the increased visitor use.

The first sewer system at Walnut Canyon National Monument was a septic tank and leech field located east of the visitor center along the Rim Trail. The septic system was replaced by lagoons in the 1970s that were again reconstructed in 1992. The lagoons reached and exceeded their capacity at least several times between 1993 and March of 2005. Pumping was required in 1994 and again in February of 2005, to prevent an uncontrolled overflow. In February 2005, 94,000 gallons were pumped from the lagoons and hauled to the Flagstaff wastewater treatment plant. Pumping, despite its effectiveness, is impractical during periods of heavy snow or rain and can often be impossible and result in a spill and or complete failure or breech of the lagoon levees.

Project Location

Walnut Canyon National Monument lies within a densely wooded area southeast of Flagstaff, Arizona on the Colorado Plateau of northern Arizona (Figure 1). The canyon is the result of a small seasonal stream, Walnut Creek, carving a 400-foot deep canyon into the local Kaibab limestone. Walnut Creek flows east into the Little Colorado River eventually joining the Colorado River. This project is located along the northern boundary of the monument property (Figure 2).

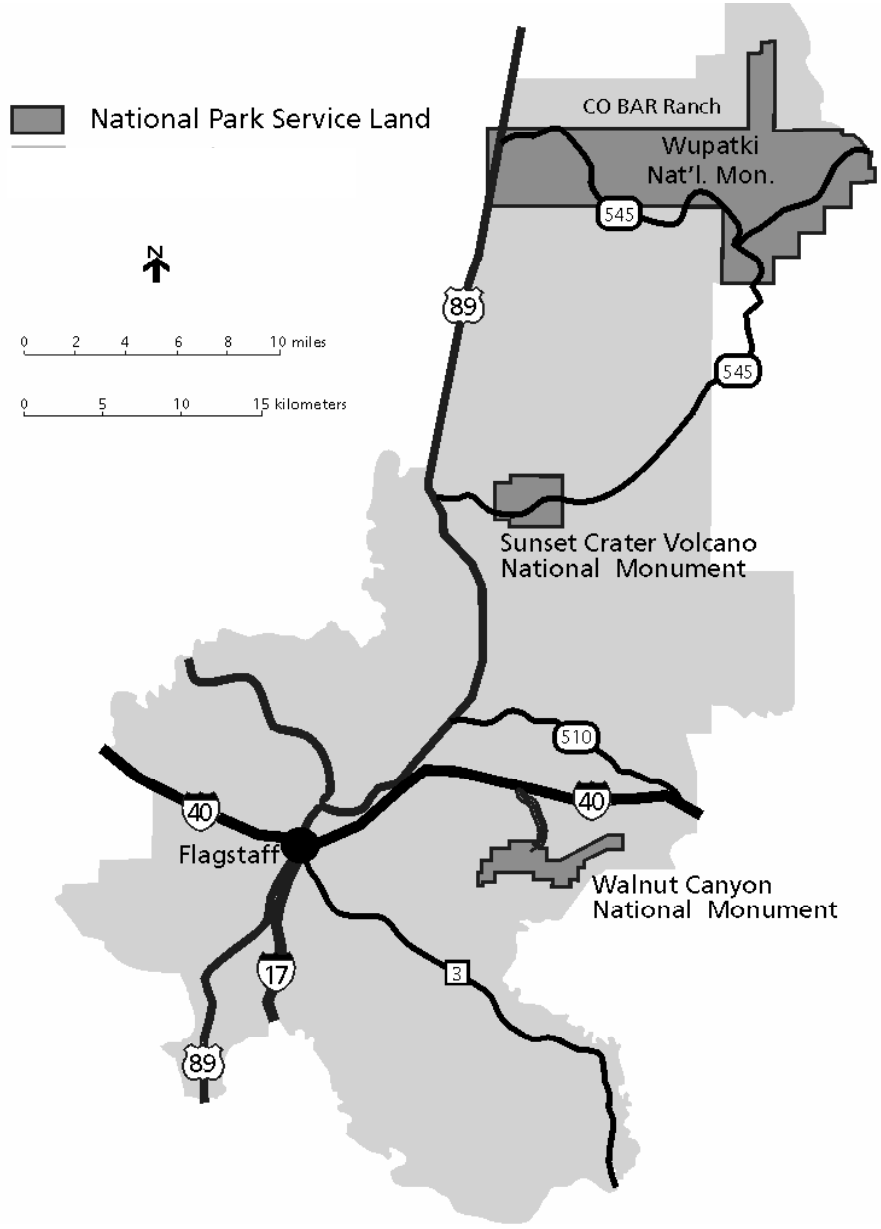

Figure 1. Vicinity map (Source: Walnut Canyon National Monument Draft GMP 2003)

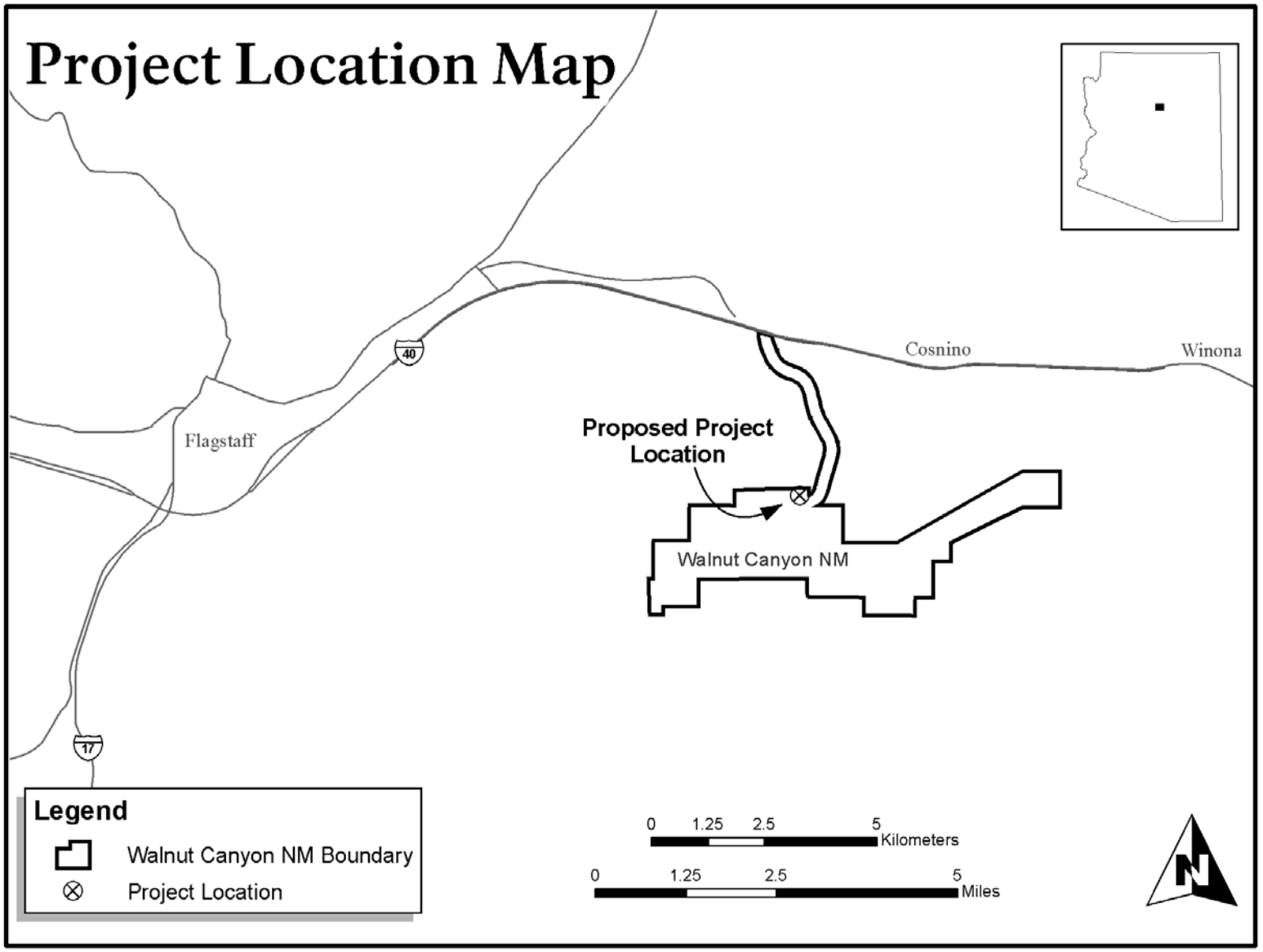

Figure 2. Project Vicinity

Summary of Park Mission and Enabling Legislation

Walnut Canyon National Monument was established by Presidential Proclamation No. 1318 on November 30, 1915, to preserve the prehistoric ruins of ancient cliff dwellings. The monument was enlarged by Presidential Proclamation No. 2300 on September 24, 1938, and on November 12, 1996, by P.L. 104-333. On February 28, 1965, Public Land Order 1269 by the Bureau of Land Management withdrew public lands as material source sites and identified lands to construct a monument approach road. The monument occupies approximately 3,600 acres immediately adjacent to Coconino National Forest and to the city limits of Flagstaff, Arizona. The park purpose for Walnut Canyon National Monument is:

- To protect ancient cliff dwellings and associated resources that are of great ethnographic, scientific, and educational interest and to properly care for and manage the cultural and natural resources of historic, social, and scientific interest within Walnut Canyon National Monument.

The park significance for Walnut Canyon National Monument is:

- Concentrations of ancestral Puebloan habitations are found in Walnut Canyon's "island" topography-the distribution, diversity, and location of sites are unusual and include the only cliff dwelling architecture of the Northern Sinagua culture. Walnut Canyon and Walnut Creek provide vivid evidence of the Sinaguas' ability to procure sufficient water to sustain life and grow crops.

- The natural and cultural resources within the monument are known to be significant to contemporary native tribes, as evidenced by oral history, continuing practices, and the archeological record.

- Within Walnut Canyon, ecological communities overlap to form ecotones, bringing together species usually separated by elevation, and creating a rare compression of flora/fauna zones. The biodiversity supported by these habitats includes a high concentration of sensitive species and is thought to have contributed to the decision of prehistoric people to settle here.

- Topographic relief and biotic diversity make the canyon an outstanding scenic resource. Together with adjacent forestlands, the monument serves as a significant component of a designated greenbelt and natural sanctuary surrounding the city of Flagstaff.

- Historic railroad settlements, such as Flagstaff, contributed to Walnut Canyon becoming one of the first archeological areas to be heavily visited. Some sites record the extensive looting of the period. Today, owing to management that emphasizes preservation, Walnut Canyon National Monument provides scientific opportunities to study irreplaceable cultural and natural resources.

Relationship to Walnut Canyon General Management Plan

The Draft 2002 General Management Plan for Walnut Canyon National Monument calls for the NPS to provide for a safe, educational visitor experience and for adequate protection and preservation of park resources (NPS 2002). The project sites lies within the Administrative Zone identified in the Draft 2002 General Management Plan and lies adjacent to the Extended Learning Zone under both of the proposed management alternatives. The

proposed activities are appropriate with the definitions of activities within these zones. The natural environment may be modified for park operation needs, but if ground disturbance is required, it should be completed in a way that harmonizes with the natural environment. Administrative use 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. Administrative use areas would not located near sensitive natural or cultural resources, if such resources could not be adequately protected (Ibid.).

Regulations and Policies

The EA/AEF is written within a complex set of regulations and policies. The plan must not only comply with requirements of the National Environmental Policy Act (NEPA) and National Historic Preservation Act (NHPA), but must also do so within the parameters of other legislation that governs land use within Walnut Canyon National Monument.

National Park Service Organic Act

In 1916, this act established the National Park Service in order to "promote and regulate the use of parks…" and defined the purpose of the national parks as "to conserve the scenery and natural and historic objects and wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." This law provides overall guidance for the management of Walnut Canyon National Monument.

Water Quality Regulations

Wastewater treatment systems in the National Park Service must operate in accordance with *Director's Order #83: Public Health and Safety,* the Clean Water Act (40 CFR 125), and the Primacy Agency (the agency designated by federal law as having oversight responsibilities) requirements. In Arizona, the Arizona Department of Environmental Quality is the Primacy Agency, responsible for enforcement of the Clean Water Act.

The Prohibition of Impairment of Park Resources and Values

National Park Service Management Policies 2001 provides guidance on addressing impairment: Impairment is an impact that, "in the professional judgment of the responsible NPS manager, would harm the integrity of park resources of values, including those that would otherwise be present for the enjoyment of those resources or values. Whether an impact meets this definition depends on the particular resources 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 with other impacts" (NPS 2001a).

Any park resource can be impaired, but an impact would be more likely to result in impairment if 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.

Issues and Impact Topics Included in this Document

This environmental analysis was prepared in accordance with the regulations of the Council on Environmental Quality (CEQ), the National Environmental Policy Act (40 CFR § 1500 *et seq*.) and in §516 of the U.S. Department of the Interior's Departmental Manual.

In July 2005, a public scoping letter about this project was sent to 93 individuals including federal and state agencies, special interest groups, American Indian tribes, and interested citizens. The letter described the proposed project and requested comments. Two letters were received by the NPS from interested agencies, groups and citizens.

Issues to be carried forward in the analysis were developed by NPS staff and it's contractor during the scoping process. The public did not identify any additional issues during public scoping. Impact topics were then selected for detailed analysis based on substantive issues; environmental statutes, regulations and executive orders; and NPS Management Policies (2001a). Once issues were identified, they were used to help formulate the alternatives and mitigation measures. Issues and impact topics analyzed in this document include geology/soils, vegetation, wildlife, special status species, and cultural resources. A summary of the impact topics and rationale for selection are described as follows.

Natural Resources

Geology/Soils

Ground disturbance would be associated with the proposed sewage lagoon expansion and would have the potential to impact soil resources; therefore, this topic will be analyzed in this document.

Biotic Communities

Vegetation

Proposed expansion of the sewage lagoon would involve disturbance and long-term removal of a small area of native vegetation and woody material greater than three inches diameter at breast height. The potential also exists for introduction and/or spread of exotic vegetation and noxious weeds from ground disturbing activities. Therefore, this topic will be analyzed in this document.

Wildlife

Proposed expansion of the sewage lagoon could potentially disturb wildlife and result in long-term loss of a small area of wildlife habitat. Therefore, this topic will be analyzed in this document.

Special Status Species

Section 7 of the Endangered Species Act of 1973, as amended, requires all federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) to ensure that any action authorized, funded, or carried out by the agency does not jeopardize the continued existence of listed species or critical habitats. The Arizona Game and Fish Department (AGFD) Heritage Data Management System website (http://www.gf.state.az.us/w_c/edits/documents/countyallspecies_003.pdf) was accessed to download the list of special status species in Coconino County, Arizona. Biological surveys conducted by park staff and others have documented that two federally-listed animal species are known to occur within Walnut Canyon National Monument and could occur near the proposed sewage lagoon expansion area: 1) Mexican spotted owl (*Strix occidentalis lucida*) and 2) bald eagle (*Haliaeetus leucocephalus*). Additionally, two AGFD wildlife species of concern are known to occur within Walnut Canyon National Monument: 1) peregrine falcon (*Falco peregrinus anatum*) and 2) northern goshawk (*Accipter gentilis*). The U.S. Forest Service lists the peregrine falcon as a

sensitive species and the northern goshawk as a management indicator species. Additionally, there are twelve species (various bat species) that are designated USFWS species of concern, one NPS species of concern (American pronghorn), and one AGFD wildlife species of concern (western red bat). One U.S. Forest Service plant species (Flagstaff pennyroyal) has the potential to occur. Therefore, special status species will be analyzed in this document.

Cultural Resources

A comprehensive cultural resources investigation of Walnut Canyon has been completed. Based on this survey, two sites would be affected by the proposed expansion (WACA 416 and WACA 92). Data recovery according to mitigation requirements and procedures approved by the State Historic Preservation Office (SHPO) would be necessary for this site.

The NPS is mandated to preserve and protect its cultural resources through the Organic Act of August 25, 1916, and through specific legislation such as the Antiquities Act of 1906, NEPA of 1969 (as amended), National Historic Preservation Act of 1966, NPS Management Policies, Cultural Resource Management Guideline (Director's Order-28), and the Advisory Council on Historic Preservation's implementing regulations regarding "Protection of Historic Properties" (36 CFR §800). Other relevant policy directives and legislation are detailed in Director's Order-28. The NPS has notified the SHPO that an EA/AEF would be prepared for this project to comply with Section 106 NHPA consultation requirements.

Visitor Experience

Visual Quality

Vulnerability to visual impacts is a function of a site's visibility, the size of the development, and the site's capacity to absorb change. The proposed project may alter the visual condition of the area surrounding the existing sewage lagoon that is visible from Forest Road 303 (a designated Historic Corridor). Therefore, this topic will be analyzed in this document.

Impact Topics Eliminated from Further Consideration

Environmental Justice

In general, the term "environmental justice" refers to fair treatment of all races, cultures, and income levels with respect to laws, policies, and government actions. In February 1994, Executive Order 12898, titled Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations, was released to federal agencies. This order requires each federal agency to incorporate environmental justice as part of its mission. Federal agencies are specifically ordered to identify and address disproportionately high and adverse effects of its programs, policies, and activities on minority and low-income populations. In a related memorandum to heads of all federal departments and agencies, released concurrently with Executive Order 12898, the President underscores provisions of existing laws that are intended to help ensure the environmental quality of communities throughout the nation. This memorandum further states that mitigation measures identified in environmental documents should address significant and adverse environmental effects on minority communities and low-income communities.

None of the alternatives would have disproportionate health or environmental effects on minorities or low-income populations or communities as defined in the Environmental Protection Agency's Environmental Justice Guidance, drafted in July 1996, as well as Executive Order 12898. This topic will not be analyzed in this document.

Ethnographic Resources

The lands of Walnut Canyon National Monument are traditionally affiliated with several tribes of the southwest—the Havasupai, Hopi, Hualapai, White Mountain Apache, Yavapai Prescott, Yavapai Apache, Tonto Apache, Navajo Nation, Kaibab Paiute, San Juan Southern Paiute, and Zuni Tribes. Letters were sent to the tribes during the public scoping process. No ethnographic resources (e.g., plant gathering areas or ceremonial sites) are known to occur in either the project area or its general vicinity. If ethnographic resources are identified during tribal review, consultation with appropriate tribal representatives would be conducted and mitigation measures developed. Therefore, this topic will not be analyzed in this document.

Air Quality

Project construction would result in an increase in fugitive dust from soil exposure and disturbance. However, this effect would only occur during the construction period and would be localized and negligible. Water or dust control agents would be applied during construction, if necessary, to control dust. The proposed activities would also increase vehicle emissions from operating construction vehicles and hauling materials. However, the increased emissions would be localized and would have an immeasurable effect on regional or local pollutant levels. Best management practices (BMPs) would be implemented (e.g., not allowing construction equipment to idle for more than 5 minutes). The existing sewage lagoon emits fugitive volatile gases from the lagoons (primarily methane gas) that are regulated by the Arizona Department of Environmental Quality and fall within the regulatory thresholds. Expansion of the lagoons is not expected to increase these emissions beyond existing thresholds. Therefore, this topic will not be analyzed in this document.

Water Quality

The NPS seeks to restore, maintain, and enhance the quality of all surface and ground waters in the park, consistent with the Federal Water Pollution Control Act, as amended, and other applicable federal, state, and local laws and regulations. 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 1,100 feet below the surface. The NPS would follow established policy requiring the use of water-conserving technology and environmentally friendly products. Except for very limited motor vehicle use to construct the wastewater discharge system, motor vehicle use to service the system would not increase over current levels. 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.

Floodplains

Executive Order 11988 (“Floodplain Management”) requires an examination of impacts to floodplains. The 2001 NPS Management Guidelines, DO-12, and the 2002 Draft GMP provide guidelines on developments proposed in floodplains. Executive Order 11988 requires all federal agencies to avoid construction within the 100-year floodplain unless no other practical alternative exists. Certain construction within a 100-year floodplain requires that a Statement of Findings be prepared and accompany a Finding of No Significant Impact. The existing sewage lagoon and proposed expansion are not within the 100-year floodplain; therefore, none of the alternatives would be constructed within the 100-year floodplain. Consequently, no Statement of Findings for floodplains will be prepared and this issue will not be analyzed in this document.

Wetlands

Executive Order 11990, Protection of Wetlands, requires federal agencies to avoid, where possible, impacts on wetlands. Proposed actions that have the potential to adversely impact wetlands must be addressed in a Statement of Findings. Soils, hydrology, and vegetation typical of a wetland environment classify jurisdictional wetlands. No jurisdictional wetlands exist at or near the project area. Therefore, this topic will not be analyzed in this document.

Prime and Unique Farmland

All federal agencies are required to analyze the effects of their actions on soils classified as prime or unique by the Natural Resource Conservation Service (NRCS), as required by the Council of Environmental Quality in a memorandum of August 1980. The Farmland Protection Policy Act of 1981, as amended, also requires federal agencies to consider adverse effects to prime and unique farmlands that would result in conversion of prime and unique farmland to non-agricultural uses. Prime farmland is defined as soil that particularly produces general crops as common foods, forage, fiber, and oil seed; unique farmland produces specialty crops such as fruits, vegetables and nuts. There are no prime or unique farmlands associated with the project area. Therefore, this topic will not be analyzed in this document.

Socioeconomic Values

The local economy and most businesses of the communities surrounding the park are based on construction, recreation, transportation, tourist sales, services, and educational research; the regional economy is strongly influenced by tourist activity. There may be short-term, negligible benefits to the local and regional economy resulting from construction-related expenditures and employment. Park businesses would not suffer any appreciable adverse short or long-term economic impacts from any of the alternatives because wastewater treatment would not be interrupted during construction of the new sewage lagoon, and no businesses would be closed for construction purposes. None of the proposed alternatives would change local or regional land use. The short and long-term socioeconomic impacts of implementing any of the action alternatives would be consistent with the impacts described in the GMP EIS. Therefore, this topic will not be analyzed in this document.

Visitor Experience

Public Health and Safety

It is estimated that Walnut Canyon National Monument receives more than 90,000 visitors each year. Providing an enjoyable and safe experience for those visitors is very important to the NPS. The existing sewage lagoons are not visible or easily accessible by visitors. Additionally, visitor experience is not expected to be affected by either maintaining the current condition or expanding the sewage lagoon. Therefore, this topic will not be analyzed in this document.

Park Operations

The superintendent at Flagstaff Area National Monuments is responsible for the full scope of managing Walnut Canyon National Monument, its staff and residents, all of its programs, and its relations with persons, agencies, and organizations interested in the park. Park staff provide the full scope of functions and activities to accomplish management objectives and meet requirements in law enforcement, emergency services, public health and safety, science, resource protection and management, visitor services, interpretation and education, community services, utilities, housing, fee collection, and management support. Maintenance and operations activities associated with the sewage lagoon include: monitoring of flow rates and maintenance of the collection system and the lagoons themselves. Walnut Canyon National Monument maintenance staff currently conducts routine maintenance and repair.

Regardless of the alternative chosen for this project, NPS staff will continue to maintain and operate the sewage lagoon. Therefore, this topic will not be analyzed in this document.

Soundscape

The NPS is mandated by DO-47 (Sound Preservation and Noise Management) to articulate their operational policies that will require, to the fullest extent practicable, the protection, maintenance, or restoration of the natural soundscape resource in a condition unimpaired by inappropriate or excessive noise sources. Natural sounds are intrinsic elements of the environment that are often associated with parks and park purposes. They are inherent components of "the scenery and the natural and historic objects and the wildlife" protected by the Organic Act. Natural sounds may provide valuable indicators of the health of various ecosystems. Intrusive sounds are of concern because they sometimes impede the ability of the NPS to accomplish their mission.

Noise impacts from this project would only last during construction. After construction is completed, noise level impacts would essentially return to their natural condition. All construction would occur during daylight hours, when roads and the associated traffic already impact the area. Therefore, this topic will not be analyzed in this document.

Lightscape

The 2001 Management Policies guide the NPS in cooperating with park neighbors and local agencies to minimize the intrusion of artificial light into the night scene. Elements such as the stars, planets, and earth's moon that are visible during clear nights influence many species, including humans. In natural areas, artificial outdoor lighting is limited to basic safety requirements and is shielded when possible. Construction and operation of the sewage lagoon would conform to all standards required by the NPS to maintain the existing dark sky. The sewage lagoon expansion would not affect the ambient night sky outside the lagoon area. Therefore, lightscape will not be analyzed in this document.

Chapter 2

Alternatives

Introduction

This section describes one action alternative for this project, in addition to the NEPA required no action alternative. Although the option of continuing current management/no action does not solve the wastewater treatment issues at the park, current conditions are used as the baseline against which the action alternative can be analyzed. This is the context for determining the relative magnitude and intensity of impacts. The no action alternative is referred to as "Alternative A, Current Management/No Action" for the purposes of this environmental assessment.

Alternative A – Current Management/No Action

The current wastewater treatment system at Walnut Canyon National Monument consists of three lagoons that are intended to allow evaporation of all influent, without discharge. The ponds total 0.44 acres in size and are located near the northern boundary of Walnut Canyon National Monument. The site is not visible from the entrance road to the park but is visible from FR 303.

The park facilities served by the sewage lagoons include the visitor center, park housing, park headquarters, and maintenance facilities.

Visitation to the park is highest in the summer months, when up to 13,000 gallons per day of effluent are generated. Wastewater inputs to the ponds totaled about 473,000 gallons per year in 2004, with precipitation adding another 500,000 gallons.

The existing ponds exhibit an average annual evaporation of about 828,000 gallons, resulting in an annual net inflow of 145,000 gallons. The lagoons have reached capacity three times in the past 10 years, requiring emergency pumping operations to alleviate capacity or risk having the lagoons overflow that could contaminate soil and non-point source stormwater runoff. Previous pumping has also occurred when the ground is very wet, resulting in deep rutting of muddy soil along the unpaved access road.

Wastewater treatment systems in the NPS must operate in accordance with Director's Order 83 and the Clean Water Act (40 CFR 125), as enforced by the states.

Alternative B – Sewage Lagoon Expansion at Existing Facility

The lagoons would consist of three cells with a total capacity of 48,826 square feet and a surface area of 1.072 acres (Figure 3); slightly more than double the existing size.

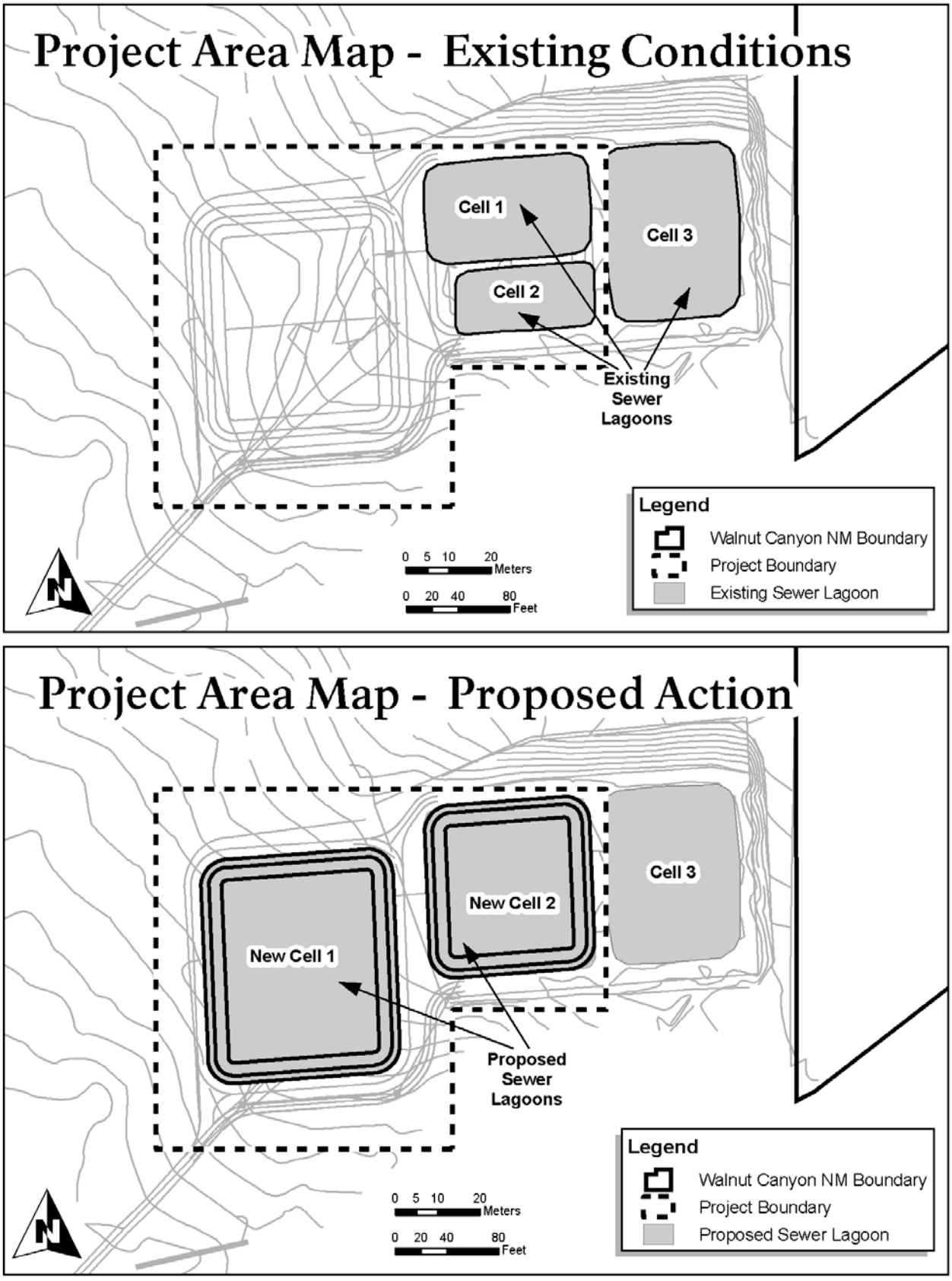

Figure 3. Project Area Map

In the new cell configuration, cell 1 would be located to the west of the current lagoons and would have an area of 21,889 square feet or 0.502 acres. The new cell 2 would be located where the current cells 1 and 2 are located and would have an area of 13,935 square feet or 0.320 acres. Cell 3 would be located where the current cell 3 is located and would have an area of 11,002 square feet or 0.253 acres. The increased surface area has been sized to handle existing and future sewage estimates, with a capacity of over 1.5 million gallons. Figure 4 illustrates the cross-section of the new cell1.

The area impacted by the project would total approximately 1.94 acres, and would include the lagoon surface area, access roads, levees and fencing. Of the 1.94 acres, the existing lagoons and access road have previously disturbed approximately 0.44 acres. In addition to the 1.94 acres, a staging area would be set up about 30 feet from the western and southern project boundary for equipment storage/staging and total about 0.3 acres.

The lagoon expansion project would be completed under the supervision and management of a contractor and registered engineer. A general estimate is that the work could be completed within 90 days of commencement. If permitted, work would be conducted between August and October.

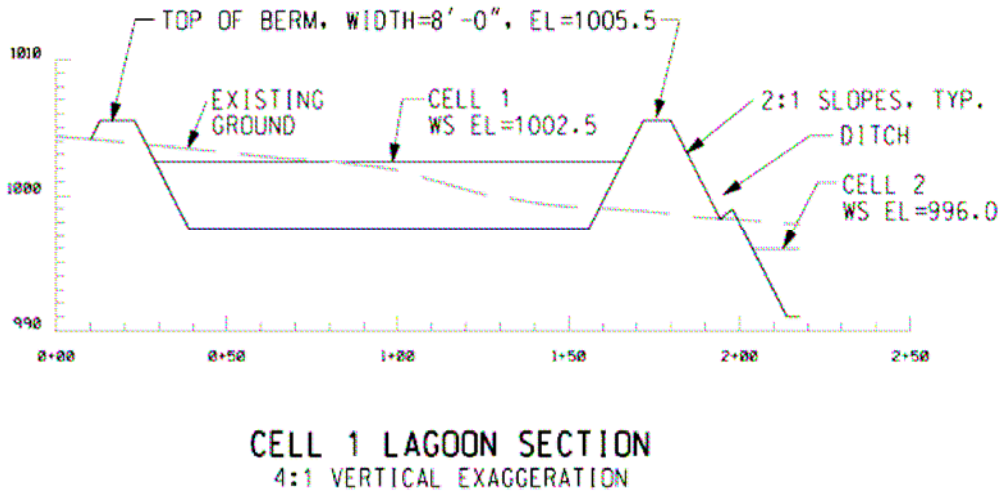

Figure 4. Cross-section of New Cell 1.

Mitigation Measures for the Action Alternatives

During implementation of the action alternative, best management practices and mitigation measures would be used to prevent or minimize potential adverse effects associated with construction activities. These practices and measures would be incorporated into the project construction documents and plans to ensure that major adverse impacts would not occur. Mitigation measures undertaken during construction activities would include, but are not limited to:

Natural Resources

Geology/Soils

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

- The lagoon cells will be constructed entirely above the bedrock to minimize ground disturbance.

- A hypalon liner will be used to prevent sewage from contaminating soil and stormwater runoff.

- Construction activities will occur outside the early spring and summer monsoon "mud" season.

- Soil stripped from the project site will be used to construct lagoon berms and reduce the volume of imported fill materials.

- Fill material will be obtained from a park-approved source.

Biotic Communities

Vegetation

To prevent and minimize the spread of exotic vegetation and noxious weeds, the following mitigation measures would be implemented:

- Existing populations of exotic vegetation at the construction site will be treated prior to construction activities.

- All construction equipment that leaves the paved road will be pressure washed prior to entering the park.

- Parking of vehicles will be limited to the maintenance facility, existing roads, or construction zone.
- Native grasses would be salvaged prior to construction and kept alive in containers for use in revegetation of the project site after construction is completed.
- Post project exotic plant monitoring will be conducted in the project area as time and funding allows.

- Construction activities will be conducted such that it will require removal of the least number of trees to safely construct and operate the sewage lagoon.

- Areas of ponderosa pines, pinyons, junipers, and Gambel oaks will be retained to screen the facility from view from the park's entrance road and the visitor center area.

Wildlife

- All construction equipment and materials that are brought on site will be inspected for exotic pests. Any exotic pests that are found will be removed prior to equipment or materials entering the park.

- Construction workers and supervisors will be advised to keep their work site clean of debris, especially food wrappers and waste that may attract wildlife. Workers and supervisors will also be instructed to not feed the wildlife.

- Construction activities will be timed to avoid the most crucial period for breeding activity for most wildlife species (spring), including peregrine falcon and northern goshawk.

- The perimeter of the project site will be fenced to prohibit access by the public and wildlife.

Species of Concern

- Construction workers and supervisors will be informed about special status species that are known to occur in the project area. If previously unknown species of concern are discovered during construction, all work in the immediate vicinity of the discovery will be halted until park staff re-evaluates the project and the work modified to allow for any protection measures determined necessary to protect the special status species.

- The use of heavy equipment will not occur before June 15 and as late as possible in the federally protected Mexican spotted owl nesting season (Feb 1 through Aug 30), to minimize noise disturbance until after Mexican spotted owl chicks are typically more mature in the nest and lower the probability that the adults would abandon the nest.

- During Mexican spotted owl-breeding season (Feb 1 through Aug 31), heavy or noisy construction equipment will not be used before 1 hour after sunrise or after 1 hour before sunset.

- During Mexican spotted owl-breeding season (Feb 1 through Aug 31), heavy or noisy construction equipment will not be used within ¼ mile of the Walnut Canyon rim.

- If necessary, additional measures to conserve Mexican spotted owl and critical habitat will be developed in consultation with USFWS under Section 7 of the Endangered Species Act.

Cultural Resources

To minimize impacts to cultural resources, the following mitigation measures will be implemented:

- If previously unknown archeological resources are discovered during construction, all work within a 100-foot radius of the discovery will be halted until the resources are identified and documented by a qualified archeologist from the NPS, and an appropriate mitigation strategy developed.

- All workers will be informed of the penalties for illegally collecting artifacts or intentionally damaging any archeological or historic property. Workers will also be informed of the correct procedures if previously unknown resources are uncovered during construction activities.

- Should unknown buried deposits be located, data recovery excavations will be undertaken. These subsurface survey and data recovery efforts would be guided by a project-specific research design. Additionally, the NPS would begin consultations under the Native American Graves Protection and Repatriation Act in the even that buried human remains are discovered during archeological excavations or project development.

Alternatives Considered But Eliminated

During development of the alternatives analyzed in this document, several alternatives were considered but eliminated from consideration. These alternatives included components that failed to meet the project objectives. The nature of the dismissed alternatives and the rationale for their rejection are outlined below.

Alternative 1 – Altering Size of Lagoons

NPS staff considered five different configurations of the sewage lagoons in an attempt to minimize impacts to natural and cultural resources. The size and configuration put forth in the preferred alternative best meets project objectives while limiting impacts to natural and cultural resources.

Alternative 2 – Lowering the Amount of Effluent Entering the System

NPS staff also considered reducing the amount of water entering the system by installing low flow toilets. Low flow toilets have been installed in many of the facilities, but this hasn't completely solved the problem.

Alternative 3 –Installing a Surface Aerator

NPS staff considered installing an aerator that would keep the surface water aerated in order to break down the solids faster. This was dismissed because it would create a water fountain in the middle of the ponds increasing visual disturbance. Another reason this alternative was not considered was because of the increased noise generated by the equipment.

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 CEQ. The CEQ provides direction that "[t]he environmentally preferable alternative is the alternative that will promote the national environmental policy as expressed in NEPA's § 101:

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

Alternative B is the environmentally preferred alternative. Alternative B was designed to use existing utility/maintenance areas and previously disturbed areas where possible, and to avoid or mitigate major or adverse impacts to resources. Alternative B provides a high level of protection of natural and cultural resources and integrates resource protection.

Comparison of Alternatives

The project objectives were identified in Chapter 1. Table 1 compares the ability of the alternatives to meet the project objectives.

Table 1. Comparison of Alternatives

Project Objective	Alternative A	Alternative B
1. Design a sewage lagoon that will efficiently and effectively handle wastewater for existing and future visitation estimates without uncontrolled overflow in the system or the need to pump the lagoons and haul wastewater to the Flagstaff water treatment plant.	No	Yes
2. Provide an enjoyable and safe experience for park visitors.	Somewhat. Uncontrolled overflow is possible	Yes
3. Construct and expand lagoons in a way that minimizes impacts to visitor enjoyment, cultural resources, and the natural environment.	Yes	Somewhat. Two cultural resource sites disturbed. Disturbance of 1.5 acres of vegetation and wildlife habitat.

Summary Of Environmental Impacts

Table 2 is a matrix of environmental consequences to the impact topics identified in Chapter 1 as a result of implementing the alternatives.

Table 2. Summary of Environmental Consequences		
Impact Topic	**Alternative A** **No Action**	**Alternative B** **Preferred Alternative**
Geology/Soils	No impact.	Short-term impacts to soils, primarily from construction vehicles driving back and forth over the project area, would be minor. Long-term impacts, primarily erosion potential and the excavating up to an eight-foot depth for the lagoon cells would be minor. Cumulatively, impacts would be minor.
Biotic Communities Vegetation	Negligible impacts to vegetation from increased frequency of maintenance of the existing system. Cumulatively, impacts would be minor over the long-term.	A total of 1.5 acres of previously undisturbed vegetation would be impacted, including removal of 275 trees greater than 3-inches DBH or DRC. Areas outside the lagoons that are disturbed by construction should revegetate naturally; therefore, long-term direct impacts to vegetation would be minor. Cumulative impacts would also be minor and long-term.
Wildlife	Negligible impacts to wildlife from increased frequency of maintenance of the existing system. Cumulatively, impacts would also be negligible over the long-term.	Short-term impacts to wildlife would be negligible. Long-term habitat loss would involve 1.5 acres of previously undisturbed area and 0.44 acres of previously disturbed and fenced area. This would be considered a minor impact. Cumulatively, impacts to wildlife would range from minor to moderate, primarily from continued loss of habitat.
Species of Concern	There is no direct impacts to Mexican spotted owls, bald eagles, Northern goshawks, and peregrine falcons from this alternative. Cumulative impacts would range from negligible to moderate.	The proposed project would have short- to long-term minor effects on the Mexican spotted owl or its habitat. Cumulative impacts would range from negligible to moderate and short- to long-term. The proposed project would have short- to long-term negligible impacts on the bald eagles, northern goshawks, peregrine falcons, various bat species and potentially to Flagstaff pennyroyal. Cumulative impacts are expected to be negligible.
Cultural Resources	No impact.	Construction of the sewage lagoon would have an adverse effect on two National Register eligible sites. Therefore, a major impact would occur. This would be mitigated through implementation of a data recovery plan approved by the Arizona State Historic Preservation Office.
Visual Quality	Visual quality impacts would continue as long-term and minor under this scenario. Cumulative impacts would be long-term and minor.	A total of 1.5 acres of previously undisturbed vegetation would be disturbed, including removal of 275 trees greater than 3-inches DBH or DRC that currently provide screening of the lagoon facility. Direct impacts to visual quality would be short-term moderate, but with revegetation/reclamation should result in long-term minor impacts to persons using FR 303. Cumulative impacts would also be long-term minor.

Chapter 3

Affected Environment

Introduction

This chapter briefly describes the existing environment of the project area. This chapter is organized by the impact topics identified in Chapter 1.

Natural Resources

Geology/Soils

The geology of Walnut Canyon is described by Darton (1910), Vandiver (1936), and Benfer (1971). The canyon is eroded into sedimentary rock layers of the Kaibab limestone and Coconino sandstone formations. The drainage of Walnut Creek became entrenched in the canyon as the formations were locally uplifted. More recent volcanic events within the San Francisco Volcanic Field have influenced the drainage pattern of Walnut Canyon and surrounding canyons (Colton 1936). The land surface ranges from 6,200 feet to 6,900 feet above sea level. The canyon trends from west to east, following the sinuous, entrenched meanders along the Walnut Creek drainage. It is typically 1/4 mile wide from north rim to south rim, 400 feet deep at the western (upstream) boundary, and 250 feet deep at the eastern (downstream) boundary. The canyon walls are steep with many bare limestone and sandstone ledges and cliffs. Above the canyon rims are level terraces. Three prominent tributary side canyons enter from the south side and another enters from the north side near the western monument boundary.

Detailed soils mapping was not completed for the project area. Soils have been identified using the General Soils Map of Arizona and consist of the Roundtop-Boysay Association (Hendricks 1985).

Roundtop soils are moderately deep and well drained. Typically, they have a dark reddish gray gravelly clay loam surface layer about 3 inches thick. The subsoil is reddish brown gravelly heavy clay loam and gravelly clay about 33 inches thick. Roundtop soils occur on rolling plains and hillslopes with slopes ranging from 2 to 30 percent. These soils have moderate available water capacity and slow permeability. Runoff is medium and the hazard of erosion is moderate.

Boysag soils are shallow and well drained. Typically, they have a reddish brown and brown fine sandy loam surface layers about 3 inches thick. Below this is a layer of yellowish red clay about 8 inches thick. Below this, the bedrock is very pale brown calcareous sandstone having widely spaced fractures. Depth to bedrock ranges from 10 to 20 inches. Boysag soils occur on gently undulating hillslopes with slopes ranging from 0 to 8 percent. These soils have low available water capacity and slow permeability. Runoff is slow to medium and the hazard of erosion is slight to moderate.

Biotic Communities

Rather than attempt to identify and describe all species of plants and wildlife within the study area, general vegetation communities (habitats) with associated characteristic species, and species and habitats of particular concern are described in the following section.

Vegetation

Inventories of the flora of the pre-1996 monument area have documented more than 400 plant taxa (Arnberger 1947, Spangle 1953, Joyce 1974, Phillips 1990, Jenkins et al. 1991, NPS 2002). Jenkins et al. surveyed the vegetation of the pre-1996 monument area in 1991 and Phillips completed a survey of riparian vegetation along the canyon floor in 1990. A network of vegetation study plots has been installed to monitor the effects of prescribed burning (Schon 2000, 2001). In addition, a new vegetation inventory, classification, and map was recently prepared by the USGS Biological Resources Division (Hansen et al. 2004).

The monument area is dominated by coniferous forest and woodland vegetation. There is a relatively compressed environmental/vegetation gradient along the canyon rim terraces, which are dominated by ponderosa pine on the west side of the monument and grade into pinyon-juniper woodland and grassland to the east. The north-facing canyon slopes and tributary canyons are more shaded and moist, and are dominated by Douglas fir-Gambel oak forest. The south-facing slopes are more arid, and dominated by scattered pinyon and juniper trees with an understory of sparse but diverse shrubs, herbaceous species, and succulents. The narrow riparian corridor along the canyon bottom is dominated by broadleaf deciduous trees, shrubs, and vines.

The project area lies in the transition zone from ponderosa pine to pinyon juniper woodland, and is dominated by ponderosa pine with a mixed mid-story of Gambel oak, pinyon, and juniper. Canopy cover in the area proposed for the sewage lagoon expansion is approximately 50%.

Diameter at breast height (DBH) of all living and dead ponderosa pine and Gambel oak greater than 3 inches DBH were measured and recorded using a diameter tape. Both living and dead junipers were similarly measured, though diameters were measured at the root crown (DRC), approximately one-inch above any butt swell of the trees' main stem. Additionally, the DBH of the dominant stem was measured for junipers with a DRC larger than 40 inches. A total of 275 live trees greater than 3 inches DBH or DRC were measured and recorded with an average of approximately 187 trees per acre. Of these, 16 trees exceeded a 16-inch DBH or DRC (8-ponderosa pines, 6-Utah juniper, and 2-alligator juniper). Table 3 shows size class distribution of all trees recorded.

Table 3. Trees in Each Size Class within Project Area

	Ponderosa Pine	Gamble Oak	Utah Juniper	Alligator Juniper	Pinyon Pine	Rocky Mtn. Juniper	Total
Seedling	7	57	61	15	39	7	186
<3"	63	28	53	28	27	4	203
3"-5.9"	49	23	9	13	7	0	101
6"-8.9"	51	14	9	6	3	3	86
9"-11.9"	32	4	8	2	3	0	49
12"-15.9"	11	2	6	3	1	0	23
16+"	8	0	6	2	0	0	16

Wildlife

A rich assemblage of wildlife inhabitat Walnut Canyon National Monument. Checklists have been prepared for mammals (Salomonson 1973) and birds (Grater 1935, Wetherill 1937, Spangle and Spangle 1954, Haldeman and Clark 1969, Southwest Parks & Monuments Association 1992). Systematic re-inventory of the mammals and the herpetofauna is nearly complete (NPS and USGS 2000, NPS 2002). The monument and surrounding lands provide seasonal habitat and movement corridors for elk, mule deer, and American pronghorn.

Mountain lion and black bear also frequent the area. Common mammals include coyote, peccary, cottontail, jackrabbit, fox, badger, and squirrel. Much of the inherent faunal diversity of the canyon is intact, which is attributed to the ruggedness of the canyon terrain, dense vegetative cover, reliable surface waters, and the long-term closure of the backcountry area. The steep terrain and secluded side canyons provide favorable habitat for numerous raptor species, including golden eagle, red-tailed hawk, Cooper's Hawk, sharp-shinned hawk, prairie falcon, great horned owl, and flammulated owl. In addition, the Mexican spotted owl, peregrine falcon, and northern goshawk occur within the monument.

Special Status Species

Table 4 shows the special status species with the potential to occur within the project area. The table is followed by a brief discussion of each species. Two federally listed animal species are known to occur within Walnut Canyon National Monument and could utilize habitat near the sewage lagoon: 1) Mexican spotted owl (*Strix occidentalis lucida*) and 2) bald eagle (*Haliaeetus leucocephalus*).

Table 4. Species of Concern with Potential to Occur in the Project Area

SPECIES	STATUS	POTENTIAL TO OCCUR IN PROJECT AREA
Mexican Spotted Owl	Threatened	Yes, nearest Protected Activity Center (PAC) within 0.3 miles. Hunting habitat available but not likely used in close proximity to visitor center and other NPS facilities.
Bald Eagle	Threatened	Yes, perching and foraging activity observed within 1 mile of project area.
Northern Goshawk	AGF and USFWS Wildlife of Special Concern	Yes, nearest known breeding territory is within ⅛ mile of the project area.
Peregrine Falcon	AGF and USFWS Wildlife of Special Concern	No, nearest known eyrie is over 1 mile from the project area. Nesting, perching and hunting activity not likely at the project site.
American Pronghorn	NPS Species of Concern	Yes, Cosnino and Young's Canyon Range Allotments adjacent to Walnut Canyon National Monument.
Spotted Bat	USFWS Species of Concern	Yes, anabat detection records at Walnut Canyon National Monument; specific habitat attributes unknown.
Greater Western Mastiff Bat	USFWS Species of Concern	Yes, anabat detection records at Walnut Canyon National Monument; specific habitat attributes unknown.
Allen's Big Eared Bat	USFWS Species of Concern	Yes, anabat detection records at Walnut Canyon National Monument; specific habitat attributes unknown.
Western Red Bat	AGF Species of Wildlife Concern	Yes, potentially occurs at Walnut Canyon National Monument but habitat use/attributes unknown.
Western Small-footed Myotis	USFWS Species of Concern	Yes, potentially occurs at Walnut Canyon National Monument but habitat use/attributes unknown.
Long-eared Myotis Bat	USFWS Species of Concern	Yes, anabat detection records at Walnut Canyon National Monument; specific habitat attributes unknown.
Occult Little Brown Bat	USFWS Species of Concern	Yes, anabat detection records at Walnut Canyon National Monument; specific habitat attributes unknown.
Fringed Myotis Bat	USFWS Species of Concern	Yes, observation record at Walnut Canyon National Monument; specific habitat attributes unknown.
Cave Myotis	USFWS Species of Concern	Yes, potentially occurs at Walnut Canyon National Monument but habitat use/attributes unknown.
Long-legged Myotis	USFWS Species of Concern	Yes, anabat detection records at Walnut Canyon National Monument; specific habitat attributes unknown.
Big Free-tailed Bat	USFWS Species of Concern	Yes, potentially occurs at Walnut Canyon National Monument but habitat use/attributes unknown.
Townsend's Big-eared Bat	USFWS Species of Concern	Yes, anabat detection records at Walnut Canyon National Monument; specific habitat attributes unknown.
Flagstaff Pennyroyal	US Forest Service Sensitive Species	Yes, shallow soils of exposed Kaibab limestone pavement, cliffs, and outcrops in ponderosa pine-dominated vegetation.

Mexican spotted owl (MSO) listed as threatened under the Endangered Species Act (ESA), nests and roosts within the monument in treetops and possibly rock ledge cavities in steep canyon terrain dominated by Douglas fir-Gambel oak vegetation. The birds likely hunt in contiguous areas of ponderosa pine-Gambel oak forest, pinyon-juniper woodland, and the riparian corridor along the bottom of the canyon. In 2002, the USFWS formally designated Walnut Canyon National Monument and several thousand acres of surrounding Coconino National Forest land as MSO critical habitat. Although the project site is within designated critical habitat, the affected habitat is not within a Mexican spotted owl breeding territory (PAC), nor does the affected habitat meet the definition of "protected" or "restricted" habitat in the Mexican spotted owl Recovery Plan (USFWS 1995).

Bald eagles, listed as threatened under the ESA, are winter residents and breeding birds within the region surrounding Walnut Canyon National Monument. There are at least nine winter roosting or "significant perching" areas south of the monument on Coconino National Forest and other lands. A small number of breeding pairs may also nest around larger lakes within the region. There are no suitable aquatic feeding habitats within the monument, and bald eagles would not be expected to nest here. Over wintering bald eagles frequently fly over the monument from October through April. Systematic surveys for winter roosts or commonly-used perches within the monument have not been conducted. Bald eagles occasionally perch in a weathered ponderosa snag along the entrance road (NPS staff observation). Bald eagles may feed on carrion along the entrance road corridor, and have been observed at least once feeding on a game carcass left on adjacent land. Critical habitat has not been formally designated within or nearby the monument.

Two USFWS and Arizona Game and Fish Department animal species of concern are known to occur within Walnut Canyon National Monument—the peregrine falcon (*Falco peregrinus anatum*) and the northern goshawk (*Accipter gentilis*).

The peregrine falcon was removed from the federal threatened list by the USFWS, but monitoring is desirable until the full recovery of the species is ensured. Peregrine falcons are known to nest on the canyon walls (NPS 1998). Peregrines successfully fledged young at least four times at Walnut Canyon National Monument between 1990 and 1996.

In northern Arizona, goshawks predominantly nest and breed in forest interior stands of large ponderosa pine trees. Dr. Patricia Hall monitored northern goshawks in proximity to Walnut Canyon from 1992-2003. Two northern goshawk territories currently occur in forested terrain south of the canyon and one north of the sewage lagoons. Portions of the territories overlap the monument boundary. Nesting activity has occurred in 1992 and 1996 within the monument boundary.

Various bat species are considered species of concern by the USFWS and have been recorded feeding around the sewage lagoons at Walnut Canyon National Monument.

Flagstaff pennyroyal (*Hedeoma diffusum*) is found in north central Arizona on the San Francisco Plateau of the Colorado Plateau Province and near Flagstaff southward in Coconino and Yavapai Counties. It is restricted to small, scattered limestone and sandstone outcrops of relatively undisturbed habitats at elevations ranging from 4,500 to 7,000 feet. Associated vegetation includes ponderosa pine, Gambel oak, blue grama, and alligator juniper (AGFD 1993). Suitable habitat may exist in isolated areas with limestone and sandstone outcrops within the project area.

Cultural Resources

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 could change in any way the characteristics that qualify the resource for inclusion on the National Register, it is considered to have an effect. No historic properties affected means that no cultural resources are affected. 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.

Prehistoric

Walnut Canyon National Monument and the area immediately surrounding the monument contain hundreds of archeological sites dating mostly to the 11th, 12th, and early 13th centuries AD. These sites and associated artifacts are the tangible remains of a prehistoric culture that flourished in the Flagstaff region from about AD 600 until 1400. Archeologists call this culture Sinagua, in reference to the early Spanish name for this highland region, Sierra Sinagua (Mountain Range without Water). Scattered Sinagua families farmed the upland areas around Walnut Canyon for centuries, growing small gardens of corn, squash, and beans. Beginning in the late 1000s, however, the population grew significantly. By the mid-1100s, many people had moved into limestone alcoves below the canyon rim, where they constructed substantial dwellings with locally available stone and clay. Today, Walnut Canyon National Monument preserves a portion of the once extensive Sinagua cultural landscape. Multi-room residential sites (both cliff dwellings and open-air pueblos), isolated field structures, forts, quarries, agricultural fields, shrines, rock art, and other features are now protected within the monument.

The dense concentration of prehistoric ruins, their exceptional state of preservation, and their unusual and highly scenic setting in sheltered alcoves along the canyon walls, coupled with the threat of imminent destruction by commercial looters and misguided tourists, were key factors influencing the creation of Walnut Canyon National Monument. These original core values persist to the present day, and the archeological sites in the monument retain a high degree of integrity. Approximately 40 of the more than 400 archeological sites in the monument have been stabilized to some degree, but many retain substantial amounts of original masonry architecture and a more or less complete assemblage of artifacts.

The site density in the monument averages almost 100 sites per square mile, compared with typical densities of 40 sites per square mile in other areas of the ponderosa pine forest near Flagstaff. The high site density in Walnut Canyon National Monument reflects the area's biological richness in general. The canyon's natural abundance and diversity of plant and animal species provided a storehouse of resources that sustained the prehistoric inhabitants of Walnut Canyon.

Walnut Canyon National Monument's ancient dwellings and rich assortment of plants and animals hold traditional cultural importance for several American Indian tribes in the area. Several Hopi clans maintain specific ancestral claims to the dwelling sites in the monument. Certain Navajo and Apache clans claim affiliation to ancestral Pueblo sites in general. Numerous plant species were traditionally used by Hopis, Yavapais, Navajos, and Apache, and many of these plants continue to have importance for medicinal and ceremonial purposes. Today, several culturally important plant species are found in much greater abundance within the monument than anywhere outside of it.

Two sites may be impacted by the proposed sewage lagoon expansion. These sites are WACA 92 and WACA 416. The threatened sites represent prehistoric occupation and use of the landscape. One site (416) consists primarily of an artifact scatter containing numerous ceramics and lithics. In addition, there may be a rock feature associated with the site but this feature lies well outside the area of potential effect and will not be affected. WACA 92 consists of a small two-room pueblo with an associated artifact scatter. It is very possible that the two sites are one larger site that was cut by the access road to the sewage lagoon and the sewer line that was previously installed.

Historic

The Walnut Canyon National Monument Headquarters Area Historic District (Walnut Canyon Historic District), originally known as the Walnut Canyon National Monument Headquarters Area, is comprised of multiple properties that represent the various phases of the early conservation and administrative development of the Walnut Canyon area. Both Forest Service and NPS administrative era properties are present. The NPS era component contains both Park Service Rustic style architecture constructed by the Civilian Conservation Corps (CCC) and Park Service Modern style architecture constructed as part of the Mission 66 program.

The Walnut Canyon Historic District has historic significance at the national level as an excellent example of projects completed as part of the early conservation efforts in the United States as well as an excellent representation of the two major infrastructure development thrusts of the National Park Service, the New Deal of the 1930s-1940s and Mission 66 of the 1950s-1960s.

The Forest Service era properties at Walnut Canyon are excellent examples of early conservation efforts in the United States that formed the basis for the concept and creation of the National Park Service.

The New Deal era properties at Walnut Canyon are excellent examples of projects completed during the formative years of the National Park Service as part of the federal relief programs of the 1930s and early 1940s.This period of history is marked by the unprecedented intervention of the federal government in the national economy and welfare of its citizens. The federal government rapidly and effectively enacted legislation that brought about relief, recovery and reform of the bankrupt economy and depleted national resources and is generally considered one of the turning points in American history. The CCC/New Deal era dates from 1933, when the CCC was established, to 1942, which represents the end of the CCC and the US entrance into World War II.

Walnut Canyon's Mission 66 era properties are excellent examples of National Park Service Mission 66 planning and design. The largest multi-year construction event in NPS history, Mission 66 was initiated in 1956 as a major effort by the NPS to upgrade the national parks to meet escalating demands in the post-World War II period, when the number of visitors to the parks dramatically increased. The goal of the program was to substantially improve the parks by 1966, hence the name "Mission 66". The NPS has determined a 1945-1972 period of significance, a date range that covers the important design precedents of Mission 66 as well as later Mission 66 influenced resources (Allaback 2000). The Walnut Canyon Historic District period of significance ranges from 1904, when the US Forest Service took initial steps to protect the Walnut Canyon area, to 1967, when the last Mission 66 projects were completed at Walnut Canyon.

The following are contributing resources for the Walnut Canyon National Monument Historic District:

<u>Forest Service era resources (1904-1934)</u>

1. Ranger Cabin and associated features
2. Ranger Ledge Trail and associated features
3. Daughters of the American Revolution (DAR) pioneer monument
4. "Old" 303 (Ranger Cabin Road)

<u>New Deal era resources (1938-1942)</u>

1. Walnut Canyon National Monument Administration Building (Building 11)
2. Comfort Station (Building No. 12)
3. Residence No. 1
4. Residence No. 2
5. CCC entrance road

6. Visitor Center Parking Lot (south end) and associated features
8. Housing Area loop road
9. Worm rail boundary fence
10. Island Trail (circulation pattern)
11. Rim Picnic Area

Mission 66 era resources (1956-1967)

1. Walnut Canyon National Monument Visitor Center addition (Building 11)
2. Expanded Visitor Center parking lot and associated features
3. Residence No. 6
4. Residence No. 7
5. Utility Building (Building 25) and associated maintenance yard
6. Residential and Utility Spur Road
7. Water Tower
8. Paved Walnut Canyon Approach Road (Route 2)
9. Rim Trail
10. Island Trail physical improvements

Other Contributing Resources

1. Generator House (Building 20) (1945)
2. Picnic Area features (water fountains, trash cans) (1947)
3. Isolated Island Trail features

The List of Classified Structures for Walnut Canyon National Monument contains 78 properties.

No historic structures would be affected by the proposed sewage lagoon expansion.

Visual Quality

Walnut Canyon National Monument was established in 1915 specifically to preserve the prehistoric ruins of ancient cliff dwellings. The presence of water in a dry land made this canyon singularly rare and valuable to its early human inhabitants, and to a variety of plants and animals. Walnut Canyon and the surrounding environment provide a great diversity in scenery and panoramic vistas.

The visual quality or character of the landscape surrounding the sewage lagoon and administrative use area is typical of NPS administrative sites – that is, it has been modified by man-made structures, roads, utilities, and vehicles. However, the topography of the rim terraces combined with the varied canopy of trees (mature ponderosa pines, pinyon pines, juniper, and oak) provides a moderately high degree of visual absorption capacity for the landscape.

The project area is not visible from any visitor use areas. The project area is about 150 feet from the edge of FR 303 (designated a historic corridor) and is intermittently visible along this road for about 250-300 feet. The vegetation that has grown along the roadway provides screening for most recreationists that use this road.

Chapter 4

Environmental Consequences

Introduction

This chapter describes the direct, indirect, and cumulative environmental consequences of the alternatives. It is organized by impact topic, with environmental consequences discussed under each alternative. Environmental consequences are the effects and impacts on the physical, biological, social, and economic environment that may be caused by implementing an alternative. Environmental consequences result from the level and type of development that either is proposed or may be expected from each alternative.

Methodology

All alternatives have been evaluated for their effects on the resources and values that were identified during the scoping process (also known as the impact topics). To determine the relative change in resource conditions, the characterization of effects was based on the following factors:

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 would no longer be detectable as the resource is returned to its predisturbance condition or appearance, generally less than 5 years.

Long-term: An effect on a resource or its condition that does not return the resource to its predisturbance condition or appearance and for all practical purposes is considered permanent.

The threshold or intensity of the effect—whether negligible, minor, moderate, or major—is specifically defined in the methodology section at the beginning of the discussion for each impact topic. Threshold values were developed based on federal and state standards, consultation with regulators from applicable agencies, and discussions with resource specialists.

Cumulative Impacts

The alternatives were evaluated based on other past, present, and reasonably foreseeable future action (regardless of who undertakes these additional actions). Impacts from these

actions could result in individually minor effects, but when considered cumulatively, could result in more intense effects taking place over a period of time.

Cumulative effects were determined by combining the effects of the alternative with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other past, ongoing, or reasonably foreseeable future actions at Walnut Canyon National Monument and in the surrounding region. Other actions that have the potential to have a cumulative effect in conjunction with this project include:

- Increased recreational use on surrounding Coconino National Forest lands.
- Increased unauthorized access into the Resource Preservation Zone within the monument.
- Increased rural and urban development.
- Increased ambient noise from the local and regional transportation system, including the nearby Interstate-40, Santa Fe Railroad, Pulliam Airport, and Forest Road 303.
- A new fully accessible visitor center and parking area would be built near I-40 at the park entrance, to orient visitors before they encounter park resources, and to collect entrance fees. Visitation numbers could be managed from this location when necessary.
- The modern additions to the existing historic Civilian Conservation Corps (CCC)-constructed visitor center would be removed, making the building less visible on the rim and restoring the small, intimate nature of the historic structure. The remaining portion would be adaptively used for both trailhead and canyon orientation and as an educational center for more in-depth learning opportunities, such as ranger talks, special events, workshops, seminars, demonstrations, and so on.
- Three gates would be located along the entrance road: one near the I-40 exit and one on each side of FR303, to eliminate after-hours access to the monument road while allowing 24-hour use of FR303.
- Within the Extended Learning Zone, self-guided trails and ranger-led activities in the vicinity of the current visitor center would remain as they are now. The potential exists to develop self-guided activities using existing primitive roads to the ranger cabin area. Efforts would be made through development of new media to provide a broader range of educational and interpretive programs aimed at in-depth learning. Some of these experiences would be provided through partnerships with affiliated tribes, organizations, institutions, and/or other agencies.
- Visitors would have access to the eastern end of the park via ranger-guided hikes. An existing US Forest Service road would be upgraded and used administratively to facilitate these guided activities. A parking area would be established within the monument from which the guided hikes would be staged.

The monument is a very small natural area within a regional framework of lands that are primarily managed by the USFS for ecologically sustainable, multiple uses. The recently completed City of Flagstaff and Coconino County growth plans emphasize managed growth, environmental protection, and conservation of biodiversity. The Coconino National Forest also recently completed the Flagstaff-Lake Mary Ecosystem Amendment to the Coconino National Forest Land and Resource Management Plan, emphasizing dispersed, non-motorized recreational use and retention of USFS ownership over lands surrounding the monument. The Coconino National Forest is currently undertaking a similar assessment process for Anderson Mesa, which is the only remaining viable corridor for seasonal wildlife movement and dispersal to and from Walnut Canyon.

Cultural Resources and Section 106 of the National Historic Preservation Act

In this EA/AEF, impacts to cultural resources are described in terms of type, context, duration, and intensity, as described above, which is consistent with the regulations of the Council on

Environmental Quality (CEQ) that implement the NEPA. These impact analyses are intended, however, to comply with the requirements of both NEPA and Section 106 of the National Historic Preservation Act (NHPA). In accordance with the Advisory Council on Historic Preservation's regulations implementing Section 106 of the NHPA (36 CFR §800, Protection of Historic Properties), impacts to cultural resources were identified and evaluated by (1) determining the area of potential effects; (2) identifying cultural resources present in the area of potential effects that were either listed in or eligible to be listed in the National Register of Historic Places; (3) applying the criteria of adverse effect to affected cultural resources either listed in or eligible to be listed in the National Register; and (4) considering ways to avoid, minimize or mitigate adverse effects.

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

CEQ regulations and the NPS' Conservation Planning, Environmental Impact Analysis and Decision-making (Director's Order-12) also call for a discussion of the appropriateness of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact (e.g. reducing the intensity of an impact from major to moderate or minor). Any resultant reduction in intensity of impact because of mitigation, however, is an estimate of the effectiveness of mitigation under NEPA only. It does not suggest that the level of effect as defined by Section 106 is similarly reduced. Although adverse effects under Section 106 may be mitigated, the effect remains adverse.

A Section 106 summary is included in the impact analysis sections for cultural resources under the preferred alternative. The Section 106 Summary is intended to meet the requirements of Section 106 and is an assessment of the effect of the undertaking (implementation of the alternative) on cultural resources, based upon the criterion of effect and criteria of adverse effect found in the Advisory Council's regulations.

Impairment of Park Resources or Values

In addition to determining the environmental consequences of the alternatives, NPS policy (NPS 2001) requires analysis of potential effects to determine whether or not actions would impair park resources.

The fundamental purpose of the national park system, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. 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 give the NPS the management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of the park, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given the NPS the management discretion to allow certain impacts within parks, that discretion is limited by the statutory requirement that the NPS 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 NPS 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 impairment. An impact would be more likely to constitute impairment to the extent that 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
- 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.

Natural Resources

Geology/Soils

Methodology

All available information on geological resources in the park was compiled. The information is based on information provided in the park's Draft General Management Plan (NPS 2002).

The thresholds of change for the intensity of an impact are defined as follows:

Negligible: An action that could result in a change to a natural physical resource, but the change would be so small that it would not be of any measurable or perceptible consequence. Soils would not be affected or the effects to soils would be below or at the lower levels of detection. Any effects to soil productivity or fertility would be slight and no long-term effects to soils would occur.

Minor: An action that could result in a change to a natural physical resource, but the change would be small and localized and of little consequence. The effects to soils would be detectable. Effects to soil productivity or fertility would be small, as would the area affected. If mitigation were needed to offset adverse effects, it would be relatively simple to implement and would likely be successful.

Moderate: An action that would result in a change to a natural physical resource; the change would be measurable and of consequence. The effect on soil productivity or fertility would be readily apparent, likely long-term, and result in a change to the soil character over a relatively wide area. Mitigation measures would probably be necessary to offset adverse effects and would likely be successful.

Major: An action that would result in a noticeable change to a natural physical resource; the change would be measurable and result in a severely adverse or major beneficial impact. The effect on soil productivity or fertility would be readily apparent, long-term, and substantially change the character of the soils over a large area in and out of the monument. Mitigation measures to offset adverse effects would be needed, extensive, and their success could not be guaranteed.

Alternative A – No Action

Direct/Indirect Impacts: No construction activities would occur that would change or impact geological formations or soil conditions. However, the lagoons have reached capacity several times in the recent past, which is likely to reoccur in the future. This could lead to sewage overflow, soil contamination, non-point source stormwater runoff, and/or deep rutting of muddy soil along the unpaved access road from emergency pumping operations (typically required when the ground is wet).

Cumulative Impacts: No action in this analysis means that the sewage lagoon expansion would not occur. Therefore, there would be no cumulative impacts to geology or soils as a result of construction activities. There would be an increased potential for soil contamination, non-point source stormwater runoff, or soil rutting from lagoons overflowing.

Impairment: There would be no impairment of Walnut Canyon National Monument resources or values if this alternative were implemented. This is concluded because no major adverse impacts would occur. Specifically, no major adverse impacts would occur to necessary resources needed to fulfill specific purposes identified in the establishing legislation or proclamation of the park, or resources that are key to the natural or cultural integrity of the park, or resources identified as a goal in the park's General Management Plan or other relevant NPS planning documents.

Conclusion: Potential long-term impacts would be minor, primarily from soil contamination from sewage overflow or potential erosion and soil rutting along unpaved access roads from emergency pumping operations. Cumulatively, impacts would be minor to moderate.

Alternative B – Preferred Alternative

Direct/Indirect Impacts: The potential for adverse impacts on geological formations is negligible, because construction of the lagoons would be within or adjacent to previously disturbed areas and lagoon construction requires only surface or near-surface disturbance. Potential effects on soils from project construction would be minor and would include increased soil erosion, soil compaction, soil removal or soil profile mixing and potential soil contamination from construction equipment.

Soil erosion could occur from construction of the sewage lagoon and staging area for construction equipment to park and turnaround; however, the project site is on nearly level terrain so the potential for erosion is limited. Soils within the proposed area designated for construction would be graded and cleared of vegetation, which would increase the potential for soil erosion at a rate higher than that occurring naturally. Silt fencing would be constructed around the downslope side of the project area to trap sediment during stormwater runoff. A total area of approximately 1.5 acres would be disturbed by the new lagoon.

Soil compaction may occur where heavy equipment traverses cross-country. Compaction lowers the value of soil as a plant medium. Compaction would be minor in intensity.

Constructing the sewage lagoon would involve stripping the topsoil from the cell sites to construct the lagoon cells and could reach a depth of eight-feet below the surface. This process could result in mixing soil profiles. About 1,800 cubic yards of fill would be needed to construct the berms. As much of the stripped soil as possible would be used for level base grading and to construct the lagoon berms. Any material needed in addition to the on-site excavation would be brought from a privately owned quarry. Rocks excavated from the cells would be spread across the disturbed area away from the lagoon or removed from the site and taken to an approved dumpsite.

Soil pollution potential would be minimized by careful handling of oils and fuel, by maintaining construction vehicles, regularly, by allowing construction vehicle maintenance in the project

area to only occur during emergency situations, and by immediately cleaning up any fluid spills.

Cumulative Impacts: The combined impact of this proposal with past, present, and foreseeable future actions would result in the continued compaction and displacement of soils from construction and development projects. Displacement from soil erosion would probably be the impact of greatest concern because of the extent of soil disturbed during construction. However, soil loss would be minimized through implementation of standard erosion control measures. Cumulatively, impacts to soils would be minor.

Impairment: There would be no impairment of Walnut Canyon National Monument's resources or values if this alternative were implemented. This is concluded because no major adverse impacts would occur. Specifically, no major adverse impacts would occur to necessary resources needed to fulfill specific purposes identified in the establishing legislation or proclamation of the park, or resources that are key to the natural or cultural integrity of the park, or resources identified as a goal in the park's General Management Plan or other relevant NPS planning documents.

Conclusion: Short-term impacts to soils, primarily from construction vehicles driving back and forth over the project area, would be minor. Long-term impacts, primarily erosion potential and the excavating up to an eight-foot depth for the lagoon cells would be minor. Cumulatively, impacts would be minor.

Biotic Communities

Vegetation

Methodology

All available information on known native vegetation, as well as exotic plants and noxious weeds was compiled. Where possible, map locations of known populations were compared with location of the sewage lagoon. Predictions about short- and long-term site impacts were based on previous studies.

The thresholds of change for the intensity of an impact are defined as follows:

Negligible: An action that would result in no native vegetation disturbed or limited disturbance to individual plants, but there would be no effect on native species populations. The effects would be short-term, on a small scale, and no species of special concern would be affected. Additionally, the action could result in the spread of noxious weeds, but the change would be so small that it would not be of any measurable or perceptible consequence.

Minor: An action that could result in disturbance to some individual native plants and could also affect a relatively minor portion of that species' population. Mitigation to offset adverse effects, including special measures to avoid affecting species of special concern, could be required and would be effective. Additionally, the action could result in the spread of noxious weeds. The change would be small and localized and of little consequence.

Moderate: An action that could result in disturbance to some individual native plants and would also affect a sizeable segment of the species' population in the long-term and over a relatively large area. Mitigation to offset adverse effects could be extensive, but would likely be successful. Some species of special concern could also be affected. Additionally, the action could result in the spread of noxious weeds. The change would be measurable and of consequence to the species or resource but more localized.

Major: An action that could result in a considerable long-term effect on native plant populations, including species of special concern, and could affect a relatively large area inside or outside the park. Mitigation measures to offset the adverse effects would be required, extensive, and success of the mitigation measures would not be guaranteed. Additionally, the action could have a noticeable invasion of noxious weeds. The change would be measurable and result in a severely adverse or major beneficial impact, and possible permanent consequence, upon the biotic community or resource.

Alternative A – No Action

Direct/Indirect Impacts: As no new ground disturbing activities would occur, there would be no direct impacts to vegetation. However, maintenance on the existing lagoon would be expected to increase in frequency as the cells reach or exceed their capacity. This could increase the potential for introduction of exotic plants or noxious weeds resulting from increased vehicular activity to the sewage lagoon area. This would be considered a negligible impact.

Cumulative Impacts: Existing development has created disturbances that have allowed the introduction of exotic plants and noxious weeds into the park. Exotic plants are also increasing at Walnut Canyon National Monument as a result of natural environmental disturbances that the NPS has little control (e.g., fires, high flows in the Walnut Creek drainage, burrowing mammals, and extreme annual precipitation variation from record drought to record wet years). Increased maintenance combined with foreseeable future projects in the area and natural environmental disturbances would increase the potential for noxious weeds and exotic plants to spread in the park at a rate that may be difficult for the existing control programs to manage. Mitigation measures would be implemented for any future projects to reduce the potential for spread or introduction of exotic plants or noxious weeds.

Impairment: There would be no impairment of Walnut Canyon National Monument's resources or values if this alternative were implemented. This is concluded because no major adverse impacts would occur. Specifically, no major adverse impacts would occur to necessary resources needed to fulfill specific purposes identified in the establishing legislation or proclamation of the park, or resources that are key to the natural or cultural integrity of the park, or resources identified as a goal in the park's General Management Plan or other relevant NPS planning documents.

Conclusion: There would be long-term negligible impacts to vegetation. Cumulatively, impacts to vegetation would be minor over the long-term.

Alternative B – Preferred Alternative

*Direct/Indirect Impacts***.** Direct impacts to vegetation would be negligible to minor because vegetation (either in the form of natural reintroduction and revegetation) would grow back in the area of disturbance not used for the lagoon. Impacts to vegetation caused by Alternative B would be primarily confined to the immediate area of the new cell (Number 1) and a small staging area to the west and south of the lagoon site. New disturbance would total approximately 1.5 acres—which equates to about 0.1% of the total 1,375 acres of ponderosa pine dominated vegetation along the rim terraces within the Monument. No sensitive vegetation areas would be impacted under this alternative.

Approximately 1.5 acres of mixed ponderosa-pinyon-juniper-Gambel oak woodland vegetation would be cleared for construction of the lagoon cells, access road, and service area. A total of 275 live trees greater than 3 inches DBH or DRC would be removed with an average of approximately 187 trees per acre. Of these, 16 trees exceeded a 16-inch DBH or DRC (8-ponderosa pines, 6-Utah juniper, and 2-alligator juniper). Within 150 feet of the project perimeter, up to 12 large ponderosa pine snags, killed by the 2002 drought, would also be removed so they won't threaten to fall and injure workers or damage the lagoon

facility. Woody material from vegetation removal would be chipped, and as much chipped material as possible would be broadcast over the project area to stabilize soil and speed plant growth.

With soil disturbance and exposure comes the potential opportunity for weedy plant invasion. The staging and operation of construction equipment could trample and have short-term impacts on understory vegetation up to 30 feet around the western and southern perimeter of the mapped project area (about 0.3 acres). Weed seed is carried from site to site on the tires of equipment and vehicles, in soils, and on clothing. Many weedy species are annuals and need very minimal requirements for establishment and propagation. As weedy species increase, native plants are often displaced. This displacement leads to a decrease in palatable and suitable forage for wildlife, in nesting and resting habitat for birds, and natural diversity indicative of natural ecosystems. To minimize impacts, native grasses would be salvaged prior to construction and kept alive in containers for use in revegetation of the project site after construction is completed.

Cumulative Impacts: Existing development has created disturbances that have allowed introduction of exotic plants and noxious weeds into the park. Constructing the proposed sewage lagoon combined with foreseeable future projects in the area would increase the potential for noxious weeds and exotic plants to spread in the park at a rate that may be difficult for the existing control programs to manage. Mitigation measures would be implemented for any future projects to reduce the potential for spread or introduction of exotic plants or noxious weeds. Therefore, cumulative impacts would be minor and long-term.

Impairment: There would be no impairment of the Walnut Canyon National Monument's resources or values if this alternative were implemented. This is concluded because no major adverse impacts would occur. Specifically, no major adverse impacts would occur to necessary resources needed to fulfill specific purposes identified in the establishing legislation or proclamation of the park, or resources that are key to the natural or cultural integrity of the park, or resources identified as a goal in the park's General Management Plan or other relevant NPS planning documents.

Conclusion: A total of 1.5 acres of previously undisturbed vegetation would be impacted, including removal of 275 trees greater than 3-inches DBH or DRC. Areas outside the lagoons that are disturbed by construction should revegetate naturally; therefore, long-term direct impacts to vegetation would be minor. Cumulative impacts would also be minor and long-term.

Wildlife

Methodology

All available information on known wildlife corridors and special use areas was compiled. Where possible, map locations of sensitive areas were compared with the location of the sewage lagoon. The thresholds of change for the intensity of an impact are defined as follows:

Negligible: An action that could result in changes that would be so slight that they would not be of any measurable or perceptible consequence to the wildlife species' population. Wildlife would not be affected or the effects would be at or below the level of detection, and would be short-term.

Minor: An action that could result in changes to wildlife that would be detectable, although the effects would be localized, and would be small and of little consequence to the species' population. Mitigation measures, if needed to offset adverse effects, would be simple and successful.

Moderate: An action that could result in changes to wildlife that would be readily detectable, long-term and localized, with consequences at the population level. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.

Major: An action that could result in changes to wildlife that would be obvious, long-term, and would have substantial consequences to wildlife populations in the region. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.

Alternative A – No Action

Direct/Indirect Impacts: Since no ground disturbing activities are proposed under this alternative, there would be no direct impacts to wildlife. Increased maintenance of the existing lagoon could result in temporary and in-frequent disturbance to wildlife that use the area. This impact would be considered short-term and negligible.

Cumulative Impacts: Wildlife habitat has been lost in and around the project area from past developments. Although the sewage lagoon would not be expanded under this alternative, the increased frequency of maintenance to the lagoon may disturb wildlife, but at a negligible level. Future projects may increase the potential for wildlife to be disturbed resulting in a long-term minor to moderate cumulative impact to wildlife.

Impairment: There would be no impairment of Walnut Canyon National Monument's resources or values if this alternative were implemented. This is concluded because no major adverse impacts would occur. Specifically, no major adverse impacts would occur to necessary resources needed to fulfill specific purposes identified in the establishing legislation or proclamation of the park, or resources that are key to the natural or cultural integrity of the park, or resources identified as a goal in the park's General Management Plan or other relevant NPS planning documents.

Conclusion: There would be a long-term negligible indirect impact to wildlife from implementing no action, resulting from increased maintenance of the existing lagoon. Cumulatively, impacts to wildlife would be minor to moderate over the long term.

Alternative B – Preferred Alternative

Direct/Indirect Impacts: The proposed development may have a long-term minor adverse effect on individual animals or on localized natural processes; however, population level effects are not anticipated for any species. The project area is within the primary visitor use area and NPS administration facilities, where the wildlife community has already been exposed and adapted to considerable daytime human activity and associated noise. The habitat in and around the existing sewage lagoon and maintenance facility would continue to provide for wildlife species that are habituated or highly adaptable to the human environment, such as deer, birds, squirrels, and rodents. Distribution and abundance of these wildlife species in and around the project area would not substantially change once construction was complete. Constructing the sewage lagoons would require disturbing an additional 1.5 acres of wildlife habitat. The 1.5 acres needed for the sewage lagoon would be fenced and no longer available for wildlife use.

Routine maintenance and operation of the lagoon would have a short-term negligible impact on wildlife.

Cumulative Impacts: Cumulatively, impacts to wildlife would be minor to moderate primarily from continued loss of this and other adjacent forested habitats because of continued urban development adjacent to Walnut Canyon National Monument and slow expansion of Flagstaff. The remaining ponderosa-pinyon-Gambel oak-juniper habitat, as well as other forested habitats, in the Walnut Canyon National Monument area would continue to provide for wildlife that are habituated to or have a high tolerance to human activity. Future projects

may increase the potential for wildlife to be disturbed resulting in a long-term minor to moderate cumulative impact to wildlife.

Impairment: There would be no impairment of Walnut Canyon National Monument's resources or values if this alternative were implemented. This is concluded because no major adverse impacts would occur. Specifically, no major adverse impacts would occur to necessary resources needed to fulfill specific purposes identified in the establishing legislation or proclamation of the park, or resources that are key to the natural or cultural integrity of the park, or resources identified as a goal in the park's General Management Plan or other relevant NPS planning documents.

Conclusion: Short-term impacts to wildlife would be negligible. Long-term habitat loss would involve 1.5 acres of previously undisturbed area and 0.44 acres of previously disturbed and fenced area. This would be considered a minor impact. Cumulatively, impacts to wildlife would range from minor to moderate, primarily from continued loss of habitat.

Special Status Species

Methodology

Information on special status species was gathered from prior research at Walnut Canyon National Monument. Map locations of habitat associated with these species were compared with the location of the sewage lagoon. Known impacts caused by construction activities were also considered. The thresholds of change for the intensity of an impact are defined as follows:

Negligible: An action that could result in a change to a population or individuals of a species or designated critical habitat, but the change would be so small that it would not be of any measurable or perceptible consequence.

Minor: An action that could result in a change to a population or individuals of a species or designated critical habitat. The change would be measurable but small and localized and of little consequence.

Moderate: An action that would result in some change to a population or individuals of a species or designated critical habitat. The change would be measurable and of consequence to the species or designated critical habitat.

Major: An action that would result in a noticeable change to a population or individuals of a species or resource or designated critical habitat.

Mexican Spotted Owl

Alternative A – No Action

Direct/Indirect Impacts: No construction activities are proposed under this alternative. Therefore, there would be no impacts to Mexican spotted owls from this alternative.

Cumulative Impacts: The NPS would remain involved in regional planning processes and site-specific development proposals in hopes that adverse effects to Mexican spotted owls and designated critical habitat are fully mitigated.

Impairment: There would be no impairment of Walnut Canyon National Monument's resources or values if this alternative were implemented. This is concluded because no major adverse impacts would occur. Specifically, no major adverse impacts would occur to necessary resources needed to fulfill specific purposes identified in the establishing legislation or proclamation of the park, or resources that are key to the natural or cultural integrity of the park, or resources identified as a goal in the park's General Management Plan or other relevant NPS planning documents.

Conclusion: There is no impact to Mexican spotted owls from this alternative. Cumulative impacts would range from negligible to moderate.

Alternative B – Preferred Alternative

Direct/Indirect Impacts: The project area is within formally designated Mexican spotted owl critical habitat; however, it doesn't meet specific critical habitat requirements provided in the Mexican spotted owl Recovery Plan for "protected" or "restricted" habitat. The closest known Mexican spotted owl protected activity center (PAC) is about 0.5 miles from the sewage lagoon. Impacts to nesting/roosting and foraging habitat for the Mexican spotted owl would be short-term and minor because of the limited duration for construction and the minor amount of habitat that would be disturbed (1.5 acres) as well as the distance of the proposed construction activities from known PACs. Additionally, the project area is in close proximity to the visitor center-administrative use areas that experience high levels of daytime traffic, human activity, and associated noise that Mexican spotted owls are not expected to use this area (USFWS 2004).

The amount of tree removal greater than 3-inches DBH (275) would have a long-term minor impact on stand structure changes; however, none of this would occur in areas formally designated as PACs.

Noise from construction activities associated excavating the sewage lagoon may impact Mexican spotted owls. Equipment that would most likely be used during construction includes dozers and excavators, which have noise levels of about 85 dBA (A-weighted decibals) at 50 feet. These noise levels would occur during daylight hours and would dissipate to between 49 and 55 dBA at a distance of 0.5 miles, which is equivalent to noise levels typically found in libraries. Walnut Canyon tends to amplify noise and could impact owls in close proximity to the canyon. Any Mexican spotted owls occupying predicted habitat farther than 0.5 miles from the project area and away from the canyon corridor would not be expected to be impacted by this level of sound (NPS 2002).

Nocturnal prey species within an estimated 500 feet radius of the construction area would be temporarily disturbed by the noise associated with excavation of the sewage lagoons. These disturbances would occur only during the day and would be short-term. The proposed sewage lagoon expansion would have negligible impacts upon the prey species habitat structure and population dynamics in formally designated PACs.

Cumulative Impacts: As stated under Alternative A, the NPS would remain involved in regional planning processes and site-specific development proposals in hopes that adverse impacts to MSO and designated critical habitat are fully mitigated.

Impairment: There would be no impairment of Walnut Canyon National Monument's resources or values if this alternative were implemented. This is concluded because no major adverse impacts would occur. Specifically, no major adverse impacts would occur to necessary resources needed to fulfill specific purposes identified in the establishing legislation or proclamation of the park, or resources that are key to the natural or cultural integrity of the park, or resources identified as a goal in the park's General Management Plan or other relevant NPS planning documents.

Conclusion: The proposed project would have short- to long-term minor impacts on the Mexican spotted owl or its habitat. Cumulative impacts would range from negligible to moderate and short- to long-term.

Bald Eagle

Alternative A – No Action

Direct/Indirect Impacts: No construction activities are proposed under this alternative. Therefore, there would be no impact to bald eagles or its foraging habitat from this alternative.

Cumulative Impacts: There would be no cumulative impacts to bald eagles as a result of implementing this alternative.

Impairment: There would be no impairment of Walnut Canyon National Monument's resources or values if this alternative were implemented. This is concluded because no major adverse impacts would occur. Specifically, no major adverse impacts would occur to necessary resources needed to fulfill specific purposes identified in the establishing legislation or proclamation of the park, or resources that are key to the natural or cultural integrity of the park, or resources identified as a goal in the park's General Management Plan or other relevant NPS planning documents.

Conclusion: There would be no impact to the bald eagle or its foraging habitat from this alternative.

Alternative B – Preferred Alternative

Direct/Indirect Impacts: Roosting or perching of bald eagles within Walnut Canyon National Monument would be a rare event, and the proposed activity should not disturb individual bald eagles, affect their survival, or affect their ability to reproduce during subsequent breeding seasons. Therefore, direct impacts are expected to be negligible.

Cumulative Impacts: Several foreseeable future projects as well as the sewage lagoon expansion would occur predominantly in already disturbed areas to the extent possible and would not affect the prey base for foraging bald eagles. None of the foreseeable actions would affect nesting habitat. Therefore, cumulative impacts to bald eagles are expected to be negligible.

Impairment: There would be no impairment of Walnut Canyon National Monument's resources or values if this alternative were implemented. This is concluded because no major adverse impacts would occur. Specifically, no major adverse impacts would occur to necessary resources needed to fulfill specific purposes identified in the establishing legislation or proclamation of the park, or resources that are key to the natural or cultural integrity of the park, or resources identified as a goal in the park's General Management Plan or other relevant NPS planning documents.

Conclusion: The proposed project would have a negligible direct impact on the bald eagles. Cumulative impacts to bald eagles as a result of implementing this alternative would be negligible.

Northern Goshawk

Alternative A – No Action

Direct/Indirect Impacts: No construction activities are proposed under this alternative. Therefore, there would be no impact to the goshawk or its foraging habitat from this alternative.

Cumulative Impacts: There would be no cumulative impacts to northern goshawks as a result of implementing this alternative.

Impairment: There would be no impairment of the park's resources or values if this alternative were implemented. This is concluded because no major adverse impacts would

occur. Specifically, no major adverse impacts would occur to necessary resources needed to fulfill specific purposes identified in the establishing legislation or proclamation of the park, or resources that are key to the natural or cultural integrity of the park, or resources identified as a goal in the park's General Management Pan or other relevant NPS planning documents.

Conclusion: There would be no direct or cumulative impacts to the goshawk or its habitat from this alternative.

Alternative B – Preferred Alternative

Direct/Indirect Impacts: Although it is possible that goshawks could fly over the project area, impacts to nesting/roosting and foraging habitat for the northern goshawk are expected to be negligible because of the limited scope of the project, the fact that the proposal would occur in an already developed and disturbed area, and its distance from known goshawk-occupied habitat (south of Walnut Canyon) and on Campbell Mesa (north of the project area).

Cumulative Impacts: Several foreseeable future projects as well as the sewage lagoon expansion would occur predominantly in already disturbed areas to the extent possible and would not affect the prey base for foraging northern goshawks. None of the foreseeable actions would affect nesting habitat. Therefore, cumulative impacts to northern goshawks are expected to be negligible.

Impairment: There would be no impairment of the park's resources or values if this alternative were implemented. This is concluded because no major adverse impacts would occur. Specifically, no major adverse impacts would occur to necessary resources needed to fulfill specific purposes identified in the establishing legislation or proclamation of the park, or resources that are key to the natural or cultural integrity of the park, or resources identified as a goal in the park's General Management Plan or other relevant NPS planning documents.

Conclusion: The proposed project is expected to have a negligible direct impact on the northern goshawk. Cumulative impacts are also expected to be negligible.

Peregrine Falcon

Alternative A – No Action

Direct/Indirect Impacts: No construction activities are proposed under this alternative. Therefore, there would be no impact to the peregrine falcon or its foraging habitat from this alternative.

Cumulative Impacts: There would be no cumulative impacts to peregrine falcons as a result of implementing this alternative.

Impairment: There would be no impairment of the Walnut Canyon National Monument's resources or values if this alternative were implemented. This is concluded because no major adverse impacts would occur. Specifically, no major adverse impacts would occur to necessary resources needed to fulfill specific purposes identified in the establishing legislation or proclamation of the park, or resources that are key to the natural or cultural integrity of the park, or resources identified as a goal in the park's General Management Plan or other relevant NPS planning documents.

Conclusion: There would be no impact to the peregrine falcon or its foraging habitat from this alternative.

Alternative B – Preferred Alternative

Direct/Indirect Impacts: Impacts to nesting/roosting and foraging habitat for the peregrine falcon are expected to be short-term and negligible because of the limited scope of the project and its distance from this type of habitat. The closest peregrine falcon nest is over 1 mile from the sewage lagoon. Although peregrine falcons have been observed flying over

forested areas of the park, main foraging areas that have been documented are limited to the canyon area where prey is abundant. It is possible that peregrine falcons could fly over the project area; however, the project area does not fall within any of the defined foraging areas.

As discussed for the Mexican spotted owl, noise from construction activities may impact peregrine falcons, but these noises are expected to occur during daylight hours and to dissipate to levels that would not likely adversely affect the falcons within 0.5 miles from construction activities. However, the canyon acts as an amplifier of noise and could disturb falcons within the canyon corridor. This impact would be short-term and minor.

Cumulative Impacts: Several foreseeable future projects as well as the sewage lagoon expansion would occur predominantly in already disturbed areas to the extent possible and would not affect the prey base for foraging peregrine falcons. None of the foreseeable actions would affect nesting habitat. Therefore, cumulative impacts to peregrine falcons are expected to be negligible to minor.

Impairment: There would be no impairment of the Walnut Canyon National Monument's resources or values if this alternative were implemented. This is concluded because no major adverse impacts would occur. Specifically, no major adverse impacts would occur to necessary resources needed to fulfill specific purposes identified in the establishing legislation or proclamation of the park, or resources that are key to the natural or cultural integrity of the park, or resources identified as a goal in the park's General Management Plan or other relevant NPS planning documents.

Conclusion: The proposed project would have short-term negligible to minor impacts on the peregrine falcon. Cumulative impacts to peregrine falcons are expected to be negligible to minor.

Bat Species

Alternative A – No Action

Direct/Indirect Impacts: No construction activities are proposed under this alternative. Therefore, there would be no impact to various bat species or their foraging habitat from this alternative.

Cumulative Impacts: There would be no cumulative impacts to various bat species as a result of implementing this alternative.

Impairment: There would be no impairment of the Walnut Canyon National Monument's resources or values if this alternative were implemented. This is concluded because no major adverse impacts would occur. Specifically, no major adverse impacts would occur to necessary resources needed to fulfill specific purposes identified in the establishing legislation or proclamation of the park, or resources that are key to the natural or cultural integrity of the park, or resources identified as a goal in the park's General Management Plan or other relevant NPS planning documents.

Conclusion: There would be no impact to various bat species or their foraging habitat from this alternative.

Alternative B – Preferred Alternative

Direct/Indirect Impacts: Impacts to foraging habitat for various bat species are expected to be short-term and negligible because of the limited scope and duration of construction for the proposed project. There would be a potential long-term minor benefit to various bat species from increasing the surface area of the sewage lagoons from 0.44 acres to 1.072 acres—resulting in a greater foraging area.

As discussed for the Mexican spotted owl, noise from construction activities may impact various bat species, but these noises are expected to occur during daylight hours and to dissipate to levels that would not likely adversely affect the bats within 0.5 miles from construction activities. However, the canyon acts as an amplifier of noise and could disturb bats within the canyon corridor. This impact would be short-term and minor.

Cumulative Impacts: Cumulative impacts to various bat species would be expected to be short-term negligible to minor.

Impairment: There would be no impairment of the Walnut Canyon National Monument's resources or values if this alternative were implemented. This is concluded because no major adverse impacts would occur. Specifically, no major adverse impacts would occur to necessary resources needed to fulfill specific purposes identified in the establishing legislation or proclamation of the park, or resources that are key to the natural or cultural integrity of the park, or resources identified as a goal in the park's General Management Plan or other relevant NPS planning documents.

Conclusion: Impacts to foraging habitat for various bat species are expected to be short-term negligible to minor. There would be a potential long-term minor benefit to various bat species from increasing the surface area of the sewage lagoons. Cumulative impacts to various bat species would be expected to be short-term negligible to minor.

Flagstaff Pennyroyal

Alternative A – No Action

Direct/Indirect Impacts: No construction activities are proposed under this alternative. Therefore, there would be no impact to the Flagstaff pennyroyal from this alternative.

Cumulative Impacts: There would be no cumulative impacts to Flagstaff pennyroyal as a result of implementing this alternative.

Impairment: There would be no impairment of the Walnut Canyon National Monument's resources or values if this alternative were implemented. This is concluded because no major adverse impacts would occur. Specifically, no major adverse impacts would occur to necessary resources needed to fulfill specific purposes identified in the establishing legislation or proclamation of the park, or resources that are key to the natural or cultural integrity of the park, or resources identified as a goal in the park's General Management Plan or other relevant NPS planning documents.

Conclusion: There would be no impact to Flagstaff pennyroyal from this alternative.

Alternative B – Preferred Alternative

Direct/Indirect Impacts: The project area provides potential habitat for Flagstaff pennyroyal. If this alternative were selected, NPS staff would conduct pedestrian surveys for the plant species prior to construction. Any plants or populations identified in the project area will be protected and if necessary removed consistent with Arizona Native Plant regulations (salvage restricted). Avoidance of any plants would result in negligible impacts to Flagstaff pennyroyal as a result of this alternative.

Cumulative Impacts: Threats to the Flagstaff pennyroyal include urban expansion, silvicultural activities, excessive livestock grazing, and throw-down camping. Populations are generally stable in wilderness areas (AGFD 1993). Cumulative impacts to Flagstaff pennyroyal as a result of implementing this alternative would be negligible to minor.

Impairment: There would be no impairment of the Walnut Canyon National Monument's resources or values if this alternative were implemented. This is concluded because no major adverse impacts would occur. Specifically, no major adverse impacts would occur to

necessary resources needed to fulfill specific purposes identified in the establishing legislation or proclamation of the park, or resources that are key to the natural or cultural integrity of the park, or resources identified as a goal in the park's General Management Plan or other relevant NPS planning documents.

Conclusion: Avoidance of any plants would result in negligible impacts to Flagstaff pennyroyal as a result of this alternative. Cumulative impacts to Flagstaff pennyroyal as a result of implementing this alternative would be negligible to minor.

Cultural Resources

Prehistoric

Methodology

To analyze the effect of each alternative on cultural resources, all available information on known archeological sites, historic properties, traditional cultural properties, and other ethnographic resources was compiled from NPS cultural resource files. Where possible, map locations of known populations were compared with the location of the sewage lagoon. Predictions about short- and long-term site impacts were based on previous studies.

The thresholds of change for the intensity of an impact are defined as follows:

Negligible: Impact(s) is at the lowest levels of detection - barely perceptible and not measurable. For purposes of Section 106, the determination of effect would be *no adverse effect*.

Minor: Adverse impact – Impact would not affect the character defining features of a National Register of Historic Places eligible or listed structure or building.

Moderate: Adverse impact – Impact would alter a character defining feature(s) of the structure or building but would not diminish the integrity of the resource to the extent that its National Register eligibility is jeopardized.

Major: Adverse impact – Impact would alter a character defining feature(s) of the structure or building, diminishing the integrity of the resource to the extent that it is no longer eligible to be listed in the National Register. For purposes of Section 106, the determination of effect would be *adverse effect*.

Alternative A – No Action

Direct/Indirect Impacts: No ground disturbing activities would be conducted under this alternative; therefore, there would be no direct impact to cultural resources.

Cumulative Impacts: No ground disturbing activities would be conducted under this alternative; therefore, there would be no cumulative impacts to cultural resources.

Impairment: There would be no impairment of Walnut Canyon National Monument's resources or values if this alternative were implemented. This is concluded because no major adverse impacts would occur. Specifically, no major adverse impacts would occur to necessary resources needed to fulfill specific purposes identified in the establishing legislation or proclamation of the park, or resources that are key to the natural or cultural

integrity of the park, or resources identified as a goal in the park's General Management Plan or other relevant NPS planning documents.

Conclusion: There would be no impact either direct, indirect or cumulative to cultural resources from this alternative.

Alternative B – Preferred Alternative

Direct/Indirect Impacts: Two sites could potentially be affected by the proposed sewage lagoon expansion (WACA 92 and WACA 416). This would result in a direct, major adverse impact to cultural resources.

WACA 92

Park archeologists speculate that the artifact scatter feature of the site extended further to the north perhaps merging with WACA 416. Although WACA 92 lies mostly outside the construction limits of the sewage lagoon, several large diameter trees are located on site and would require removal to facilitate circulation and evaporative efficiency of the ponds. Limited testing would be necessary to mitigate the adverse action that tree removal activity would cause.

No artifact counts were tabulated as it was originally thought that the site would not be impacted by the undertaking. Subsequent modifications to the project may impact the extreme northwest area of the site.

WACA 416

WACA 416 was originally recorded in 2003 by park archeologists in conjunction with preliminary planning in association with the proposed sewage lagoon expansion. The site primarily consists of an artifact scatter of ceramics and lithics with one possible rock feature. A significant portion of this site lies in the area of potential effect; however, the possible rock feature lies well outside probable construction activities. The potential for subsurface deposits is unknown but the potential is present.

Cumulative Impacts: As described for Alternative A, the park's ongoing programs and regional development projects have the potential to have a moderate to major impact on cultural resources. Mitigating measures such as stop-work provisions in contracts would help ensure that previously unidentified buried sites are not inadvertently damaged.

Impairment: There would be no impairment of Walnut Canyon National Monument's resources or values if this alternative were implemented. Although two sites would be adversely affected, there would be no impairment because the sites are not considered necessary resources needed to fulfill specific purposes identified in the establishing legislation or proclamation of the park, or resources that are key to the natural or cultural integrity of the park, or resources identified as a goal in the park's General Management Plan or other relevant NPS planning documents.

Section 106 Summary: After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR §800.5, *Assessments of Adverse Effects*), implementation of the preferred alternative would have an adverse effect on two National Register eligible sites or properties.

Conclusion: Construction of the sewage lagoon would have an adverse effect on two National Register eligible sites. Therefore, a major impact would occur. This would be mitigated through implementation of a data recovery plan approved by the Arizona State Historic Preservation Office.

Visual Quality

Methodology

Visual quality affects both visitor enjoyment and perception of Walnut Canyon National Monument. All available information on visual resources was compiled. The potential impact of the alternatives on visual resources of the project area was evaluated through an on-site visit and visual inspection of FR 303. The thresholds of change for the intensity of an impact are defined as follows:

Negligible: An action that could result in a change in visual quality that is barely detectable.

Minor: An action that could result in a change in visual quality that is slightly detectable and may be noticed by some visitors.

Moderate: An action that could result in a change in visual quality that is readily apparent and would be noticed by many visitors.

Major: An action that could result in an extreme change in visual quality that would be noticed by the majority of visitors.

Alternative A – No Action

Direct/Indirect Impacts: No construction activities would occur under this alternative; therefore, visual quality would not change if this alternative were selected. The existing sewage lagoon is not visible within the visitor use areas of the monument but is intermittently visible along FR 303 for about 150 feet. This is a long-term minor impact.

Cumulative Impacts: No action in this analysis means that the sewage lagoon expansion would not occur. Therefore, there would be no cumulative impacts to visual quality as a result of construction activities. The sewage lagoon would continue to be visible along FR 303, resulting in the long-term minor impact.

Impairment: There would be no impairment of the Walnut Canyon National Monument's resources or values if this alternative were implemented. This is concluded because no major adverse impacts would occur. Specifically, no major adverse impacts would occur to necessary resources needed to fulfill specific purposes identified in the establishing legislation or proclamation of the park, or resources that are key to the natural or cultural integrity of the park, or resources identified as a goal in the park's General Management Plan or other relevant NPS planning documents.

Conclusion: Visual quality impacts would continue as long-term and minor under this scenario. Cumulative impacts would be long-term and minor.

Alternative B – Preferred Alternative

Direct/Indirect Impacts: Walnut Canyon National Monument is well known for its spectacular beauty. The administrative use area, however, is a portion of the park that is not generally part of the visitor use area. Within the area considered for this analysis are maintenance facilities, the sewage lagoon, as well as residential housing. The short-term visual effects of the proposed expansion of the sewage lagoon would include disturbed land, construction equipment, and development activities.

The lagoons would be built in an area that is not visible by most visitors. Its location, however, would be approximately 150 feet from FR 303, a historic corridor used by recreationists. Disturbing the ground to construct the sewage lagoons would make the lagoons more noticeable along FR 303 and for a greater length from adding another cell to the lagoons. The ponderosa pines situated between the road and lagoons would provide some screening, but people using FR 303 would experience a diminished visual quality from construction of the sewage lagoon. Measures to minimize impacts to visual quality would include salvaging native grasses from the construction zone to be transplanted on the berms following construction completion to speed revegetation/reclamation efforts. Because of the previous disturbance within this corridor, impacts would be considered a short-term moderate to long-term minor.

Cumulative Impacts: Existing development has created disturbances that are visible within the park. Constructing the proposed sewage lagoon combined with foreseeable future projects in the area would increase the potential diminishing the visual quality of the area. However, implementing mitigation measures such as transplanting native grasses back on the berms would minimize the visual disturbance and length of time needed to restore the area to pre-construction views. Therefore, cumulative impacts would be long-term minor.

Impairment: There would be no impairment of the Walnut Canyon National Monument's resources or values if this alternative were implemented. This is concluded because no major adverse impacts would occur. Specifically, no major adverse impacts would occur to necessary resources needed to fulfill specific purposes identified in the establishing legislation or proclamation of the park, or resources that are key to the natural or cultural integrity of the park, or resources identified as a goal in the park's General Management Plan or other relevant NPS planning documents.

Conclusion: A total of 1.5 acres of previously undisturbed vegetation would be disturbed, including removal of 275 trees greater than 3-inches DBH or DRC that currently provide screening of the lagoon facility. Direct impacts to visual quality would be short-term moderate, but with revegetation/reclamation should result in long-term minor impacts to persons using FR 303. Cumulative impacts would also be long-term minor.

Chapter 5

Consultation/Coordination

Introduction

This chapter identifies the persons responsible for preparing this document, lists the individuals that were consulted or coordinated with for information regarding the document content, and provides a bibliographic citation for all referenced material. During the preparation of this EA/AEF, input was also received from federal, tribal, and county agencies; non-governmental organizations; and, private individuals. These entities are listed at the end of this chapter, followed by a brief synopsis of public scoping.

Preparers

Museum of Northern Arizona

Sonny Kuhr, Project Manager

Consultation/Coordination

The following agencies, organizations and tribes were contacted for information or assisted in identifying important issues or analyzing impacts.

Agencies

Arizona Game and Fish Department
Flagstaff Office

Arizona State Historic Preservation Office
Matthew Bilsbarrow

National Park Service, Flagstaff Area National Monuments
Palma E. Wilson, Superintendent
Todd Metzger, Chief, Resources Management
Jeri De Young, Curation and Compliance Program Manager
Steve Mitchelson, Natural Resource Program Manager
Al Remley, Archeology Program Manager
Paul Whitefield, Natural Resource Program Manager
Michael Schneegas, Facility Manager
John Cannella, GIS Specialist

U.S. Fish and Wildlife Service

Sam Spiller

Havasupai Tribe
Hopi Tribe
Hualapai Tribe
Kaibab Band of Paiute Indians
Navajo Nation
Pueblo of Zuni
San Juan Southern Paiute Tribe
Tonto Apache
Yavapai Apache
Yavapai Prescott
White Mountain Apache

References

Arnberger, L. 1947. Flowering Plants and Ferns of Walnut Canyon. Plateau Vol. 20, pp. 29-36.

Grater, R. 1935. Walnut Canyon Bird List. Western Archaeological and Conservation Center Archives, National Park Service, Tucson, Arizona.

Haldeman, J.R., & A.B. Clark. 1969. Walnut Canyon: An Example of Relationships Between Birds and Plant Communities. Plateau, Vol. 41(4) pp. 164-177.

Hendricks, D. M. 1985. Arizona Soils. University of Arizona Press. Tucson, Arizona.

Jenkins, P., F. Reichenbacher, K. Johnson, & A. Gondor. 1991. Vegetation Inventory, Classification, and Monitoring at Walnut Canyon National Monument. Report to the National Park Service. Southwestern Field Biologists, Tucson Arizona.

Joyce, J.F. 1974. Vegetation Analysis of Walnut Canyon, Arizona. Journal Arizona Academy of Science, Vol. 11, 127-133.

National Park Service and U.S. Geological Survey. 2000. Biological Inventories of National Park Areas on the Southern Colorado Plateau. National Park Service Colorado Plateau Cooperative Ecosystem Studies Unit and U.S. Geological Survey Colorado Plateau Field Station, Northern Arizona University, Flagstaff, Arizona.

National Park Service. 1991. Natural Resources Management Guidelines, NPS-77. Washington, D.C.

National Park Service. 2000. Director's Order – 47 Sound Preservation and Noise Management. U.S. Department of Interior, Washington D.C.

National Park Service. 2001a. Director's Order – 12: Conservation Planning, Environmental Impact Analysis, and Decision-making. U.S. Department of Interior, Washington D.C.

National Park Service. 2001c. Management policies. Available on the Internet at www.nps.gov/policy/mp/policies.html

National Park Service. 2002. Draft Environmental Impact Statement/General Management Plan. Walnut Canyon National Monument, Arizona.

Salomonson, M. 1973. The Mammals of Walnut Canyon National Monument. Plateau Vol. 46(1) pp. 19-24.

Schon, K. 2000. Saguaro National Park and Walnut Canyon National Monument: 2000 Fire Effects Report. National Park Service Fire Effects Monitoring Program, Saguaro National Park, Tucson, Arizona.

Schon, K. 2000. Saguaro National Park and Walnut Canyon National Monument: 2000 Fire Effects Report. National Park Service Fire Effects Monitoring Program, Saguaro National Park, Tucson, Arizona.

Southwest Parks & Monuments Association. 1992. A Checklist of the Birds of Walnut Canyon National Monument. Southwest Parks & Monuments Association, Tucson.

Spangle, P.F. & E.L. Spangle. 1954. Birds of Walnut Canyon. Southwestern Monuments Association, Globe, Arizona. Western Archaeological and Conservation Center Archives, National Park Service, Tucson, Arizona.

USDA Forest Service. 2004. Draft Existing and Desired Condition Specialist Report for the Anderson Mesa Landscape Scale Assessment: Wildlife Resources. Coconino National Forest, Flagstaff, Arizona.

APPENDIX A
Cultural Resources Specialists Review

I have reviewed this preferred alternative for conformity with requirement for the § 106 process, with the 1995 Servicewide Programmatic Agreement (if applicable), and applicable parts of the Secretary of the Interior's Stands and Guidelines for Archeology and Historic Preservation, MPS Management Policies, and DO-28. I have stated any additional stipulation that should apply, and I concur in the recommended assessment of effect above.

Signed: _____ _____
Archaeologist Date

Comments: _____

Signed: _____ _____
Cultural Landscape Architect Date

Comments: _____

Signed: _____ _____
Curator Date

Comments: _____

Signed: _____ _____
Ethnographer Date

Comments: _____

Signed: _____ _____
Historian Date

Comments: _____

Signed: _____ _____
Historical Architect Date

Comments: _____

Approved: _____ _____
Park Compliance Coordinator Date

Approved: _____ _____
Superintendent Date