National Park Service U.S. Department of the Interior

Sunset Crater Volcano National Monument Arizona



Environmental Assessment / Assessment of Effect

June 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 post comments online at http://parkplanning.nps.gov/. This environmental assessment will be on public review for 30 days. It is the practice of the NPS to make all comments, including names and addresses of respondents who provide that information, available for public review following the conclusion of the environmental assessment process. Individuals may request that the NPS withhold their name and/or address from public disclosure. If you wish to do this, you must state this prominently at the beginning of your comment. Commentators using the website can make such a request by checking the box "keep my contact information private." NPS will honor such requests to the extent allowable by law, but you should be aware that NPS may still be required to disclose your name and address pursuant to the Freedom of Information Act. We will make all submissions from organizations, 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: Scott Travis, Superintendent 6400 N. Hwy 89 Flagstaff, Arizona 86004

Summary

The National Park Service (NPS) is planning for a Fire Facility at Sunset Crater Volcano National Monument. This project would be located southeast of the existing visitor center. The purpose of the proposed facility is to improve operational efficiency by consolidating equipment and employee workspaces. As proposed, the facility would consist of approximately 1,850-square-feet of work and storage space. The facility would house and protect two existing NPS fire engines, enabling NPS staff to increase emergency response capabilities. No current facilities exist for this purpose, exposing park resources to the risk of wildland fire danger. The location and size of the facility is based on recommendations made in the Sunset Crater Volcano General Management Plan (2002), fire guidelines recommended in the National Interagency Fire Planning Plan, and a space analysis prepared by an NPS architect working in coordination with park staff.

Sunset Crater Volcano National Monument was proclaimed a national monument in 1930. Infrastructure for the monument was constructed during the Mission 66 era in the mid to late 1960s and provides limited work and storage space for fire management activities. The visitor center and surrounding facilities were determined eligible for listing in the National Register of Historic Places through a consensus determination of eligibility between the Arizona State Historic Preservation Office and the National Park Service in February 2004. The limited work and storage space has led to inefficient operations and unsafe work environments for employees.

This Environmental Assessment/Assessment of Effect (EA/AEF) analyzes the impacts of two alternatives: 1) no action and 2) construction of the Fire Facility southeast of the visitor center. Impacts to geologic resources, vegetation, wildlife, special status species, archeological resources, historic structures, park operations, and visual quality are described in this document.

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Introduction

This EA/AEF provides disclosure of the planning and decision-making process and potential environmental consequences of constructing a Fire Facility near the visitor center at Sunset Crater Volcano National Monument. The document 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

As proposed, the facility would house and protect two existing NPS fire engines, enabling NPS staff to increase emergency response capabilities. No current facilities exist for this purpose, exposing park resources to the risk of wildland fire danger. It would serve as a base of operations for the Flagstaff fire program, including all three Flagstaff Area National Monuments (Wupatki, Sunset Crater Volcano, and Walnut Canyon) and may also serve other federal agencies (e.g. Coconino National Forest) and serve as a dispatch location as part of the Flagstaff Zone fire operations. Wildland fire protection would be extended the full year. Current situation requires that fire vehicles be taken out of service and winterized for portions of the spring and fall fire season due to the damage that they would receive if exposed to freezing temperatures while still full of water.

Project Objectives

Three objectives have been identified:

- 1. Design a Fire Facility that will allow for storage of fire equipment with protection from environmental exposure.
- 2. Provide year-round wildland fire protection for the Flagstaff Area National Monuments.
- 3. Construct the Fire Facility in a way that minimizes impacts to visitor enjoyment, cultural resources, and the natural environment.

Sunset Crater Volcano National Monument was proclaimed a national monument in 1930. Infrastructure for the monument was constructed during the Mission 66 era in the mid to late 1960s and provides limited work and storage space for fire management activities and includes a visitor center/maintenance complex and employee housing area. The complex was determined eligible for listing in the National Register of Historic Places through a consensus determination of eligibility between the Arizona State Historic Preservation Office and the National Park Service in February 2004.

Project Location

Sunset Crater Volcano National Monument contains over 3,000 acres northeast of Flagstaff, Arizona (Figure 1) and represents the Colorado Plateau's most recent volcanic eruption. It is the youngest, least-eroded cinder cone in the San Francisco Volcanic Field. The Fire Facility would be constructed at the administrative site for Sunset Crater Volcano National Monument located on Coconino National Forest land immediately west of the monument boundary. The National Park Service would administer and maintain the fire facility.



Figure 1. Vicinity map (Source: Sunset Crater Volcano National Monument Final GMP 2002)

Summary of Park Mission and Enabling Legislation

Sunset Crater National Monument was established by Presidential Proclamation No. 1911 on May 26, 1930, to provide proper protection for certain geologic formations. The monument's name was changed November 16, 1990, to Sunset Crater Volcano National Monument by the Smith River National Recreation Act, P.L. 101-612. The monument occupies 3,040 acres totally surrounded by the Coconino National Forest. The park purpose for Sunset Crater Volcano National Monument is:

To preserve and protect Sunset Crater Volcano National Monument's geological formations, features, and resources for scientific interests and research, and for public interest, including scenic, educational, and recreational pursuits.

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

- Sunset Crater Volcano is the Colorado Plateau's most recent eruption of the San Francisco Peaks Volcanic Field and provides an unparalleled opportunity to study eruption dynamics, change, and recovery in an arid climate following a volcanic eruption.
- The volcanic eruption profoundly affected people in the area and their lifeways and left a unique archeological and ethnographic record of human adaptation, response, and recovery to volcanic eruption. Sunset Crater Volcano and its natural resources continue to have cultural significance to contemporary native tribes.
- The park's volcanic features are seen now with few human disturbances and provide excellent opportunities for science, education, and interpretation, including insight into plate tectonics, ongoing geologic and ecological processes, and a larger view of how this area is important in the context of Southwestern U.S. and world geology. This dramatic landscape of visually striking and colorful geologic features provokes introspection.
- The microhabitat and climate of Sunset Crater Volcano create an unusual species mix, including lichens, molds, and endemic species that are highly visible examples of the scientific concepts of succession and adaptation.

Relationship to Sunset Crater Volcano General Management Plan

The Final General Management Plan for Sunset Crater Volcano National Monument calls for facilities, services, and recreational opportunities to be offered but in keeping with site-specific requirements of resource protection and visitor enjoyment. Safety measures are an integral part of the visitor experience (NPS 2002). The project area lies within the administrative zone identified in the General Management Plan. Within this zone the natural environment may be modified for park operation needs, but changes should be made in a way that harmonizes with the natural environment. Facilities should not be close to sensitive natural or cultural resources (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 Sunset Crater Volcano 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 Sunset Crater Volcano National Monument.

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 or 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 September 2005, a public scoping letter about this project was sent to 87 individuals including federal and state agencies, special interest groups, American Indian tribes, and interested citizens. The letter described the proposed project and requested comments. No 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. Impact topics analyzed in this document include geologic resources, vegetation, wildlife, special status species, archeological resources, historic structures, park operations, and visual quality. A summary of the impact topics and rationale for selection are described below.

Natural Resources

Geologic Resources

The proposed construction of a fire facility would involve ground-disturbing activities for the building, parking area, and wastewater leach field system. Sunset Crater Volcano National Monument was established under the Antiquities act to preserve and protect the unique geologic features associated with the Sunset Crater volcanic eruption. The effects of the new facility upon these resources should be considered, and this topic will be analyzed in this document.

Biotic Communities

Vegetation

Proposed construction of the Fire Facility would involve disturbance and long-term removal of a small area of native vegetation and woody material. 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 construction of the Fire Facility could potentially disturb wildlife and result in longterm 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 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. Annual winter surveys have documented that bald eagles (*Haliaeetus leucocephalus*) winter in the area and have been routinely observed above the loop road corridor.

Monument staff and the Arizona Heritage Database were consulted for a listing of species of concern not listed as threatened or endangered by the U.S. Fish and Wildlife Service but nonetheless of concern to agencies. Pronghorn antelope (*Antilocapra americana*) and the golden eagle (*Aquila chrysaetos*) are wildlife species of concern. Two plant species of concern potentially occur within or nearby the project area: Sunset Crater penstemon (*Penstemon clutei*) and *Phacelia serrata*. Therefore, this topic will be analyzed in this document.

Cultural Resources

Archeological Resources

A comprehensive cultural resources investigation of the project area has been completed. Based on this survey, one site is nearby the proposed expansion (AR-03-04-02-2641). 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.

Historic Structures

The proposed site also lies within the Sunset Crater Volcano National Monument Visitor Center Complex Historic District (Sunset Complex). The Sunset Complex, historically known as the "Headquarters Area for Sunset Crater National Monument," is comprised of Mission 66 era properties that form an administrative center, visitor contact area, maintenance area and park housing for the monument. The Sunset complex has historic significance at the national level as an excellent example of a Mission 66 development. Therefore, this topic will be analyzed in this document.

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 facility may alter the visual condition of the area surrounding the existing visitor center, a campground north of the visitor center, and the primary monument road (Forest Road 545). Therefore, this topic will be analyzed in this document.

Park Operations

The superintendent of Flagstaff Area National Monuments is responsible for managing Sunset Crater Volcano National Monument, its staff and residents, all of its programs, and its relations with persons, agencies, and organizations interested in the park. Park staff provides 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. The facilities for fire operations are inadequate for protection of investment in equipment and tools. The park's two fire engines, representing an investment of over \$150,000, must be taken out of service and drained seasonally as low temperatures drop below freezing. There is no facility for storage of either engine and service to vehicles must be performed under environmental conditions that are often extreme. Therefore, this topic will be analyzed in this document.

Impact Topics Eliminated from Further Consideration

Soils

The project site lies in an area of unconsolidated, recent volcanic cinder and scoria deposits. Within these deposits, a thin, poorly-developed soil horizon has accumulated about 10 to 16 inches below the ground surface, which is why the ground is mostly barren of vegetation. The proposed action would result in limited surface disturbance through grading, site leveling, ground compaction, paving, and trenching. Impacts to the poorly-develop soil horizon would be considered negligible. Therefore this topic will not be analyzed in this document.

Environmental Justice

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 (Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations) was released. This order requires each federal agency to incorporate environmental justice as part of its mission. Specifically they are 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, the President underscores provisions of existing laws that are intended to help ensure the environmental quality of communities throughout the nation. This memorandum states that mitigation identified in environmental documents should address significant and adverse environmental effects on minority and low-income communities.

None of the alternatives would have disproportionate health or environmental effect 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. The proposed project would impact everyone similarly and would not disproportionately affect any certain economic, religious, or ethnic class. Therefore, this topic will not be analyzed in this document.

Ethnographic Resources

The lands of Sunset Crater Volcano 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. None of the affiliated tribes responded with concerns for ethnographic resources that could be affected by the proposed undertaking. 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.

Museum Collections

No objects would be collected as a result of this project. 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). 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. Construction of the proposed Fire Facility would occur outside of the 100-year floodplain and is not proposed for construction within a wash or major drainage. For these reasons, the proposed action and all alternatives are deemed to have a negligible impact on 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 Final 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 proposed Fire Facility is 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, fire support services would not be interrupted during construction of the new Fire Facility, 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

Visitor health and safety is not expected to be affected by either maintaining the current condition or constructing the Fire Facility. 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 Fire Facility would conform to all standards required by the NPS to maintain the existing dark sky. The Fire Facility would not affect the ambient night sky outside immediate area. Therefore, lightscape will not be analyzed in this document.

Chapter

Introduction

This section describes one action alternative for this project, in addition to the Council on Environmental Quality (CEQ) required no action alternative. Although the option of continuing current management/no action does not improve operational efficiency, 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 No Action alternative would maintain the existing conditions at the administrative site associated with Sunset Crater Volcano National Monument and provides the baseline for comparison with the action alternative. This alternative would result in the NPS rejecting the proposal for a new Fire Facility at the administrative site.

The administrative site associated with Sunset Crater Volcano National Monument was constructed and is operated by NPS under an agreement with the US Forest Service (USFS). A Memorandum of Understanding between USFS and NPS establishes the responsibilities and uses of the administrative area at Sunset Crater Volcano National Monument. Currently, the administrative site contains separate buildings for the visitor center, park residences, a maintenance facility, and a maintenance storage area. The existing use and development is based on planning initiated in the late 1950s and put into place in the late 1960s.

Alternative B - Fire Facility Southeast of Existing Visitor Center

As proposed, the facility would consist of approximately 1,850-square-feet of work and storage space built on Coconino National Forest land adjacent to the Sunset Complex. Its proximity to a designated Historic District would necessitate that it blend with the setting that determined the complex's eligibility. A schematic drawing of the proposed facility is illustrated in Figure 2 and building elevations are illustrated in Figure 3. A general estimate is that the construction could be completed within four to six months of commencement.

The area impacted by the proposed facility is depicted in Figure 4 and would total approximately 0.34 acres (3,690 square feet of previously disturbed area that would be paved and 11,325 square feet of newly disturbed area). Of the newly disturbed area, 6,600 square feet would be paved, 1,850 square feet would be for the building, and 2,875 square feet would be for a leach field and sewer line. The area set aside for utilities would be allowed to return to a somewhat natural state once construction is complete. Staging areas, material stockpiling, and project storage would be contained within the 0.34 acres. The location and size of the facility is based on recommendations made in the Sunset Crater Volcano General Management Plan (2002) and a space analysis prepared by an NPS architect working in coordination with park staff. The design of this fire facility represents the minimum capability required in the nationwide interagency Fire Planning Plan, and represents that space needed for a minimum fire engine and crew preparation and dispatch area. Providing a facility smaller than this standard would prevent use of the fire facility by a non-NPS entity. Utilities and roads would be extended to the site from the administrative area and a parking area would be constructed.



Figure 2. Schematic Illustration of Proposed Fire Facility.



BUILDING SECTION AT OFFICE AND STORAGE

Figure 3. Proposed Fire Facility Building Elevations.

BUILDING SECTION AT VEHICLE BAYS

The Fire Facility would house two existing fire engines, fire cache supplies (personal protective equipment, hose, hose drying rack, generators, pumps, chainsaws, etc), and all of the necessary equipment to fight fire. It would support the Flagstaff Area National Monuments fire program and may also serve other federal agencies (e.g. Coconino National Forest) or serve as a dispatch location as part of the Flagstaff Zone fire operations.



Figure 4. Proposed Fire Facility within Visitor Center Complex

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

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.

Biotic Communities

Vegetation (Invasive Species)

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

- Existing populations of exotic vegetation that are found at the project 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.
- Post project exotic plant monitoring will be conducted in the project area as time and funding allows.

Vegetation (Native Species)

- Construction activities will be conducted such that it will require removal of the least number of trees to safely construct and operate the Fire Facility.
- Areas of ponderosa pines will be retained to assist in screening the facility from view from the park's entrance road and the visitor center area.

Wildlife

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

Special Status Species

In areas where Penstemon clutei occur, the top layer of cinders (16-18 inches) and underlying upper 3 inches of soil will be removed and stored separately during construction, and replaced in the leach field and sewer line area as a habitat conservation measure. This soil storage and replacement should be done in an area five feet outside the limit of the plants, i.e. a five-foot radius for one plant or a tight clump of plants. Where plants are more dispersed, then the entire area plus a five-foot margin around the perimeter should be removed and stored.

- If construction occurs after the existing plants have set seed, then seed will be collected from those plants, stored, and dispersed over the leach field and sewer line area after construction is completed.
- Penstemon clutei plants that would be destroyed by construction activities will be transplanted to an appropriate location or facility to be grown as a seed source. Seeds or seedling plants will be reintroduced in the area following construction.

Cultural Resources

- An archeologist will monitor ground-disturbing activities. If any isolated artifacts are found during construction, they will be documented and collected, and features will be documented and monitored during construction.
- 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, other 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 – Footprint Located South of Existing Site

NPS staff considered a configuration of size and location for the Fire Facility that was south of the proposed location. However, this configuration would impact cultural resources and a National Historic Preservation Act eligible site. Therefore, this alternative was eliminated from further consideration. The size and configuration put forth in the preferred alternative best meets project objectives while limiting impacts to natural and cultural resources.

Alternative 2 – Housing Fire Engines Off-Site

Consideration was given to housing the engines off-site at either U.S. Forest Service or local volunteer fire departments. These options were rejected because of the increase in response time and the lack of available facility at those locations. Housing the units on-site also reduces the exposure to emergency vehicle traffic to the public. Therefore, this alternative was eliminated from further consideration.

Comparison of Alternatives

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

Pro	ject Objective	Alternative A	Alternative B
1.	Design a Fire Facility that will allow for storage of fire equipment with protection from environmental exposure.	No. No current facilities exist to house and protect two existing NPS fire engines. Without proper cover, employees must perform routine maintenance on the fire engines outdoors (often in inclement weather).	Yes. The facility would house and protect two existing NPS fire engines, enabling NPS staff to increase emergency response capabilities. Construction of new facility would allow staff to perform routine maintenance on fire engines inside the storage space.
2.	Provide year-round wildland fire protection for the Flagstaff Area National Monuments	No. Fire vehicles must be taken out of service and winterized for portions of the spring and fall fire season due to the damage that they would receive if exposed to freezing temperatures while still full of water.	Yes. Construction of the Fire Facility would allow the fire engines to be stored inside and in-service year round.
3.	Construct the Fire Facility in a way that minimizes impacts to visitor enjoyment, cultural resources, and the natural environment.	Yes. No additional facilities would be constructed so no additional impact to visitor enjoyment, natural or cultural resources is anticipated.	Yes. Disturbance of 0.34 acres of vegetation and wildlife habitat, but increased ability to respond to wildfire year round to protect park resources. Potential to improve response times and potentially protect resources from impacts caused by wildfire.

Table 1. Comparison of Alternatives

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
Geologic Resources	No direct or indirect impacts. Cumulative impacts would be minor to moderate over the long-term, primarily as a result of continued development and recreation on lands surrounding the monument.	Approximately 0.25 acres of previously undisturbed recent volcanic scoria and cinder deposits would be built upon or excavated to construct the new facility. No unique geologic features associated with the Sunset Crater Volcano eruption would be impacted. Long-term direct impacts to geologic resources would be minor. Cumulative impacts would be minor to moderate over the long-term.
Biotic Communities Vegetation	No impact.	A total of 0.34 acres of vegetation would be impacted (of which 0.25 acres is previously undisturbed), including removal of about 13 trees greater than 3-inches DBH. Long-term direct impacts to vegetation would be minor. Cumulative impacts would also be minor and long-term.
Wildlife	No impact.	Short-term impacts to wildlife would be negligible. Long-term habitat loss would involve up to 0.25 acres of previously undisturbed area. This would be considered a minor adverse effect. Cumulatively, impacts to wildlife would range from minor to moderate, primarily from continued loss of habitat.
Species of Concern	No impacts to bald eagle, Sunset Crater penstemon or <i>Phacelia serrata</i> .	The proposed project would have a negligible adverse effect on the bald eagles. Cumulative impacts to bald eagles as a result of implementing this alternative would also be negligible
		Construction of the Fire Facility would permanently remove 0.25 acres of habitat for <i>Penstermon clutei</i> and <i>Phacelia serrata</i> . The building footprint could require removal of between 5-10 penstermons. Situating the building footprint to minimize disturbance to as few plants as possible, salvaging plants that would be destroyed from construction activities, and segregating topsoil from areas surrounding known plants or populations of plants would result in minor impacts to <i>Penstermon clutei</i> and <i>Phacelia serrata</i> . Cumulative impacts as a result of implementing this alternative would be negligible to minor.
Cultural Resources Prehistoric	No impact.	Construction of the Fire Facility would have a long-term minor adverse effect on one National Register eligible site.
Historic	No impact.	Construction of the Fire Facility would have a long-term moderate adverse affect on the Sunset Complex Historic District.
Park Operations	Direct, indirect, and cumulative impacts to park operations would be long-term and moderate to major adverse under this scenario because of the limited efficiency and effectiveness of park emergency staff, limited use of emergency equipment, potential to expose park staff to harmful viruses.	Construction of a new Fire Facility would have a long-term major beneficial impact on operational efficiency as many of the existing deficiencies and health and safety needs in park facilities would be addressed and mitigated. Cumulative impacts would have long-term moderate adverse effects to operational efficiency.
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 0.25 acres of previously undisturbed vegetation would be disturbed, including removal about 13 trees greater than 3-inches DBH. Because of the previous disturbance within this area, impacts would be considered a short-term major to long-term moderate. Cumulative impacts would also be long-term moderate.

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 administrative use area 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. Although Alternative A does not propose any construction activities, there are currently no facilities to house two NPS fire engines, preventing year-round emergency response to wildland fire and increasing the risk of adverse impacts to natural and cultural resources from wildland fire.

Chapter3Affected 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

Geologic Resources

Sunset Crater Volcano erupted around 1040 - 1100 AD, and is the youngest dated volcano in the San Francisco Volcanic Field (Holm and Moore 1987). The local terrain is rugged and dominated by mostly barren basaltic cinder cones and lava flows. Sunset Crater Volcano lies at the southeastern corner of the monument. The volcano is a classic example of a cinder cone volcano, approximately 1,000 feet high and more than a mile wide at the base. At the crest of the cinder cone are fumerole deposits of distinct white, yellow, and pink minerals. While the cinder cone was erupting, two basalt lava flows extruded from the base of the cone. The Kana-A Flow flowed more than six miles to the northeast down a narrow valley. The Bonito Flow locally pooled over about two square-miles around the northwest base of the cinder cone. Sunset Crater Volcano erupted at the northwest end of a six-mile long volcanic fissure, trending northwest to southeast. A huge volume of volcanic scoria, lapilli, cinders, and ash were ejected into the air and deposited as a "tephra blanket" over an 800 square mile area around the volcano (Amos 1986, Hooten et al. 2001). During the peak of volcanic activity, at least nine other cinder cones, numerous smaller spatter cones and fumeroles, and three lava flows were simultaneously active along the fissure, forming a "ring-of-fire" style eruption much like those observed today in Hawaii. Most of this volcanic fissure and other geologic features associated with the Sunset eruption lie outside of the monument on the Coconino National Forest.

Biotic Communities

The monument is a very small natural area within a regional framework of lands that are primarily managed by the US Forest Service for ecologically sustainable, multiple uses. The natural systems and processes surrounding the monument have been influenced by historical logging and timber management practices. Preserving the integrity of the monument's natural systems requires close coordination with the Coconino National Forest to ensure that the full complement of plants and wildlife within the monument are conserved.

An inventory of natural resources within Sunset Crater Volcano was completed during the late 1970s (Bateman 1976, 1979). This study remains the best available documentation of the monument's flora and fauna. Research has also examined plant succession in the area following the volcano's eruption (Eggler 1966).

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

Vegetation is relatively sparse within the monument, but soil pockets on cinder cone slopes, lava, and deep cinder deposits are dominated by ponderosa pine trees.

The project area lies within an essentially pure stand of mature ponderosa pine. Canopy cover in the area proposed for the Fire Facility is approximately 30%. Few herbaceous plants, including Sunset Crater penstemon, make up the understory.

Approximately 20-30 ponderosa trees are found within the footprint area proposed for the Fire Facility, of which about 70% have a diameter at breast height (DBH) less than 12-inches and about 30% have a DBH greater than 12-inches (including three with a DBH greater than 24-inches).

There currently is little information on the distribution or impacts of nonnative plants within the monument. Nonnative plant infestations, predominantly mullen (*Verbascum thapsus*), are generally confined to road corridors, developed areas, or areas of heavy visitation. These plants benefit from the additional runoff associated with paved surfaces and often out-compete native vegetation along road shoulders. Nonnative plants may also rapidly colonize areas where the ground surface is heavily disturbed by equipment or heavy foot traffic. One patch of Camelthorn (*Alhagi maurorum*), a tenacious shrub species, and diffuse knapweed (*Centauea diffusa*) are known to occur along FR545.

Wildlife

The sparse vegetation cover probably provides little forage and cover for wildlife. The Bonito Lava Flow, which dominates more than 25% of the surface area within the monument, is extremely inhospitable to foot travel and probably does not provide habitat for larger animals, which are likely more restricted to the western, southern, and northern margins of the monument. Mammals observed on the monument include coyote, pronghorn, cottontail, jackrabbit, bobcat, squirrel, raccoon, porcupine, and skunk. Over 100 species of avifauna have been observed in the monument (NPS 2005).

Special Status Species

The Arizona Heritage Database (Arizona Game and Fish Department 2006) was queried to generate a list of threatened and endangered species and other species of concern for Coconino County, Arizona. Currently, no federally listed threatened or endangered plant or animal species are known to occur in Sunset Crater Volcano National Monument (NPS 2002).

Bald eagles, listed as threatened under the ESA, are winter residents and breeding birds within the region surrounding Sunset Crater Volcano 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 are routinely observed above the loop road corridor during annual winter surveys. Bald eagles may feed on carrion along the road corridor. Critical habitat has not been formally designated within or nearby the monument.

One endangered species, the Mexican spotted owl (*Strix occidentalis lucida*), is known to occur on nearby Coconino National Forest land. The species lives and nests in dense, old growth forest on steep mountain slopes or in deep canyons. Suitable habitat conditions are not likely found within the monument, but the Mexican spotted owl may rarely cross into the monument in search of prey. The proposed Fire Facility would not be located within critical habitat for the Mexican spotted owl as designated by the US Fish and Wildlife Service (NPS 2002).

An additional bird species of concern, the northern goshawk (*Accipiter gentilis*), is known to occur on nearby Coconino National Forest land. The species is widespread but solitary across much of the United States and southern Canada (Association for Biodiversity

Information 2000). It nests and breeds in a wide variety of habitats, including agricultural areas and formerly logged forests. In Arizona, goshawks prefer forest interior stands of large ponderosa pine trees. Suitable habitat conditions are not likely found within the monument, but the northern goshawk may rarely cross into the monument in search of prey (NPS 2002).

Although they are not formally listed as a species of concern, golden eagles (*Aquila chrysaetos*) may forage within the monument. There are no records of golden eagle nests within Sunset Crater Volcano, but suitable nesting habitat is found on nearby Coconino National Forest land. They are known to be sensitive to human presence (NPS 2002).

Although not formally listed as a species of concern, the pronghorn antelope (*Antilocapra americana*) herd within the region is being affected by large-scale habitat fragmentation and loss, and the regional pronghorn population has declined during the last few decades (Bright and Van Riper III 2000). Although pronghorn are not known to occur within the existing boundary of the monument, they are known to use nearby Bonito Park as a fawning ground (NPS 2002).

At Sunset Crater, there are two plant species of concern-*Penstemon clutei* and *Phacelia serrata*. Both are short-lived wildflowers that are only found on cinder deposits within the San Francisco Volcanic Field. Populations of both species have been documented from numerous locations within the monument. Recent studies have shown that *Penstemon clutei* is adapted to fire and other types of disturbance within ponderosa pine forest (2000 Southwest Rare Plant Conference Proceedings).

Surveys completed in November 2005 and March 2006 documented presence of previous years *Penstemon clutei* within and adjacent to the project area. Within the proposed footprint, seven small populations of *Penstemon clutei* ranging in size from six to 20 plants were noted. They were found to be more heavily concentrated on the northeast quadrant of the project area, but plants were also found in the central and southwest quadrant and dormant seeds can be assumed to lie in the substrate throughout the proposed facility footprint.

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.

Archeological Resources

Prior to the eruption of Sunset Crater, the area around the monument was occupied by farmers who lived in small, scattered hamlets adjacent to their fields. When Sunset Crater erupted, the prehistoric inhabitants of the area, whom archeologists call Sinagua, apparently moved out of harm's way. No evidence has been found indicating that the people were surprised by the eruptions, and no human remains have been found indicating deaths occurred as a direct result of the volcanic activity. However, numerous pithouse dwellings were burned and filled with cinders from the eruption. Many of these "preeruptive" sites have been found on Forest Service lands surrounding the monument (NPS 2002).

Dr. Harold Colton, founder of the Museum of Northern Arizona (MNA), first recognized the connection between Sunset Crater and the nearby buried pithouse ruins in the early 1930s, several years after Sunset Crater National Monument was established. Research by MNA archeologists revealed that the people who built these pithouses had witnessed Sunset Crater's birth in 1064. It was tree-ring dating of timbers found in these pithouses and the nearby pueblo structures of Wupatki that gave geologists a more definitive date for the beginning of the Sunset eruption (NPS 2002).

Although not specifically set aside to preserve archeological remains, Sunset Crater Volcano protects an important piece of prehistory relating to the impact of the 11th-century Sunset Crater Volcano eruption on the prehistoric occupants of the southern Colorado Plateau. The development of the prehistoric Sinagua culture in the Flagstaff area was profoundly affected by the geologic forces that formed Sunset Crater. The importance of Sunset Crater Volcano as a geologic feature cannot be separated from its significance as a key influence in the evolution of human cultures in the Flagstaff region. The relationship between the archeological and geological resources of the monument is reciprocal: previous studies of archeological sites in the vicinity of Sunset Crater have been instrumental in improving our understanding of the geologic processes and timing of events that shaped Sunset Crater while, at the same time, current studies of the volcano and associated lava flows are helping us to decipher the sequence of events that shaped human prehistory in the region. The area retains importance to numerous American Indian tribes (Ibid.).

Only a handful of archeological sites have been documented within the boundaries of Sunset Crater Volcano or on the adjoining administrative lands. This low number of documented sites reflects the fact that only about 1 percent of the 3,040 acres in the monument has been intensively inventoried for archeological resources. Some nearby areas lying outside monument boundaries on USFS lands have been inventoried at various levels of intensity, including most of the NPS administrative area, the USFS campground, and some of the forested terrain adjoining Bonito Park. These nearby inventories provide a general basis for predicting the types and numbers of sites likely to be found within monument boundaries (Ibid.).

Three prehistoric archeological sites are located in close proximity to the visitor center. The proposed Fire Facility may potentially affect one of these sites (AR-03-04-02-2641). Surface artifacts suggest this site represents prehistoric occupation and use of the landscape. Bremer first recorded the site in 1983, the boundaries of which were later expanded as a result of archaeological investigations undertaken in 1995 "...to assess the potential impacts of various construction and other ground disturbing activities proposed by NPS on Coconino National Forest lands within an administrative area used by NPS for its Sunset Complex (Downum and Gumerman 1998)". Limited testing of the site may suggest a predominantly Coconino and Medicine Valley phase occupation (ca. A.D. 750? to perhaps the eruption of Sunset Crater in A.D. 1064-1065). Some ceramic evidence, however, suggests a posteruption occupation as well, but most likely no later than A.D. 1150. It appears to have been used for habitation. In general, the surface of this site has been heavily disturbed by previous activities (e.g., the use of unimproved roads, the storage of heavy equipment and building materials, and the construction of a water tower and maintenance building). The site, however, still maintains a high degree of integrity (Ibid.).

Historic Structures

The historic built environment of the greater Flagstaff region has been influenced by timber, cattle grazing, and the mining industry (Cline 1994). A few grand homes survive in the area, constructed by Flagstaff's first entrepreneurs in the late 19th century.

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

The landscapes of the region are many and span great lengths of time. Landscapes from the prehistoric Sinagua culture overlap with other prehistoric groups, including the Kayenta Anasazi and Cohonina. Melded in this region are natural features and cultural elements shared by historic Navajo and Paiute groups, early cattle and sheep ranchers, and lumbermen.

The Sunset Complex, historically known as the "Headquarters Area for Sunset Crater National Monument," is comprised of Mission 66 era properties that form an administrative center, visitor contact area, maintenance area and park housing for the monument. Located on U.S. Forest Service land approximately ½ mile west of the monument boundary, the Sunset complex is set in a ponderosa forest and cinder dune landscape. Architect Cecil Doty designed the Sunset complex in 1965, and construction of the Mission 66 development was completed by the fall of 1967. The Sunset complex has historic significance at the national level as an excellent example of a Mission 66 development that is exceptional among Mission 66 developments for three main reasons:

- 1. Unlike most Mission 66 visitor centers, the Sunset complex was located outside the monument to preserve the natural landscape around the park's primary interpretive feature (the Sunset Crater Cinder Cone) by minimizing development in this area
- 2. Its original development was exclusively a Mission 66 design that did not build on any existing developments
- 3. The Sunset complex was designed by Cecil Doty, and represents an unusual design for this prominent NPS architect.

The largest multi-year construction event in NPS history, Mission 66 was 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. Initiated in 1956, the goal of the program was to substantially improve the parks by 1966, hence the name "Mission 66". Although Mission 66 officially extended from 1956-1966, 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 Sunset complex period of significance ranges from 1965 to 1967.

Buildings contributing to the historic significance of the Sunset complex are one-story NPS-Modern-style buildings clad in wood shingles with lava rock water tables. Two of the buildings have large glulam structural systems that form dramatic angled profiles. The Sunset complex is comprised of six properties that contribute to the historic significance of the Mission 66 complex and thirteen non-contributing properties. Most of the contributing properties are in excellent condition and retain a high level of historic integrity, reflecting the original Mission 66 era location, design, setting, materials, workmanship, feeling, and association. Character defining elements of buildings in the Sunset complex include cedar shingle siding, window patterns, lava rock water tables, and the overall layout of the complex. Additionally, characterdefining elements of the Visitor Center Building include the 1960s loft-style open floor plan, clerestory windows, and the folded plate roof over the entryway portico.

The following presents a list of contributing resources for the Sunset Crater Volcano National Monument visitor center complex:

- 1. Sunset Crater Volcano National Monument Visitor Center building (No. 16/20) and public parking area (1967). An associated entryway terrace, walkways, a flagpole, lava rock planters and landscaping have been replaced and do not retain their historic integrity.
- Maintenance and Storage Building (No. 27) south of the northwest wall of the visitor center and associated fenced/walled employee parking area compound east of maintenance building (1967)

- 3. Apartment Building (No. 18) and associated walkways and yards (1967)
- 4. Administrative Road System to the employee parking compound, water tower loop, and housing area loop (1965)
- 5. Water Tower (1965)
- 6. Old Pump House (1965)

The following presents a list of non-contributing resources in the immediate vicinity of the Sunset Crater Volcano National Monument visitor center complex:

- 1. Residence Building No. 2 (1985 modular)
- 2. Detached garage associated with Residence Building No. 2 (1980s structure)
- 3. Residence Building No. 7 (1985 modular)
- 4. Detached garage associated with Residence Building No. 7(1980s structure)
- 5. Residence Building No. 12 (1978 modular)
- 6. Residence area Playground
- 7. Detached garage (1980s structure) associated with Residence 18A (Building 18)
- 8. Detached garage (1980s structure) associated with Residence 18B (Building 18)
- 9. New pump house (2001 structure)
- 10. WNPA shed (1980s structure)
- 11. Vehicle fuel tanks (1996 structures)
- 12. Hazardous Materials Storage Building (mid-1990s structure)
- 13. The employee parking area to the east of the visitor center

Park Operations

The visitor center, entrance station, and associated maintenance and housing areas are all located on Coconino National Forest land and are operated under a memorandum of understanding with U.S. Forest Service. The visitor center/maintenance complex, vintage Mission 66 construction, is directly south of FR545, approximately ½ mile west of the monument. The facility contains a small museum and book-selling area, attached offices, and rest rooms.

The Sunset Crater maintenance facility serves as the central office for the maintenance functions for the three Flagstaff Area parks. Maintenance facilities are attached to the south side of the visitor center and include a small maintenance office, a one-bay garage, and an open area for the storage of vehicles and small equipment. The maintenance storage area is south of the visitor center complex and impacts a cultural resource on Forest Service land. Routine tasks such as vehicle service and repairs, working on snowplows, and so on, must be conducted outside in adverse weather conditions.

The residential area consists of three single-family residence and two apartments. Trailer pads are located nearby.

Bonito Campground, a large developed campground managed by the Forest Service, is directly across from the visitor center on FR545.

Staff for visitor services, interpretation, law enforcement, and maintenance is concentrated in the visitor center. Sunset Crater maintenance employees travel to Walnut Canyon and

Wupatki as needed for projects beyond those parks' capabilities. One maintenance employee is a required occupant at Sunset Crater Volcano.

No facilities currently exist to house two NPS fire engines, preventing year-round emergency response to wildland fire.

Visual Quality

The Flagstaff Area National Monuments are relatively small enclaves of National Park Service management located within a geographic area dominated by the much larger Coconino National Forest. The Flagstaff Area National Monuments are managed in accordance with the NPS mandate "to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

For many visitors, Sunset Crater Volcano is largely a drive-through experience, often in conjunction with a visit to Wupatki National Monument. Spectacular views of the volcano, lava flow, nearby mountains, and the San Francisco Peaks are available to all visitors, and make up a highly significant element of the visitor experience. Sunset Crater Volcano, the primary geological feature, is a prominent landmark for miles around. The trail to the top was closed in 1973, owing to highly visible impacts from heavy use (NPS 2002).

The proposed Fire Facility would be visible from the visitor center/employee housing, the primary entrance road to the monument (FR 545), and Bonito Campground. Although it would be setback from the entrance road by nearly 500 feet, maintaining as much mature vegetation between the road and the facility would provide some screening (NPS 2002).

Chapter

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 Sunset Crater Volcano 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.
- Planning and design of new wayside exhibits and museum exhibits is in progress, in accordance with the Flagstaff Area National Monument's Comprehensive Interpretive Plan, to improve visitor understanding and appreciation of Sunset Crater Volcano resources. New wayside exhibits will replace and expand the existing system of interpretive signs along FR545 and at major existing visitor use areas, that is, at Bonito Park, Lava Flow Trail, Lenox trail, and the Painted Desert picnic area.

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 natural scenic quality along the monument entrance road corridor, non-motorized recreation north of the entrance road corridor, and off-road motorized recreation along the south of the entrance road corridor.

Cultural Resources and Section 106 of the National Historic Preservation Act

Potential impacts to cultural resources (archeological resources, prehistoric or historic structures, cultural landscapes, and traditional cultural properties) either listed in or eligible to be listed in the National Register of Historic Places were identified and evaluated in accordance with the Advisory Council on Historic Preservation's regulations implementing §106 of the National Historic Preservation Act (36 CFR 800, *Protection of Historic Properties*): by (1) determining the area of potential effects; (2) identifying cultural resources present in the area of potential effects that are National Register listed or eligible; (3) applying the criteria of adverse effect to affected resources; and (4) considering ways to avoid, minimize or mitigate adverse effects.

Under the Advisory Council's regulations a determination of *no historic properties affected*, *adverse effect*, or *no adverse effect* must be made for affected National Register listed or eligible cultural resources. A determination of *no historic properties affected* means that either there are no historic properties present or there are historic properties present but the undertaking will have no effect upon them (36 CFR 800.4(d)(1)). An *adverse effect* occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualifies it for inclusion in the National Register, e.g. diminishing the integrity (or the extent to which a resource retains its historic appearance) of its location, design, setting, materials, workmanship, feeling, or association. Adverse effects also include reasonably foreseeable effects caused by the alternatives that would occur later in time, be farther removed in distance or be cumulative (36 CFR 800.5(a)(1)). A determination of *no adverse effect* means there is an effect, but the effect would not meet the criteria of an adverse effect, i.e. diminish the characteristics of the cultural resource that qualify it for inclusion in the National Register (36 CFR 800.5(b)).

Thus, the criteria for characterizing the severity or intensity of impacts to National Register listed or eligible archeological resources, prehistoric or historic structures, cultural landscapes, and traditional cultural properties are the §106 determinations of effect: *no historic properties affected, adverse effect,* or *no adverse effect.* A §106 determination of effect is included in the conclusion section for each analysis of impacts to National Register listed or eligible cultural resources.

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

Geologic Resources

Methodology

Scientific papers, technical reports, and maps of the geologic resources associated with Sunset Crater Volcano were reviewed. The site of the proposed fire facility and the construction methods were assessed for potential impacts to these geologic features.

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

Negligible: An action that would cause no change in existing geologic features.

Minor: An action that would locally affect only widespread or common geologic features. The change would have barely perceptible consequences to the integrity of geologic resources.

Moderate: An action that would affect a unique and irreplaceable geologic feature or a large area of widespread geologic features. The change would result in permanent partial loss of the integrity of geologic resources.

Major: An action that would destroy or permanently impair unique and irreplaceable geologic features or most of a large-scale geologic resource. The change would result in permanent loss and/or largely compromise the integrity of geologic resources.

Alternative A – No Action

Direct/Indirect Impacts: As no new ground disturbing activities would occur, there would be no direct or indirect impacts to geologic resources.

Cumulative Impacts. Geologic resources in the monument are adversely affected by disturbance to the unique cinder cone, lava flow, spatter cone, and other volcanic features caused by human activities inside and outside park boundaries. NPS planning documents also call for eventual construction of other new facilities around the project site. Inside the monument, areas receiving heavy visitor use, particularly steep slopes may continue to erode, along with the breakage, collapse, and loss of lava and spatter cone surfaces. Both the widespread tephra deposits and a number of unique volcanic features associated with the Sunset Crater volcanic eruption have been impacted to varying degrees on surrounding Coconino National Forest, Arizona State Land Trust, and privately owned lands around the project area. Most private lands are rapidly being developed as housing subdivisions, and the Arizona state lands are subject to eventually being sold for similar development. Most of the geologic features associated with the Sunset "Ring-of-Fire" eruption are on neighboring Coconino National Forest lands, and are being impacted by off-road driving activities within the Cinder Hills off-road-driving recreation area. The off-road driving area is approximately 13,600 acres, but a considerably larger surrounding area is being impacted by off-road driving activity. Some of the geologic features that have already been impacted or are at risk are unique features that are irreplaceable through natural processes and cannot otherwise be restored. These impacts are anticipated to continue and increase well into the future as a result of continued community growth and outdoor recreational demands on the region. Therefore, cumulative impacts to geologic resources would be minor to moderate over the long-term.

Impairment: There would be no impairment of Sunset Crater Volcano 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 General Management Plan or other relevant NPS planning documents.

Conclusion: There would be no direct or indirect impacts to geologic resources. Cumulatively, impacts to geologic resources associated with the Sunset Crater volcanic eruption would be minor to moderate over the long-term.

Alternative B – Preferred Alternative

Direct and Indirect Impacts: Approximately 0.25 acres of previously undisturbed recent volcanic scoria and cinder deposits would be built upon or excavated to construct the new facility. This is less than 0.002% of the total 98,500 acres of recent volcanic tephra deposits that are three feet or deeper across the region surrounding Sunset Crater Volcano. No unique geologic features associated with the Sunset Crater Volcano (cinder cones, spatter cones, fissure vents, fumerole vents, lava flows, lava "squeeze-ups", lava tubes, etc.) would be impacted. Long-term direct impacts to geologic resources would be minor.

Cumulative Impacts. Except for an additional long-term disturbance to a relatively minute area of volcanic scoria and ash deposits, cumulative impacts would be the same as Alternative A, and would be minor to moderate over the long-term.

Impairment: There would be no impairment of Sunset Crater Volcano 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 General Management Plan or other relevant NPS planning documents.

Conclusion: There would be no direct or indirect impacts to geologic resources. Cumulatively, impacts to geologic resources associated with the Sunset Crater volcanic eruption would be minor to moderate over the long-term.

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 Fire Facility. Predictions about short- and long-term site impacts were based on fieldwork completed in November 2005 and March 2006.

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.

Cumulative Impacts: Existing development has created disturbances that have allowed the introduction of exotic plants and noxious weeds into the park. Knapweed and camelthorn are known to occur along FR 545. Increased development 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 Sunset Crater Volcano 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 long-term 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 minor because vegetation within the project area is sparse. New disturbance would total approximately 0.25 acres, of which 0.06 acres would be used for the leach field and sewer line and would be allowed to return to a somewhat natural state after construction. Approximately 50 ponderosa pine trees are found within the proposed footprint including three with a DBH greater than 24-inches. Approximately 13 trees with a DBH greater than 3-inches would need to be removed.

With soil disturbance and exposure comes the potential opportunity for weedy plant invasion. Many weedy species are annuals and need very minimal requirements for establishment and propagation. Weed seed is carried from site to site on the tires of equipment and vehicles, in soils, and on clothing. As weedy species increase, native plants are often displaced. The staging and operation of construction equipment could trample and have short-term impacts on understory vegetation; however, this vegetation is considered sparse within the project area.

Cumulative Impacts: Existing development has created disturbances that have allowed introduction of exotic plants and noxious weeds into the park. Constructing the proposed Fire Facility combined with foreseeable future projects in the area would increase the potential for noxious weeds and exotic plants to spread in the park. 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 Sunset Crater Volcano 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 0.25 acres of previously undisturbed vegetation would be impacted, including removal of approximately 13 trees greater than 3-inches DBH. 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 Fire Facility. 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 habitat-disturbing activities are proposed under this alternative, there would be no direct impacts to wildlife.

Cumulative Impacts: Wildlife habitat has been lost in and around the project area from past developments. 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 Sunset Crater Volcano 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 long-term impacts to wildlife. 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 Fire 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 Fire Facility would require disturbing up to 0.25 acres of wildlife habitat.

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 Sunset Crater Volcano National Monument and slow expansion of Flagstaff. The remaining ponderosa pine habitat, as well as other forested habitats, in the Sunset Crater Volcano 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 Sunset Crater Volcano 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 up to 0.25 acres of previously undisturbed area. This would be considered a minor adverse effect. Cumulatively, impacts to wildlife would be long-term and would range from a minor to moderate adverse effect, primarily from continued loss of habitat.

Special Status Species

Methodology

Information on special status species was gathered from prior research at Sunset Crater Volcano National Monument. Map locations of habitat associated with these species were compared with the location of the Fire Facility. 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.

Bald Eagle

Alternative A – No Action

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

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

Impairment: There would be no impairment of the Sunset Crater Volcano 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 wintering bald eagles from this alternative.

Alternative B – Preferred Alternative

Direct/Indirect Impacts: Roosting or perching of bald eagles within the Visitor Center Complex at Sunset Crater Volcano 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 proposed Fire Facility would be concentrated into 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 the Sunset Crater Volcano 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 adverse effect on the bald eagles. Cumulative impacts to bald eagles as a result of implementing this alternative would also be negligible.

Sunset Crater Penstemon

Alternative A – No Action

Direct/Indirect Impacts: No construction activities are proposed under this alternative. Therefore, there would be no impact to the Sunset Crater penstemon from this alternative. *Cumulative Impacts:* There would be no cumulative impacts to Sunset Crater penstemon as a result of implementing this alternative.

Impairment: There would be no impairment of the Sunset Crater Volcano 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 Sunset Crater penstemon from this alternative.

Alternative B – Preferred Alternative

Direct/Indirect Impacts: The proposed facility would permanently remove 0.25 acres of favorable habitat. Fieldwork conducted in November 2005 and March 2006 document the presence of Sunset Crater penstemon within the proposed project area. Seven small populations were noted with numbers of plants ranging from 6 to 20 at each location. Prior to construction, NPS staff should conduct pedestrian surveys for the plant species. Any plants or populations identified in the immediate disturbance zone would be protected and if necessary removed consistent with Arizona Native Plant regulations (salvage restricted) and topsoil within a five-foot radius around each plant/population would be segregated and spread over the area of disturbance to as few plants as possible, salvaging plants that would be destroyed from construction activities, and segregating topsoil from areas surrounding known plants or populations of plants would result in minor adverse effects to Sunset Crater penstemon as a result of this alternative.

Cumulative Impacts: Because of the limited distribution and restrictive habitat requirements for this species, other foreseeable future actions outside of Sunset Crater Volcano National Monument would have negligible impacts on this species. Therefore, cumulative impacts to Sunset Crater penstemon as a result of implementing this alternative would be negligible to minor.

Impairment: There would be no impairment of the Sunset Crater Volcano 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: Situating the building footprint to minimize disturbance to as many plants as possible, salvaging plants that would be destroyed from construction activities, and segregating topsoil from areas surrounding known plants or populations of plants would result in minor adverse effects to Sunset Crater penstemon as a result of this alternative. Cumulative impacts as a result of implementing this alternative would be negligible to minor.

Phacelia serrata

Alternative A – No Action

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

Cumulative Impacts: There would be no cumulative impacts to *Phacelia serrata* as a result of implementing this alternative.

Impairment: There would be no impairment of the Sunset Crater Volcano 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 Phacelia serrata from this alternative.

Alternative B – Preferred Alternative

Direct/Indirect Impacts: Fieldwork conducted in November 2005 and March 2006 did not reveal the presence of *Phacelia serrata* within the proposed project area; however, this work was completed outside the normal growing season. The project area lies within favorable habitat and construction of the Fire Facility would permanently remove 0.25 acres of habitat. Immediately prior to construction, NPS staff should conduct pedestrian surveys for the plant species. Any plants or populations identified in the immediate disturbance zone would be protected and if necessary removed consistent with Arizona Native Plant regulations (salvage restricted) and topsoil within a five-foot radius around each plant/population would be segregated and spread over the area of disturbance once construction is complete. Situating the building footprint to minimize disturbance to as few plants as possible, salvaging plants that would be destroyed from construction activities, and segregating topsoil from areas surrounding known plants or populations of plants would result in minor adverse effects to *Phacelia serrata* as a result of this alternative.

Cumulative Impacts: Because of the limited distribution and restrictive habitat requirements for this species, other foreseeable future actions outside of Sunset Crater Volcano National Monument would have negligible impacts on this species. Therefore, cumulative impacts to *Phacelia serrata* as a result of implementing this alternative would be negligible to minor.

Impairment: There would be no impairment of the Sunset Crater Volcano 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: Situating the building footprint to minimize disturbance to as many plants as possible, salvaging plants that would be destroyed from construction activities, and segregating topsoil from areas surrounding known plants or populations of plants would result in minor adverse effects to *Phacelia serrata* as a result of this alternative. Cumulative impacts 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 sites/historic properties were compared with the location of the Fire Facility through intensive site reconnaissance. Predictions about short- and long-term site impacts were based on previous and recent 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 Sunset Crater Volcano 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 (direct, indirect or cumulative) to cultural resources from this alternative.

Alternative B – Preferred Alternative

Direct/Indirect Impacts: One site could potentially be affected from construction of the proposed Fire Facility. This would result in a direct, minor adverse impact to cultural resources. The project area was adjusted to fall outside the site boundary and avoid as many features and isolated artifacts as possible. Two isolated artifacts and one feature currently lie within the project area. To minimize impacts to cultural resources, a qualified archeologist would monitor construction activities to assist crews in avoiding disturbance to any known sites or artifacts. Any sites or artifacts that are discovered during construction would be evaluated by the monitor and action would be taken to minimize impacts.

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 "no adverse effect" on any National Register eligible sites or properties.

Conclusion: Construction of the Fire Facility would have a long-term minor adverse effect on one National Register eligible site.

Methodology

For a structure or building to be listed in the National Register of Historic Places, it must be associated with an important historic context, meaning that it possesses significance – the value or meaning ascribed to the structure or building, *and* have integrity of those features necessary to convey its significance, for example, location, design, setting, workmanship, materials, feeling, and association (see National Register Bulletin #15, *How to Apply the National Register Criteria for Evaluation [NPS 1995b]*). For purposes of analyzing potential impacts to historic structures/buildings, 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.

Beneficial impact – Stabilization/preservation of character defining features in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*, to maintain existing integrity of a structure or building. For purposes of Section 106, the determination of effect would be *no adverse effect*.

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.

Beneficial impact – Rehabilitation of a structure or building in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties, to make possible a compatible use of the property while preserving its character defining features. For purposes of Section 106, the determination of effect would be *no adverse effect*.

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.

Beneficial impact – Restoration in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties, to accurately depict the form, features, and character of a structure or building as it appeared during its period of significance. For purposes of Section 106, the determination of effect would be *no 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 the historic district designation of the Sunset Crater Volcano National Monument Visitor Center Complex.

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

Impairment: There would be no impairment of Sunset Crater Volcano 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 direct, indirect or cumulative impact to historic resources from this alternative.

Alternative B – Preferred Alternative

Direct/Indirect Impacts: The proposed Fire Facility lies adjacent to the designated eligible historic district of the visitor center complex. Although there would be no direct impacts to known historic features within the designated district from constructing the Fire Facility, adding new structures within the historic district would have a moderate adverse effect on the integrity of the overall district setting. Requiring the building/landscape design to blend with the Mission 66 features that afford the historic district designation would mitigate this impact.

Cumulative Impacts: Existing development has created disturbances that are visible within the park. Constructing the proposed Fire Facility combined with foreseeable future projects should not cumulatively impact the integrity of the historic district designation.

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 "no adverse effect" on National Register eligible sites or properties.

Conclusion: Construction of the Fire Facility would have a long-term moderate adverse effect on the Sunset Crater Volcano Visitor Center Complex Historic District.

Visual Quality

Methodology

Visual quality affects both visitor enjoyment and perception of Sunset Crater Volcano 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 545. 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 maintenance facilities are visible to the majority of visitors either at the visitor center or

traveling along FR 545. However, this site has been chosen to concentrate development so that the important features that make the monument unique remain intact for the visitor to enjoy. Additionally, most of the existing facilities were purposefully aligned to be due south of the visitor center to be screened from view by the public from the visitor center building. Therefore, there would be no impact.

Cumulative Impacts: No action in this analysis means that the Fire Facility would not be constructed. Therefore, there would be no cumulative impacts to visual quality as a result of construction activities.

Impairment: There would be no impairment of the Sunset Crater Volcano 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 visual quality under this alternative.

Alternative B – Preferred Alternative

Direct/Indirect Impacts: Sunset Crater Volcano National Monument is well known for its spectacular beauty. The administrative use area, however, is a portion of the park that has been consolidated and developed to minimize scattered development throughout the park. Existing facilities within the area considered for this analysis include the visitor center, utilities, maintenance facilities, a water tower, and staff housing. The majority of this development has been built behind the visitor center so that it is somewhat screened from public view. The proposed Fire Facility would be built southeast of the visitor center and depending on exact placement could lengthen the visual disturbance along FR 545. Visual guality would be impacted to the greatest extent during construction, with additional vehicles, disturbance, construction materials, and development activities. Once the construction is complete it would be somewhat less noticeable, but still expected to be noticed by the majority of visitors as it would only be about 200 feet set back from FR545. The ponderosa pines situated between the road and the proposed facility would provide some screening, but people visiting the visitor center, camping at Bonito Campground, and traveling along FR 545 would experience a diminished visual quality from construction of the Fire Facility. Impacts would be considered short-term major to long-term moderate.

Cumulative Impacts: Existing development has created disturbances that are visible within the park. Constructing the proposed Fire Facility combined with foreseeable future projects in the area would increase the potential for diminishing the visual quality of the area. However, implementing mitigation measures such as maintaining mature ponderosa pines for screening would minimize visual quality impacts. Therefore, cumulative impacts would be long-term moderate to major.

Impairment: There would be no impairment of the Sunset Crater Volcano 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 0.25 acres of previously undisturbed vegetation would be disturbed, including removal of approximately 13 trees greater than 3-inches DBH. Impacts would be considered short-term major to long-term moderate to major. Cumulative impacts would also be long-term moderate.

Park Operations

Methodology

For this analysis, park operations are the human and fiscal resources available to protect and preserve natural and cultural resources at Sunset Crater Volcano National Monument and provide for safe and enjoyable visitor experiences. The discussion of impacts to park operations focuses on rangers and other staff that ensure visitor and employee safety and opportunities for quality experiences, as well as the ability of the resource management staff and trail crew to protect and preserve resources at current staffing and funding levels. The thresholds of change for the intensity of an impact are defined as follows:

Negligible—Sunset Crater Volcano National Monument operations would not be affected or the effect would not be apparent to park staff or the public.

Minor—<u>Adverse</u>: Impacts would be measurable but would not have an appreciable effect on or consequences for park operations.

Beneficial: Impacts would result in short-term improvements in park operations.

Moderate—<u>Adverse</u>: Impacts would be readily apparent and would result in a measurable change in park operations in a manner noticeable to staff and the public.

Beneficial: Impacts would result in short- to long-term improvement in park operations.

Major—<u>Adverse</u>: Impacts would be readily apparent and would result in a substantial change in park operations in a manner noticeable to staff and the public.

Beneficial: Impacts would result in long-term improvement in park operations.

Alternative A – No Action

Direct/Indirect Impacts: Under the No Action Alternative, impacts to park operations would be long-term moderate to major adverse. Continuing to house the fire engines outdoors would prohibit their use when temperatures fall below freezing. The existing situation also limits access to supplies and compromises the efficiency of the emergency response system and crew.

Cumulative Impacts: Growth and development of the city of Flagstaff and the outlying communities would have a long-term minor to moderate adverse effect on operational efficiency of Sunset Crater Volcano National Monument. The most significant effect would be an increase in the number of visitors coming to the park, resulting in an increased need for law enforcement patrols and emergency response.

Increased growth of the surrounding communities would increase the interest and demand on Forest Service land surrounding the park. Because the two agencies have differing missions, the potential exists for inconsistent and incompatible uses to could occur adjacent to park boundaries. Such use could result in unregulated and unauthorized entry into closed areas of the park, resulting in intentional and unintentional impacts to park resources, which could have long-term moderate adverse effects to operational efficiency, through an increased need for law enforcement patrols to protect park resources.

Impairment: There would be no impairment of the Sunset Crater Volcano 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: Direct, indirect, and cumulative impacts to park operations would be long-term and moderate to major adverse under this scenario because of the limited efficiency and effectiveness of park emergency staff and limited use of emergency equipment.

Alternative B – Preferred Alternative

Direct/Indirect Impacts: Construction of a new Fire Facility would have a long-term major beneficial impact on operational efficiency. Addressing the existing health and safety issues is likely to have a moderate to major, beneficial impact on operational efficiency. Many of the existing deficiencies and health and safety needs in park facilities would be addressed and mitigated.

Cumulative Impacts: Growth and development of the city of Flagstaff and the outlying communities would have a long-term minor to moderate adverse effect on operational efficiency of Sunset Crater Volcano National Monument. The most significant effect would be an increase in the number of visitors coming to the park, resulting in an increased need for law enforcement patrols and emergency response.

Increased growth of the surrounding communities would increase the interest and demand on Forest Service land surrounding the park. Because the two agencies have differing missions, the potential exists for inconsistent and incompatible uses that could occur adjacent to park boundaries. Such use could result in unregulated and unauthorized entry into closed areas of the park, resulting in intentional and unintentional impacts to park resources, which could have long-term moderate adverse effects to operational efficiency, through an increased need for law enforcement patrols to protect park resources.

Impairment: There would be no impairment of the Sunset Crater Volcano 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: Construction of a new Fire Facility would have a long-term major beneficial impact on operational efficiency as many of the existing deficiencies and health and safety needs in park facilities would be addressed and mitigated. Cumulative impacts would have long-term moderate adverse effects to operational efficiency.

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
- Bob Frankeberger
- Coconino National Forest Alvin Brown, NEPA Coordinator Heather Provencio, Archeologist
- National Park Service, Intermountain Region Office Sayre Hutchison, Architect/LCS Coordinator Lisa Haddox, Architect
- National Park Service, Flagstaff Area National Monuments Scott Travis, Superintendent Charles Strickfaden, Chief Ranger Mike Schneegas, Facility Manager 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 John Cannella, GIS Specialist

U.S. Fish and Wildlife Service

Sam Spiller

Tribes

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

- Allaback, Sarah. 2000. Mission 66 Visitor Centers: The History of a Building Type. U.S. Government Printing Office.
- Amos, R.C. 1986. Sunset Crater, Arizona: Evidence for a large magnitude strombolian eruption. Unpublished masters thesis, Arizona State University.

Arizona Game And Fish Department. 2006. Arizona Heritage Data Management System.

- Bateman, Gary C. 1979. "Natural Resource Survey And Analysis Of Sunset Crater Volcano And Wupatki National Monuments, Preliminary Report (Phase Iii)." Prepared For The Office Of Natural Resource Management Southwest Region, National Park Service. Ms On File Wupatki National Monument.
- 1976. "Natural Resource Survey And Analysis Of Sunset Crater Volcano And Wupatki National Monuments." Ms. On File Wupatki National Monument. Report Prepared By Northern Arizona University, Contract No. 950134.
- Bremer, J. M. 1988. "Settlement And Land Use In The Walnut Creek Drainage Of North Central Arizona During The 12th And 13th Centuries." Unpublished Masters Thesis. Northern Arizona University, Flagstaff.

Cline, Platt. 1994. Mountain Town: Flagstaff's First Century. Northland Publishing, Flagstaff.

Downum, Christian, and George Gumerman. 1998. "Archeological Investigations At Sunset Crater Volcano National Monument." Report On File, Flagstaff Area National Monuments Headquarters Library, Flagstaff, Arizona.

Eggler, W. A. 1966. "Plant Succession On The Recent Volcano, Sunset Crater," Plateau 38, No. 4:81-96.

Holm, R.F., and R.B. Moore. 1987. Holocene Scoria Cone and Lava Flows at Sunset Crater, Northern Arizona. In *Geological Society of American Centennial Field Guide-Rocky Mountain Section*, pp. 393-97.

Hooten, J.A., M. H. Ort, and M.D. Elson. The origin of cinders in Wupatki National Monument. Technical Report No. 2001-12. Desert Archaeology Inc. Tucson.

Museum Of Northern Arizona. 1929. "Sunset Crater And The Lava Beds." Museum Notes Of The Museum Of Northern Arizona. Volume 2, Number 4. October. Flagstaff, Arizona.

- 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. Final Environmental Impact Statement/General Management Plan. Sunset Crater Volcano National Monument, Arizona.
- National Park Service. 2005. Fire Management Plan Environmental Assessment/Assessment of Effect. Flagstaff Area National Monuments. Flagstaff, 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