

National Park Service
U.S. Department of the Interior

Petrified Forest National Park
Arizona



Fire Management Plan Environmental Assessment / Assessment of Effect

June 2013



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Environmental Assessment / Assessment of Effect Fire Management Plan PETRIFIED FOREST NATIONAL PARK

Navajo and Apache Counties, Arizona
June 2013

The National Park Service (NPS) at Petrified Forest National Park, located in Navajo and Apache Counties, Arizona, has prepared this environmental assessment to analyze the effects of fire management. The National Park Service seeks to adjust management direction from the previous plan by accommodating new federal and NPS policies and new scientific information. More specifically, the purpose of the proposed fire management plan at Petrified Forest National Park is to better ensure the health and safety of firefighters, NPS staff, and the public; protect cultural and natural resources; and enhance public education and expand training for NPS staff regarding fire management and safety.

Two alternatives were analyzed for meeting the objectives of the plan:

Alternative A - No Action Alternative (Fire Suppression): Fire management activities would be conducted without a formal management plan in place. In lieu of a plan, the National Park Service would conform with policy mandates that all wildland fires be treated using a full suppression approach and stipulations that fires cannot be used for resource management. No planned projects (fuel reduction, ecosystem restoration, or maintenance) are allowed under the no-action alternative.

Alternative B – Multiple Fire Management Strategies: Implementation of a new fire management plan for Petrified Forest National Park would include options for manual and mechanical fuel reduction to lower the risk of wildland fires, prescribed fire as a fuels reduction tool, targeted application of herbicides to treat nonnative plant species and reduce fuel loads, and suppression of all wildland fires.

Neither of the alternatives analyzed in this environmental assessment would result in major environmental impacts.

PUBLIC COMMENT

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/pefo>. This environmental assessment will be on public review for 30 days. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. Although you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Please address written comments to:

Brad Traver, Superintendent
ATTN: Fire Management Plan EA
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Petrified Forest, AZ 86028

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Chapter 1: Purpose and Need for Action

BACKGROUND

Petrified Forest National Park was established as a national monument in 1906 and achieved national park status in 1962. It is in northeast Arizona and contains 218,533 acres (341 square miles); including two wilderness areas (figure 1). The park boundary was expanded in 2004 from its original 93,533 acres (146 square miles) through passage of the Petrified Forest National Park Expansion Act (Public Law 108-430). Most of the addition lands are in private ownership (59%) with 29% owned and managed by the state. The remaining 12% was transferred from the Bureau of Land Management to the National Park Service (NPS) in 2007.

The park is most famous for its colorful petrified wood and Painted Desert vistas, but it has many other notable resources. The fossils it contains make it a site unique in the world for studying the Triassic period ecosystem. Archeological sites are numerous, and the Petrified Forest area is now known to have been a transition area between a number of ancient cultures. The park contains one of the few examples of shortgrass prairie in northeast Arizona, as well as a number of historic structures, including the Painted Desert Inn, which has been designated a National Historic Landmark. The park preserves these resources in perpetuity and makes this valuable part of America's heritage available to approximately 682,000 visitors each year for their experience, enjoyment, understanding, and appreciation. Petrified Forest National Park preserves, protects, and interprets a globally significant example of a Triassic ecosystem and a continuum of human use in a high desert/shortgrass prairie. It preserves wilderness values for recreation, solitude, vistas, natural quiet, and night skies. It provides outstanding opportunities for scientific research and education.

PARK PURPOSE

Purpose statements express why the park was set aside as part of the national park system. They are grounded in a thorough analysis of the park's legislation and legislative history, and they provide fundamental criteria against which the appropriateness of plan recommendations, operational decisions, and actions are tested.

A proclamation by President Roosevelt created Petrified Forest National Park in 1906 for the stated purpose of reserving "the mineralized remains of Mesozoic forests [which] are of the greatest scientific interest and value." Subsequent proclamations and acts of Congress expanded the park to include "additional features of scenic and scientific interest," including cultural as well as natural resources (NPS 2005b).

The purpose of Petrified Forest National Park is to preserve and protect the Petrified Forest, its outstanding paleontological sites and specimens, its associated ecosystems, cultural and historical resources, and scenic and wilderness values for present and future generations; to provide opportunities to experience, understand, and enjoy the Petrified Forest and surrounding area in a manner that is compatible with the preservation of the park's resources and wilderness character; to facilitate orderly, regulated, and continuing research; and to promote understanding and stewardship of resources and park values by providing educational opportunities for students, scientific groups, and the public.

PARK SIGNIFICANCE

Park significance statements capture the essence of the unit's importance to the nation's natural and cultural heritage. They describe the unit's distinctiveness and why an area is important within

regional, national, and global contexts. Significance statements help NPS managers focus their efforts and funding on attributes that are directly related to the purpose of the unit.

“Petrified Forest National Park is globally significant for its exposures of the Chinle Formation's fossils which preserve evidence of a Triassic Period ecosystem of more than 200 million years ago. The detailed paleontological (fossil) and stratigraphic (layered) records provide outstanding opportunities to study changes in organisms and their environments in order to better understand today's environment” (NPS 2005b).

FIRE HISTORY IN THE PARK

Since 2000, there have only been 20 fires within park boundaries. The fires were generally small in size, averaging approximately a tenth of an acre, with the largest fire event measured at approximately 3 acres. The park is not located in a fire-dominated ecosystem; therefore, this recent fire history is relatively typical. Fires in the park are usually wind-driven, with those in areas vegetated with tamarisk burning longer than those in grasslands. Human-caused fires in the park have begun from a variety of sources, ranging from a spark from railroad cars to an inadvertent fire during routine park maintenance activities. The greatest concern for large fires occurs during the spring season, when winds are especially high (NPS 2012a). Nonetheless, the low frequency of fires within the park and their small size is an important consideration when determining fire management planning actions.

PURPOSE OF THE ACTION

The National Park Service is preparing this fire management plan environmental assessment / assessment of effect (referred to hereafter as the environmental assessment) because the Secretary of the Interior, through NPS wildland fire policy directives and *Director's Order #18 Wildland Fire Management* (NPS 2008b), requires parks with burnable vegetation to have a fire management plan. These plans are intended to be both strategic and operational, guiding the full range of fire program activities that support land and resource management objectives. In preparing a new fire management plan for Petrified Forest National Park, the National Park Service seeks to provide management direction by accommodating the latest NPS and other federal government policies and scientific information.

More specifically, the purpose of the proposed fire management plan at Petrified Forest National Park is to:

- Ensure the health and safety of firefighters, NPS staff, and the public;
- Protect and maintain cultural and natural resources in the park;
- Reduce the potential for a catastrophic wildfire within the park;
- Protect properties adjacent to the park through cooperative efforts between the National Park Service and local agencies, and;
- Enhance public education and expand training for NPS staff regarding fire management and safety.

The fire management activities identified in the alternatives would apply only to those lands owned by the National Park Service. Fire management activities on lands that are in private or state ownership are not addressed in this environmental assessment. However, the National Park Service would continue to coordinate with federal, state, tribal, and local agencies in managing wildland fires that occur on those properties.

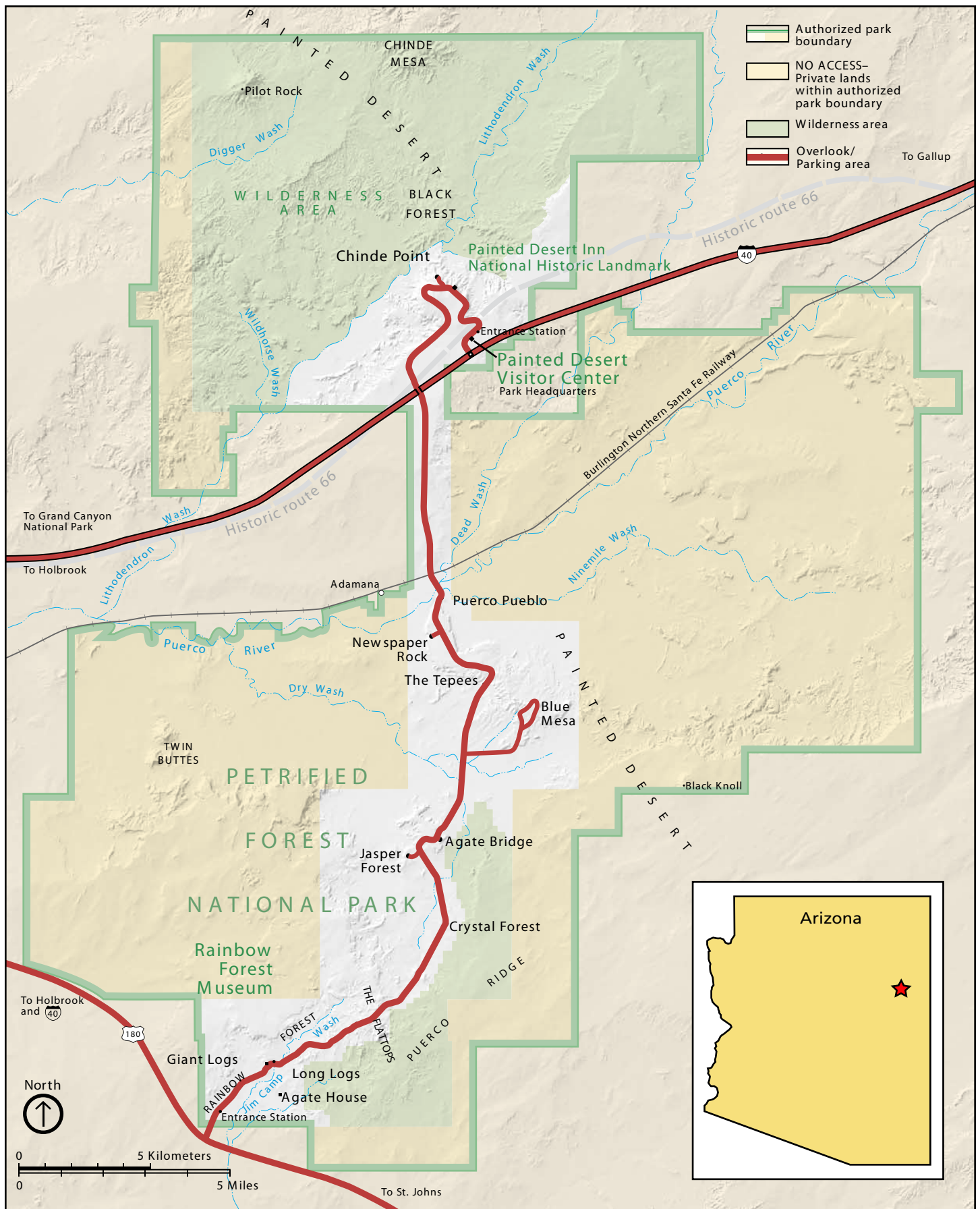


Figure 1: Petrified Forest National Park Map

Management Policies 2006 (NPS 2006) requires analysis of potential effects to determine whether 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, 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, adversely impacting park resources and values. However, the laws give the National Park Service the management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given the National Park Service the management discretion to allow certain impacts within parks, that discretion is limited by the statutory requirement that the National Park Service must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise.

This environmental assessment has been prepared in accordance with the National Environmental Policy Act and its implementing regulations in 40 *Code of Federal Regulations* parts 1500-1508; *Director's Order #12 and Handbook, Conservation Planning, Environmental Impact Analysis, and Decision-making* (NPS 2001); and section 106 of the National Historic Preservation Act and its implementing regulations in 36 *Code of Federal Regulations* part 800. The environmental assessment process is being used to comply with section 106.

NEED FOR THE ACTION

Fire management planning in the National Park Service has evolved over time as knowledge of fire behavior and effects has grown. Although a fire management plan for Petrified Forest National Park was prepared in 2005, the National Environmental Policy Act compliance used to evaluate the plan's effects was the Healthy Forest Initiative Hazardous Fuels Reduction Categorical Exclusion. In May 2008, the National Park Service determined that NPS units in the Supreme Court 9th Circuit Court of Appeals jurisdiction, such as Petrified Forest National Park, may no longer use the categorical exclusion. In April 2012, it further determined that this categorical exclusion no longer provided suitable National Environmental Policy Act compliance for any NPS units. The NPS memorandums documenting these changes are included in appendix A. As a result of the determination, a new fire management plan and this environmental assessment are being prepared. A brief description of the park's 2005 *Wildland Fire Management Plan* is presented below.

A fire management plan is an important planning tool for NPS staff and must be consistent with the park's general management plan and other related park plans. The fire management plan will incorporate the latest fire management science and will meet evolving NPS policies and guidance. The new fire management plan will include measures to promote safety in the park and will contain provisions for managing natural and cultural resources.

OBJECTIVES

Objectives are specific statements of purpose and describe what must be accomplished to a large degree for the project to be considered a success. This will allow the National Park Service to decide on alternative actions. The following objectives were used in the analysis of alternatives in the environmental assessment:

- Provide protection of NPS staff and promote public safety by continuing to work through cooperative efforts between the National Park Service and local agencies.
- Protect property and resources by preserving the cultural landscape, maintaining the native plant community and natural resources, and reducing fuel loads.

- Identify and mitigate hazardous fuels in the wildland-urban interface.
- Provide education regarding fire management for the public and park staff.

RELATIONSHIP OF THE PROPOSED ACTION TO OTHER PLANNING EFFORTS

Numerous policies, planning documents, and agreements guide the decisions and actions that can be taken to manage fire in Petrified Forest National Park. This section describes these plans, policies, and agreements to show the constraints under which a fire management plan for the park must operate. In addition, actions undertaken in association with the proposed fire management plan have the potential to contribute to the cumulative effects of other plans and projects in or near the park. The following projects and plans have the ability to contribute to cumulative effects of the project. These are included in analyses of the cumulative scenario for the various impact topics addressed in this environmental assessment.

GENERAL MANAGEMENT PLAN AND AMENDMENT

The park's revised general management plan (NPS 2004a) and amendment (NPS 2010) provide the guidelines and strategies for management and use of Petrified Forest National Park. The proposed fire management plan objectives identified in this environmental assessment are consistent with the general management plan and amendment.

PAINTED DESERT INN, NATIONAL HISTORIC LANDMARK CULTURAL LANDSCAPE TREATMENT PLAN

A particularly relevant section of this plan (NPS 2003) with regard to fire management vegetation thinning efforts states "Removal of invasive exotic species in the vicinity of historic and archeological resources should be undertaken in such a way as to minimize ground disturbance and threats to remaining vegetation. Removal should be undertaken only after remaining resources and landscape features and systems have been protected." These stipulations do not conflict with the goals or objectives of the proposed fire management plan.

WILDERNESS PLAN AND STUDY

The park staff is currently developing a wilderness management plan for the two designated wilderness areas in the pre-expansion portion of the national park. In addition, *NPS Management Policies 2006* requires that all NPS lands be studied for possible inclusion in the national wilderness preservation system. Thus, a wilderness study will be required for the 125,000 acres added to the park in 2004. However, because most of the addition lands are still in private ownership, the wilderness study has been deferred until after a substantial part of the private lands is acquired. The proposed fire management plan will be considered in the development of the wilderness plan for the designated wilderness areas in the park.

WILDLAND FIRE MANAGEMENT PLAN

The 2005 *Wildland Fire Management Plan* (NPS 2005b) outlined actions to be taken by Petrified Forest National Park in meeting its fire management goals. The plan is no longer operational because a categorical exclusion used for compliance with the National Environmental Policy Act was found to be unsuitable. The plan proposed to continue to suppress all wildland fires using the most appropriate management response, based on human safety, threat and potential damage to property and resources, and cost effectiveness. Suppression would not have been used to accomplish resource

objectives. The plan further indicated that naturally ignited wildland fires would not be managed for resource benefits.

STRATEGIC PLAN

The *Strategic Plan for Petrified Forest National Park* (NPS 2005a) addresses the long-term goals in the National Park Service and the Department of the Interior plans that are appropriate to Petrified Forest National Park as part of the overall National Park System and its mission. Park-specific goals are included based on legislative mandates, missions, resources, visitor services, and issues. The plan, then, is a blend of national and local priorities and goals.

INTERAGENCY STANDARDS FOR FIRE AND FIRE AVIATION OPERATIONS

The *Interagency Standards for Fire and Fire Aviation Operations 2012* (National Interagency Fire Center 2012) provides direction for the Bureau of Land Management, U.S. Forest Service, U.S. Fish and Wildlife Service, and National Park Service. It outlines principles and policies that guide the philosophy, direction, and implementation of fire management planning, activities, and projects on federal lands. The proposed fire management plan and actions identified in the alternatives are consistent with these standards.

MUTUAL ASSISTANCE

Department of the Interior State Fire Management Plan

This plan authorizes fire response on Department of the Interior-managed lands and would continue to be applicable under the proposed fire management plan.

Joint Powers Agreement

This agreement is between the U.S. Forest Service, Department of the Interior, and state of Arizona and addresses response to fires. It is valid for five years. The proposed fire management plan would continue to operate under the terms of this agreement and any future agreements.

White Mountain Zone Agreement

This agreement is between the U.S. Forest Service, Bureau of Indian Affairs, National Park Service, and state of Arizona. It provides for fire response and dispatch responsibilities. The proposed fire management plan would continue to operate under the terms of this agreement and any future agreements.

PUBLIC SCOPING

Scoping is an early and open process to determine the breadth of environmental issues and alternatives to be addressed in an environmental assessment and assessment of effect. Petrified Forest National Park conducted both internal scoping with appropriate NPS staff and external scoping with the public and with interested or affected groups and agencies.

Internal scoping was conducted by the staff of Petrified Forest National Park, a planning professional from the NPS Intermountain Regional Office, a plant ecologist from the NPS Southern Colorado Plateau Network, and the acting NPS fire management officer from the Four Winds Fire Program. This interdisciplinary process defined the purpose and need for the plan, identified

potential actions to address the need, determined what the likely issues and impact topics would be, and identified the relationship, if any, of the proposed action to other planning efforts at the park.

The public, American Indian tribes traditionally associated with the lands of Petrified Forest National Park, and others who park staff regularly consult were informed of the proposed action by a scoping letter distributed in May 2012 (see appendix B).

Comments were solicited during external scoping until October 26, 2012. One response was received from the U.S. Fish and Wildlife Service (see appendix B). This agency advised the National Park Service to review the list of federally threatened, endangered, and candidate species found in Navajo and Apache Counties and recommended protection of native plant species within riparian corridors. No other concerns or issues were raised, and no other alternatives were proposed by external scoping.

The undertakings described in this document are subject to section 106 of the National Historic Preservation Act, as amended in 1992 (16 *United States Code*, section 470 *et seq.*). Consultations with the Arizona State Historic Preservation Office have been ongoing since the start of the project. This environmental assessment / assessment of effect will be submitted to the State Historic Preservation Office for review and comment to fulfill Petrified Forest National Park's obligations under section 106 (36 *Code of Federal Regulations* part 800.8[c], Use of the National Environmental Policy Act Process for Section 106 Purposes).

ISSUES

Issues are concerns or topics that need to be considered in the course of developing a successful project that is consistent with governing laws, regulations, and policies and park resources. Issues need to be addressed in the analysis of the proposed project and its alternatives.

In terms of planned fire management activities (for example, prescribed fire, mechanical or manual fuel reduction, or herbicide application) at Petrified Forest National Park, there is concern that archeological resources and historic properties could be disturbed or damaged as a result of fire management actions.

Four issues relate to wildland fire events and fire management strategies to control them.

- Because lands outside the park are heavily grazed and very sparsely vegetated, there is little potential for or concern about fire entering the park. Wildfires starting in the park are infrequent and small in size, but could burn onto adjacent lands.
- There are access difficulties in the badlands in the northern wilderness area of the park, which present a safety hazard for firefighters entering the area to suppress a fire. Concerns include the increased potential for injury and a lack of water.
- Archeological resources may be exposed as a result of wildland fires or erosion of soils following a fire event. This exposure could increase the potential for vandalism.
- Suppression activities that involve creation of a fireline may affect surface and subsurface archeological resources.

IMPACT TOPICS (INCLUDING TOPICS CONSIDERED AND DISMISSED)

This section identifies the resources and other values (impact topics) that could be affected by the alternatives. Candidate impact topics for this environmental assessment were identified from internal and public scoping; federal laws, regulations, and orders; NPS guidance such as *Management Policies 2006* (NPS 2006); and NPS knowledge of park resources.

Justifications are provided regarding why there was no need to examine some impact topics in detail. Other impact topics were carried forward for further analysis in chapter 3 of this environmental assessment. Effects on these impact topics were evaluated based on the issues, listed above, that were identified during scoping.

RETAINED IMPACT TOPICS

Cultural Resources – Cultural Landscapes

There are several cultural landscapes in the park, including the Painted Desert Inn, the Painted Desert Complex, and the Rainbow Forest. Because beneficial effects could result from maintenance and restoration of the cultural landscape from fuel reduction work, cultural landscapes were carried forward for analysis.

Cultural Resources – Historic Structures

Reduction of fuel loads adjacent to historic structures in the park could have beneficial impacts. Therefore, this topic was retained for further analysis.

Cultural Resources – Archeology

More than 900 recorded sites representing Paleoindian, Archaic, Basketmaker, Puebloan, and Navajo cultures exist in the park. In addition, historic area archeological sites such as those associated with wagon, rail, and automobile routes are also found in the park. Because fire has the potential to effect archeological resources, this topic was retained for further analysis.

Vegetation

Fire suppression would affect vegetation in the park. Manual or mechanical thinning could affect native or nonnative plant species. Therefore, this impact topic was retained for analysis.

Wildlife

Fire could potentially affect wildlife and its habitat in the project area. Therefore, this impact topic was retained for analysis.

Air Quality

Smoke from fires could affect air quality, including visibility in the park vicinity. This impact topic was, therefore, retained for further analysis.

Wilderness

There are two wilderness units in the park. Wildland fire suppression actions and proposed fire management activities could affect the character and values of wilderness from the use of mechanized equipment, noise, and the presence of field crews. As a result, wilderness was retained as an impact topic. A minimum requirement analysis was prepared and is included in appendix C of this environmental assessment.

Health and Safety

Operational guidance directs all fire management activities to be conducted to mitigate risk from unwanted wildland fire while providing for firefighter and public safety. Because fires can affect the safety of park visitors, NPS staff, firefighters, and the surrounding community, health and safety was retained as an impact topic for further analysis.

Visitor Use and Experience

Wildland fire suppression actions and fuel reduction activities could affect public access and the visitor experience of the park. Therefore, visitor use and experience is addressed as an impact topic in this environmental assessment.

IMPACT TOPICS DISMISSED FROM FURTHER CONSIDERATION

This section explains why some impact topics were not evaluated in more detail. Impact topics were dismissed from further evaluation either because the resource does not occur in the park or because implementing the alternatives would have only a negligible or minor effect on the resource or value. Negligible or minor effects would include the following:

- An effect would be negligible if the effect would be so small that it would not be detectable or measurable.
- A minor effect would be detectable or measurable, but would be of little importance and the impact topic dismissed would not be central to the issues associated with the proposed action.

Because there would be negligible or minor effects on the dismissed impact topics, the contribution from an alternative to cumulative effects for dismissed topics would be low or none.

Geologic Resources

The potential for geological resources to be affected by fire management actions is very low, based on the infrequent occurrence of wildland fire. Additionally, the sparse vegetation would produce low intensity and short-duration fires, leaving geological resources largely unaffected. Planned fuel reduction projects (manual fuel reduction, mechanical fuel reduction restricted to existing roads, prescribed fire, and herbicide application) would be designed to avoid any impacts to geological resources. Therefore, the impact topic of geologic resources is dismissed from further analysis.

Ecologically Critical Areas, Wild and Scenic Rivers, or Other Unique Natural Resources

Petrified Forest National Park does not contain any designated ecologically critical areas, wild and scenic rivers, or other unique natural resources, as referenced in title 40, *Code of Federal Regulations*, section 1508.27. Therefore, this impact topic was dismissed from further analysis.

Floodplains

A floodplain analysis is typically warranted based on alterations to the floodplain by introduced structures or modifications to the floodplain (changes in the ability to convey flood flows) (see *National Park Service Procedural Manual 77-2: Floodplain Management*, NPS 2004b). None of the proposed fire management approaches would introduce structures or modifications to the floodplain that would change flood hazards or increase the risk to public health and safety.

Reducing fuel loads through the treatment of nonnative tamarisk and revegetating with cottonwood and/or willow would not change the floodplain's ability to convey flood flows. Cottonwood and/or

willow revegetation of areas where tamarisk would be treated probably would not result in a substantial net change in water uptake or water quality, and there would not be a geomorphologic change in the ability of stream drainages to migrate naturally. Benefits to vegetation and wildlife from controlling nonnative tamarisk, revegetating with native cottonwood and/or willow, and establishing wildlife habitat would be addressed in the respective vegetation and wildlife impact topics. As a result, effects on floodplain morphology from tamarisk treatments would not likely be greater than negligible, thus warranting dismissal of the floodplain topic.

Wetlands

NPS policy (Director's Order #77-1, NPS 2002) states that activities with the potential to adversely impact wetlands are subject to the procedures of Executive Order 11990. These are activities with the potential to degrade any of the natural and beneficial ecological, social/cultural, and other functions and values of wetlands. Examples of activities with the potential to adversely impact wetlands include drainage, water diversion, pumping, flooding, dredging, channelizing, filling, nutrient enrichment, diking, impounding, placing of structures or other facilities, livestock grazing, and other activities that degrade natural wetland processes, functions, or values.

No wetlands occur in the park. Therefore, this impact topic was not carried forward for further analysis.

Special Status Species

Although no federally listed, proposed, or candidate species are found in the park, there are two species with state status: paper-spined cactus (*Pediocactus papyracanthus*) and gladiator milkvetch (*Astragalus xiphoides*), each with a state status of "salvage restricted." Paper-spined cactus is typically closely associated with grama grasses (*Bouteloua* spp.), especially blue grama (*B. gracilis*) (Matthews 1994), while gladiator milkvetch is generally associated with badlands of broken sandstone and clay bluffs (Arizona Rare Plant Committee 2001). In the case of the paper-spined cactus, grama grasses would be surveyed for the cactus prior to implementing fire management activities with potential to affect the cactus (NPS 2010). For the milkvetch, fire management activities are unlikely in the sparsely vegetated badland habitats. As a result, activities associated with fire management would not be expected to affect either of these species. Thus, special status species were not retained for detailed analysis.

Soils

The potential for soils to be adversely affected by fire management actions is low, based on the infrequent occurrence of wildland fire, small area of soils that would be affected by management actions such as manual or mechanized fuel reduction activities, and relatively small areas in the park sufficiently vegetated to fuel a wildland fire. Wildland fire events in the past 20 years have been infrequent and limited to small areas of several acres in the 218,000-acre park (NPS 2005b).

Potential adverse effects of fire management activities to cryptobiotic soils (also referred to as biological soil crusts) could occur during wildfire suppression actions. However, for events that involve planned fuel reductions, potential effects to these soils could be avoided or mitigated by avoiding cryptobiotic soils when selecting locations to burn woody or other vegetation debris (for example, tumbleweed piles) or to reduce other vegetation fuel loads. Although fire management actions performed in response to wildland fire could result in limited adverse effects to cryptobiotic and highly erodible soils from the use of tools or by foot traffic, the infrequent occurrence of wildland fires and their small areal extent would likely result in negligible adverse impacts from a

park-wide perspective. Soils were dismissed as an impact topic for further analysis because of the low potential and small magnitude of adverse impacts, as well as the ability to effectively mitigate impacts.

Soundscapes

Noise is defined as unwanted sound. Fuels reduction, prescribed fires, and fire suppression efforts can all involve the use of noise-generating mechanical tools and devices with engines. Use of this equipment would be of short duration and would not be frequent or widespread enough to substantially interfere with human activities in the area. Such infrequent noise would not chronically impact the solitude and tranquility associated with Petrified Forest National Park. Therefore, this impact topic was dismissed from further analysis.

Cultural Resources – Museum Collections

Although recent wildland fires in Arizona have demonstrated that the contents of most buildings can be destroyed, the Petrified Forest National Park museum collection is very likely to survive any wildland fire because the building housing the collection complies with Fire Wise standards, and because wildland fires are infrequent, and very small in size due to limited amount of vegetation to burn. Thus, there would be no effect to museum collections that would differ between the implementation of the two alternatives, and this topic was dismissed from further consideration.

Indian Trust Resources

The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights. It represents a duty to carry out the mandates of federal law with respect to American Indian and Alaska Native tribes. Environmental Compliance Memorandum Number ECM97-2 provides compliance guidance regarding responsibilities for Indian trust resources. According to park staff, Indian trust resources do not occur at Petrified Forest National Park. Therefore, this impact topic was dismissed from further analysis.

Sacred Sites

Executive Order 13007 requires all federal land management agencies to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and to avoid adversely affecting the physical integrity of sacred sites. Fire management activities in Petrified Forest National Park would be brief in duration and could easily be re-scheduled to accommodate ceremonial use, and the fire program will not alter the ability to access and use sacred sites, or change the physical characteristics of sacred sites. Therefore, sacred sites were dismissed from further analysis.

Prime and Unique Farmlands

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

Socioeconomic Environment

The National Environmental Policy Act requires an analysis of impacts to the “human environment,” which includes economic, social, and demographic elements in the affected area. Fire management activities under either alternative may bring a short-term need for additional personnel in the park, but this addition would be minimal and would not affect the population, income, or employment base of neighboring communities. Management actions proposed would not have a measurable impact on the local or regional economy. Therefore, this impact topic is dismissed from further analysis.

Environmental Justice

Executive Order 12898, General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. The proposed fire management activities would not have disproportionate health or environmental effects on minorities or low-income populations or communities as defined in the U.S. Environmental Protection Agency’s (1998) environmental justice guidance. Therefore, environmental justice was dismissed from further analysis.

Energy Requirements and Conservation Potential

This impact topic is based on section 1502.16 of the Council on Environmental Quality (1978) regulations for implementing the National Environmental Policy Act. Increasing concern is reflected by recent executive orders, including 13423, Strengthening Federal Environmental, Energy, and Transportation Management (2007) and 13514, Federal Leadership in Environmental, Energy, and Economic Performance (2009).

Fire management activities in Petrified Forest National Park would generally not be considered energy-intensive. They primarily would involve the consumption of gasoline or diesel fuel as personnel travel to and from a fire management activity. Implementation of either alternative would not substantially change the volume of hydrocarbon fuel consumed annually at the park.

As with all of its actions, the National Park Service would strive to reduce energy costs, eliminate waste, and conserve energy resources by using energy-efficient and cost-effective technology. Energy efficiency and the use of renewable energy sources would be emphasized in the decision-making process. Because the alternatives would not vary substantially in their use of energy or potential for conservation, this impact topic was dismissed from further consideration.

Natural or Depletable Resource Requirements and Conservation Potential

This impact topic is based on the Council on Environmental Quality (1978) regulations and executive orders cited for energy requirements and conservation potential. It addresses the quality, recycling, or conservation of petroleum products and other natural resources. The use of fuels and other energy sources, including petroleum products, was discussed above under energy requirements and conservation potential. Because neither alternative would involve any construction or other activities that would require the commitment of other natural or depletable resources, differences between the alternatives for this impact topic would be negligible. Therefore this impact topic was dismissed from further analysis.

Climate Change

Climate change refers to any significant changes in average climatic conditions (such as mean temperature, precipitation, or wind) or variability (such as seasonality and storm frequency) lasting for an extended period (decades or longer). Recent reports by the U.S. Climate Change Science Program (2007) and the Intergovernmental Panel on Climate Change (2007a and 2007b) provide evidence that climate change is occurring as a result of rising greenhouse gas emissions and could accelerate in coming decades.

While climate change is a global phenomenon, it manifests differently depending on regional and local factors. Global changes that are expected in the future as a result of climate change include hotter, drier summers; warmer winters; warmer water; higher ocean levels; more severe wildfires; degraded air quality; more frequent heavy downpours; and increased drought. In the part of Arizona that includes Petrified Forest National Park, output of the HadCM2 computer model predicts a temperature increase between 3°C and 5°C (5.4°F and 9.0°F) for the 30-year target period of 2070-2100, compared to a baseline of 1960-1990 (Climate Charts 2010).

Although some effects of climate change are known or likely to occur, many potential impacts are unknown. Much depends on the rate at which the temperature would continue to rise and whether global greenhouse gas emissions can be reduced or mitigated. Climate change science is a rapidly advancing field and new information is being collected and released continually.

It is not possible to meaningfully link the greenhouse gas emissions of individual project actions to quantitative effects on regional or global climatic patterns. While fire management activities would contribute to increased greenhouse gas emissions, such emissions would be temporary and not discernible at a regional scale. Therefore, the topic was not retained for further analysis.

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Chapter 2: Alternatives

This chapter describes two alternatives for fire management in Petrified Forest National Park. Alternative A is no action, where the National Park Service would not have an approved fire management plan and would suppress all wildfires, with no fuel reduction and maintenance projects. Alternative B would implement a new fire management plan for the park.

ALTERNATIVE A, THE NO ACTION ALTERNATIVE (FIRE SUPPRESSION)

Under the no action alternative, Petrified Forest National Park would suppress all wildfires, and no approved fire management plan would exist. The park would not be in compliance with the NPS directive (NPS 2006) that requires park units to have approved fire management plans in place if there is burnable vegetation.

WILDFIRE RESPONSE

If a park does not have an approved fire management plan, section 4.5 of *Management Policies 2006* (NPS 2006) stipulates that all wildland fires must be immediately suppressed. Under alternative A, all wildland fires would be suppressed. On all wildfire management actions, use of *minimum impact suppression tactics (MIST)* is the policy of the National Park Service. Minimum impact suppression tactics (MIST) are defined as the application of those techniques that effectively accomplish wildfire management objectives with the least environmental impact, commensurate with public and firefighter safety (NPS 2008a). Full suppression would involve the use of hand crews, engine crews, or aircraft, as needed. The objectives of minimum impact suppression tactics (MIST) are to make unique decisions with each fire start to consider the land, resource, and wildland fire incident objectives (NPS 2008a).

According to *Director's Order #18: Wildland Fire Management* (NPS 2008b), "The protection of human life is the single, overriding suppression priority. Setting priorities to protect human communities and community infrastructure, other property and improvements, and natural and cultural resources will be done based on human health and safety, the values to be protected, and the costs of protection. Once people have been committed to an incident, these human resources become the highest value to be protected." Fire suppression under alternative A would be implemented in compliance with this priority.

The next priority of suppressing a wildfire under alternative A would be to protect values at risk, including developed areas and other park resources. Additional details regarding the procedures to be followed in establishing command and control on a wildland fire, as well as specific on-the-ground operations instructions, can be found in *Reference Manual 18: Wildland Fire Management* (NPS 2008a) and the *2013 Wildland Fire Incident Management Field Guide* (National Wildfire Coordinating Group 2013), respectively. The appropriate tactics to suppress wildfires would be determined by the incident commander.

FIRE SUPPRESSION STRATEGY

All wildland fire suppression activities would provide for firefighter and public safety as the highest consideration. Suppression tactics would strive to protect park resources, to minimize the potential damage to natural and cultural resources, and would take into consideration economic expenditures. As stated previously, the incident commander would determine the appropriate suppression tactics. Tactics may include creating indirect fuel breaks around a fire, allowing the fire to burn to a fuel

break or natural feature and burn itself out, or to create direct fuel breaks to immediately suppress the fire.

Creating a fuel break around a fire could include natural barriers or could consist of manually and/or mechanically constructed lines. Using natural fuel breaks could increase fire size, but could provide for firefighter safety and reduce disturbances on the land. This strategy could allow managers to focus firefighting activities on an area of the fire where life, property, and natural or cultural resources are threatened, while allowing other areas to burn to established natural and/or human-made barriers.

The tactic of using natural barriers to contain a fire would be preferred in the northern wilderness area within the park. The frequency of wildland fires in the park is low and their size is typically very small. There have been 20 fires in the last 12 years, averaging less than 0.1 acres. The northern wilderness area is extremely rugged, consisting of mesas and badlands that would act as natural barriers to contain a wildfire. Firefighter access into the wilderness can be very challenging because of the rugged, remote nature of the area. There is an unimproved road on the eastern boundary of the park adjacent to the wilderness, but it does not provide access into most of the wilderness area. In most cases, this wildland fire suppression strategy would enhance firefighter safety by avoiding this difficult terrain.

More aggressive fire suppression could employ a variety of tools. An example of an aggressive suppression strategy would be to directly attack along the fire's edge with hand crews, heavy equipment, water pumps (fire engines) with fire hoses, and aircraft. Petrified Forest National Park would not consider the use of heavy equipment off established roads, because of the presence of sensitive natural and cultural resources.

Hand crews typically use hand tools such as shovels, McClouds, Pulaskis, and chainsaws. The objective is to dig fire line down to mineral soil, effectively removing fuel from the fire.

Water pumps on fire engines are commonly used to apply water or liquid retardant to burning material to extinguish fire. Water is pumped through fire hose, and is handled at the nozzle by a fire fighter.

Aircraft used to fight wildfire range from the very large tanker planes, to small helicopters. These aircraft deliver water or liquid fire retardant from the bodies of planes and large helicopters, or from buckets suspended from other helicopters. The application ranges from hundreds of gallons to thousands of gallons of water or fire retardant.

In accordance with the *Interagency Standards for Fire and Fire Aviation Operations* (National Interagency Fire Center 2013) only approved chemicals are to be used in fire operations. Approved chemicals are listed by the U.S. Forest Service (U.S. Forest Service 2012) and include retardants and foam. Retardants are most often delivered in fixed or rotor-wing aircraft although some products are formulated specifically for delivery from the ground. Fire suppressant foams are combinations of wetting and foaming agents added to water to improve the efficiency of water and are delivered by engines and portable pumps. Helicopters and Single Engine Airtankers can also deliver foam. Foam would not be used near watercourses where accidental spillage or over spray of the chemical could be harmful to the aquatic ecosystem.

ALTERNATIVE B, MULTIPLE FIRE MANAGEMENT STRATEGIES

This alternative, the NPS preferred alternative, consists of preparing and implementing a new fire management plan for Petrified Forest National Park. The new fire management plan would include options for:

- Suppressing wildfire;
- Using herbicides for fuel reduction, as well as limiting infestations of nonnative vegetation that would contribute to excess fuel loads;
- Employing manual and mechanical fuel reduction to lower the intensity and/or risk of wildland fires; and
- Using prescribed fire to reduce fuel loads.

As described in alternative A, minimum impact suppression tactics (MIST) would be used to suppress all wildfires.

WILDFIRE RESPONSE

Wildfire responses would be the same as those described in alternative A.

PLANNED PROJECTS (ALTERNATIVE B ONLY)

Alternative B is different from alternative A by considering several ways to reduce vegetation (fuels) in specific areas. Fuel reduction may be accomplished by applying herbicide primarily targeting nonnative plants, by manual or mechanical thinning, and by pile or broadcast prescribed fire.

Herbicide Use

Herbicide treatments would be used to reduce fuel loads and to control nonnative plant proliferation. Application methods would target nonnative plant communities with spot treatments rather than widespread, broadcast methods. This would enhance the treatment's effectiveness and reduce effects on native plant species. The areas to be treated are predominantly in the developed part of the park around structures and roads.

Post-emergent herbicides could be used to reduce and remove existing non-native species. Pre-emergent herbicides could be used to prevent non-native plant seeds from germinating. These applications could be applied as the sole treatment, with no additional management strategies, or could be used in combination with other management treatments.

Herbicides would be applied only by certified applicators. Approved herbicides would be used in accordance with manufacturer labeled directions and Environmental Protection Agency (EPA) regulations would be followed.

Manual and Mechanical Thinning

Manual thinning of vegetation would be accomplished using hand-held tools, including, but not limited to chain saws, hand saws, and line trimmers. Mechanical thinning using wheeled or tracked vehicles with attached implements would stay on paved roads in the park and would not be used in wilderness areas.

Vegetation thinning would reduce the fuel load available to support either a planned or wildfire. Fuel reduction could be used alone to reduce the intensity of a potential wildfire or it could be used prior

to a prescribed burn to minimize the intensity and help maintain control of the fire. The need for using fuel reduction techniques would be determined in consultations between NPS resource management specialists, fire ecologists, and a fire management officer.

A number of provisions would guide NPS selection and use of manual equipment and tools. Prior to implementing fuel reduction efforts, the equipment to be used for the specific vegetation being targeted would be clearly identified. Seasonal use restrictions would be considered as well as any restrictions related to weather or species sensitivity. Both short- and long-term monitoring of fuel reductions would take place to determine the success in meeting project objectives and the effectiveness of protecting resources.

Prescribed Fire

The use of prescribed fire would be included in the fire management plan to reduce fuel loads for health and safety, resource, and/or structure protection.

The National Park Service would use the most current version of the *Interagency Prescribed Fire Planning and Implementation Procedures Guide* as direction for planning, implementing, and evaluating prescribed burns. As stated in the guide, “As one component of fire management, prescribed fire is used to alter, maintain, or restore vegetative communities; achieve desired resource conditions; and to protect life, property, and values that would be degraded and/or destroyed by wildfire.” In addition, cultural landscape plans for Rainbow Forest and the Painted Desert Inn include mitigation measures that would be applicable to actions associated with prescribed fire. Prescribed fire plans would be consistent with these plans.

Operational guidelines for a prescribed fire would be presented for each proposed action in a detailed prescribed fire plan, as described in the *Interagency Prescribed Fire Planning and Implementation Procedures Guide* (USDA and USDOJ 2008) appendices. The details for each proposed prescribed fire would depend on its purpose, the vegetation to be burned, the specific objectives, and the location of the proposed action. These details would require review and approval by NPS fire specialists and managers.

As described for fuel reduction activities, use of a prescribed fire would consider factors such as seasonal use restrictions, weather restrictions, firefighter resources, visitor use, species sensitivity, or other concerns that may affect equipment use or operations related to prescribed fire.

Due to the character of the area and surrounding lands, there is a small risk of escape from a prescribed fire. Each prescribed fire would be managed and monitored by qualified personnel before and during all operations. The park would meet all requirements for smoke management as described by the Arizona Department of Environmental Quality prior to implementing prescribed fire (ADEQ 2012).

Prescribed fire would include pile and broadcast burns. Pile burns would include burning of accumulated vegetation debris such as dried tumbleweeds that collect along fences, and piles intentionally created during manual and mechanical fuel reduction projects. Broadcast burning includes applying fire to vegetation across the landscape to reduce fuel loads. Although broadcast burning is a suitable tactic, its use at Petrified Forest National Park is not expected to be extensive. Park ecosystems are not fire adapted and fire is a relatively rare event that happens on a relatively small scale. The use of broadcast burning in the park would be used to reduce fuels, thereby reducing wildfire intensity.

APPLICABLE MITIGATION MEASURES / BEST MANAGEMENT PRACTICES

The following mitigation measures would minimize adverse impacts that may result from implementing either of the alternatives. The measures are organized by resource topic, although some overlap occurs. The evaluation of impacts in chapter 3 takes these mitigation measures into account.

GENERAL

- Use fire management staff and resource advisors to continuously educate fire crews on the appropriate methods of protection of natural and cultural resources during suppression, prescribed fire, and hazardous fuel reduction treatments.

VEGETATION AND SOIL

- Park vehicles in designated areas and have crews walk to project sites to avoid resource damage.
- Do not drive vehicles off pavement or gravel roads without the superintendent's approval.
- Prepare and implement a fire rehabilitation plan. Return firelines to as near original condition as possible using existing materials.
- Use protective tactics in areas identified as being sensitive for natural resources.
- Use wetlines instead of handline construction if adequate water and pumps are available.
- Keep firelines to the minimum width necessary to stop the fire's spread and to allow backfiring or a safe blackline to be created. Whenever possible, use natural barriers to avoid unnecessary fireline construction.
- Use sprinklers, soaker nozzles, or fogger nozzles during mop-up of fire incidents. Avoid boring and hydraulic action.
- Include rehabilitation of handlines prior to containment and during fire mop-up. Return vegetation to the handline to help prevent erosion.
- Begin efforts to rehabilitate the direct impacts of fire suppression activities as soon as possible, at times even before the fire is declared out.
- Remove invasive exotic species in the vicinity of historic and archeological resources in such a way as to minimize ground disturbance and threats to remaining vegetation. Conduct removal only after remaining resources and landscape features and systems have been protected.
- Survey area where debris burning is planned and avoid cryptogammic soils to the greatest extent possible.
- Apply herbicides in a manner that targets specific, unwanted, nonnative vegetation and implement when winds are calm to avoid unnecessary dispersal.
- Scatter debris such as cut trees, limbs, and brush produced by manual thinning actions. Do not leave debris in piles.
- Rehabilitate all firelines, spike camps, or other disturbances in the park to maintain a natural appearance.
- Replace organic materials to assist in natural vegetation regeneration.

- Scatter native seed-bearing plants cut along firelines as mulch to provide a source of indigenous seed for bare soil areas.
- Monitor for occurrences and establishment of invasive vegetation following fuels treatments and fire suppression activities.
- Use central refueling stations with ground protection for refueling equipment such as chain saws and brush cutters to minimize chances of gasoline or oil spills.

WATER RESOURCES

- Consult the *Implementation Guide for Aerial Application of Fire Retardant* (USDA 2013) when deciding between water drops or use of fire-retardant chemicals.
- Plan each prescribed burn to retain small areas of unburned islands throughout the burn area to help stabilize soil and reduce runoff in steep areas.

AIR QUALITY

- Use smoke management techniques that are based on computer models to determine smoke dispersion prior to prescribed burns.
- Postpone prescribed fires when conditions are unfavorable for smoke dispersion and air quality standards would be threatened.
- Use current and predicted weather forecasts along with test fires to determine smoke dispersal.
- Visually monitor smoke dispersal on a regular basis throughout the length of the project. The designated burn boss will determine adaptive strategies to reduce smoke concerns, as is necessary.
- When prescribed fires are conducted, obtain the necessary permit from the Arizona Department of Environmental Quality (ADEQ 2012).
- Provide notices regarding prescribed fires to personnel from Apache and Navajo counties, local communities, park staff, concessioners, and visitors.
- Post signs if smoke would affect roads or designated visitor areas (such as interpretive sites or picnic areas).
- Limit the acreage and amount of fuel to be burned as noted in the prescribed fire plans.
- Select the timing and method of ignition to limit effects on air quality.

HEALTH AND SAFETY

- Consider temporarily closing parts of the national park to visitors as a safety precaution. This decision would be made by the superintendent or the superintendent's designee.
- When a burn is conducted, place warning signs, such as "Smoke on Road" along all maintained roads.
- When human life or property is not threatened, maximize the use of natural barriers for firelines even if this requires adjusting the burn area size.

CULTURAL RESOURCES

- Avoid historic structures and archeological sites whenever possible.
- Educate fire personnel about known locations and cultural resources in general.
- Minimize ground disturbance when possible.
- Do not install fire control lines through archeological sites or immediately adjacent to historic structures that are eligible for or listed in the National Register of Historic Places.
- Locate and isolate archeological sites that are vulnerable to fire or to human activities associated with burns.
- Remove heavy fuels that could cause long-duration heating on sites.
- If feasible, temporarily remove cultural materials.
- Brief fire crews about the need to protect any cultural resources encountered.
- Implement cultural resource protection measures under the supervision of a qualified cultural resource specialist.
- Protect historic structures from wildland fire by maintaining the existing defensible space around each, appropriate to the cultural landscape.

THE PREFERRED ALTERNATIVE AND ENVIRONMENTALLY PREFERABLE ALTERNATIVE

THE ALTERNATIVE PREFERRED BY THE NATIONAL PARK SERVICE

Under alternative A, the park would be out of compliance with NPS directives that require park units to have approved fire management plans in units with burnable vegetation. Alternative B would meet NPS requirements, and therefore is the NPS preferred alternative.

ENVIRONMENTALLY PREFERABLE ALTERNATIVE

According to the Council of Environmental Quality regulations in 43 *Code of Federal Regulations* section 46.30 that implement the National Environmental Policy Act, the environmentally preferable alternative “causes the least damage to the biological and physical environment and best protects, preserves, and enhances historical, cultural, and natural resources. The environmentally preferable alternative is identified upon consideration and weighing by the Responsible Official of long-term environmental impacts against short-term impacts in evaluating what is the best protection of these resources.”

Alternative B is the environmentally preferable alternative because it would provide for suppression of wildfires, address resource protection in the event of wildfires, and allow use of manual application of approved herbicide, manual and mechanical fuel reduction, and prescribed fire as management tools to achieve desired conditions.

Alternative A would not provide a framework for the use of fire as a management tool (that is, prescribed fire would not be considered under alternative A). Under alternative A, the park would be bound to respond to all fires with suppression tactics only. This alternative, therefore, would fail to provide additional fire management actions that could be used to protect health and safety and to benefit resources in the park.

ALTERNATIVES CONSIDERED BUT DISMISSED

The use of biological agents to reduce fuel loads in the park was a management option considered by the park staff to reduce fuel loads. Biological agents are available for treating tamarisk, a nonnative species that has infested the riparian areas in the park. The use of biological agents to control tamarisk and reduce fuel loads was found to be impractical because other fuel reduction methods, such as manual thinning and herbicides, would be much more efficient and quicker means for treating nonnative tamarisk.

Managing natural fire ignitions for the benefit of natural or cultural resources was also considered. This strategy was dismissed primarily because the native vegetation is not adapted to fire.

SUMMARY COMPARISON OF THE ALTERNATIVES

Table 1 provides a summary of the important features of the alternatives. Table 2 summarizes the environmental consequences that would result from each alternative. More detailed summaries of the factors responsible for the effects are presented in the “Conclusion” sections at the end of each impact topic analysis. The full analyses of the impacts are presented in Chapter 3: Affected Environment and Environmental Consequences.

The purpose of this proposed action was identified at the beginning of chapter 1, with objectives that could be used to determine if an alternative would successfully meet the purpose. Alternative A would not meet the objectives of protecting park staff, property, and resources from fire and reducing fuel loads because fuel reduction projects could not be considered. Alternative B would not result in any conflicts with any environmental laws or policies.

Table 1: Comparison of the Alternatives

Feature	Alternative A: No Action (Fire Suppression)	Alternative B: Multiple Fire Management Strategies
Prepare and implement a fire management plan.	A fire management plan would not be prepared. Fire management would continue under the NPS default policy of suppressing all fires.	A new fire management plan would be prepared and fire management activities would proceed according to that plan.
Suppress all wildland fires.	Hand crews engine crews, or aircraft, would be used to suppress wildland fire. A contain and confine suppression tactic could also be used in the northern wilderness area.	Suppression tactics would be the same as alternative A.
Implement manual and/or mechanical thinning to reduce fire fuel loads.	Manual and/or mechanical thinning of vegetation would not be available as a fire management tool.	Manual thinning of vegetation would be used to reduce fuel available to a wildfire. Manual thinning would also be used to maintain contributing landscape elements and values as needed. Mechanical thinning (for example, mowing) would be used along roads and in select developed areas to minimize fuel loads.
Use herbicides to treat unwanted nonnative vegetation and reduce fire fuel loads.	Herbicide use would not be available as a fire management tool.	Herbicides would be used in targeted applications to treat unwanted nonnative vegetation and reduce fire fuel loads. Mitigation measures would be employed to ensure application only to intended species.
Use prescribed fire to achieve resource management objectives.	Prescribed fire would not be available as a fire management tool to reduce fuel loads and as a resource management tool.	Prescribed fire, including pile and broadcast burning, would be used to reduce fuel loads and to burn woody plant debris.

Table 2: Impacts of the Alternatives

Impact Topic	Alternative A: No Action (Fire Suppression)	Alternative B: Multiple Fire Management Strategies
Cultural resources – cultural landscapes	There would be short- and long-term, negligible to moderate, adverse impacts on the cultural landscape and long-term, negligible to minor, adverse cumulative impacts.	There would be short- and long-term, negligible, adverse to long-term, minor to moderate, adverse, as well as long-term, beneficial impacts on cultural landscapes. The cumulative impacts would be long-term, minor, adverse, and long-term beneficial. The section 106 determination would be <i>no adverse effect</i> .
Cultural resources – historic structures	Alternative A would have permanent, negligible to minor, adverse long-term impacts on historic structures. Cumulative impacts would be permanent, moderate, and adverse. The effects of the no-action alternative would contribute slightly to the adverse cumulative impact.	Alternative B would have long-term beneficial and short-term, negligible to long-term, minor, adverse impacts on historic structures. Cumulative impacts would be permanent, minor, and adverse. The section 106 determination would be <i>no adverse effect</i> .
Cultural resources – archeological resources	Alternative A would have localized negligible to minor impacts on archeological resources. The negligible to minor adverse effects would neither contribute to nor detract from the permanent, negligible to minor, adverse cumulative impacts of other plans and projects.	Alternative B would have localized long-term beneficial impacts, and permanent, negligible to minor, adverse impacts on archeological resources, and would slightly contribute to the resulting permanent, negligible to minor, adverse cumulative impact of other plans and projects. The section 106 determination would be <i>no adverse effect</i> .
Vegetation	<p>Suppression tactics under alternative A would result in localized, adverse impacts that would be short- and long-term and range from negligible to minor, depending on the magnitude of the fire and suppression efforts.</p> <p>The local adverse impacts from wildland fire would be short-term for herbaceous species. Long term, adverse effects to woody species would be likely in the event of high-intensity fire.</p> <p>The cumulative effects of the other plans, projects, and policies combined with the effects of alternative A on vegetation would be parkwide, long-term, and beneficial.</p>	<p>The impacts from wildland fire and suppression tactics would be the same as those described for alternative A.</p> <p>Manual and mechanical thinning, and herbicide use, would result in short- and long-term beneficial effects on vegetation associated with reduced fuel loads and the control of nonnative species.</p> <p>Prescribed fire would have short-term, local negligible adverse impacts on plant populations as a result of trampling by field crews and short- and long-term beneficial effects on vegetation as fuel loads would be reduced.</p> <p>The cumulative effects of the other plans, projects, and policies combined with the effects of alternative B on vegetation would be parkwide, long-term, and beneficial.</p>

Table 2: Impacts of the Alternatives

Impact Topic	Alternative A: No Action (Fire Suppression)	Alternative B: Multiple Fire Management Strategies
Wildlife	<p>The effects of wildfire suppression tactics would be negligible to minor, local, and short-term.</p> <p>The effects of wildfire would be directly related to the size and duration of the fire with localized short-term impacts ranging from negligible to minor for mobile species and those outside breeding season. Up to minor adverse impacts would occur to immobile species unable to escape the fire or for ground-nesting birds with unhatched eggs or unfledged young.</p> <p>The cumulative effects would be parkwide, long-term, and beneficial, as the long-term beneficial effects of other management plans and projects would outweigh the negligible to minor adverse impacts of alternative A on wildlife.</p>	<p>The effects of wildfire suppression tactics would be the same as those described for alternative A.</p> <p>The effects of manual and mechanical thinning on wildlife would represent a short-term, local, and negligible to minor adverse effect.</p> <p>The use of prescribed fire to burn debris piles would have negligible, short-term local adverse effects on wildlife.</p> <p>The adverse effects to wildlife species from the direct effects of fire, as would occur if the wildland fire suppression tool were implemented, would be minor, short-term, and local.</p> <p>The cumulative effects of alternative B for wildlife would not differ from the cumulative impacts described for alternative A, namely long-term and beneficial.</p>
Air quality	<p>Fire suppression would have beneficial impacts on air quality because the release of particulate matter and visibility restrictions would be reduced. The use of fire trucks and aircraft would cause local negligible adverse short-term impacts to air quality associated with combustion engine emissions. Wildland fire would have localized to widespread, negligible to moderate (for a large event), adverse, short-term impacts on air quality in direct proportion to the intensity and extent of the fire.</p> <p>The beneficial impacts of suppression activities on air quality would have a relatively minor contribution to the localized to widespread, long-term, beneficial, cumulative effects on air quality under alternative A.</p>	<p>Fire suppression would have impacts on air quality similar to those described for alternative A, namely beneficial and short-term. Manual and mechanical thinning would have localized beneficial effects to air quality as a result of reduced particulates and less smoke with reduced fire fuels. The impacts of wildfire would be the same as alternative A.</p> <p>The adverse impacts of prescribed fire under alternative B would not exceed negligible to minor, local, short-term impacts to air quality.</p> <p>The beneficial impacts of suppression on air quality and negligible to minor adverse effects of other fuel reduction activities would have a relatively minor contribution to the localized to widespread, long-term beneficial cumulative effects of other plans and projects on air quality.</p>

Table 2: Impacts of the Alternatives

Impact Topic	Alternative A: No Action (Fire Suppression)	Alternative B: Multiple Fire Management Strategies
Wilderness	<p>Fire suppression would have local, short-term, minor to moderate adverse impacts on the untrammelled and undeveloped wilderness qualities. Suppression would result in long-term, minor, adverse impacts to the natural quality of wilderness. The use of mechanized fire suppression equipment would result in short-term, negligible to minor and adverse impacts to opportunities for solitude or primitive and unconfined type of recreation.</p> <p>Wildland fire would result in negligible impacts to the untrammelled, undeveloped, and natural qualities of wilderness. Wildland fire could result in short-and long-term adverse impacts to the natural quality of wilderness depending on the location and severity.</p> <p>The cumulative effects on park wilderness would be long-term beneficial</p>	<p>Fire suppression and fuel reduction activities would have short-term, minor to moderate adverse impacts on the untrammelled and undeveloped wilderness qualities.</p> <p>Suppression of wildfire would limit on a small-scale a natural process and result in long-term, minor, adverse impacts to the natural quality of wilderness. The use of mechanized tools would result in short-term, negligible to minor and adverse impacts to opportunities for solitude or primitive and unconfined type of recreation.</p> <p>Wildland fire would result in negligible impacts to the untrammelled, undeveloped, and natural qualities of wilderness. Wildland fire could result in short-and long-term adverse impacts to the natural quality of wilderness depending on the location and severity.</p> <p>Manual thinning of vegetation and the removal of nonnative vegetation would help maintain natural flora and fauna communities, reduce fuel load, and enhance the natural process of fire which would result in long-term benefits to the natural quality of wilderness and to opportunities for solitude or primitive and unconfined type of recreation.</p> <p>Alternative B cumulative effects on park wilderness long-term beneficial.</p>
Health and safety	<p>Alternative A would have localized, short-term, negligible to minor, adverse, and long-term beneficial effects on health and safety in the park. When the long-term beneficial effects of other past, on-going, and future plans, projects, and activities are combined with the effects of alternative A, the cumulative effects would be widespread long- term beneficial.</p>	<p>Alternative B would have localized, short-term, negligible to minor adverse, and long-term beneficial effects on health and safety. When the long-term beneficial effects of other past, on-going, and future plans, projects, and activities affecting health and safety are combined with the short-term negligible to minor adverse and long- term beneficial effects of alternative B, the cumulative effects would be widespread long- term beneficial.</p>
Visitor use and experience	<p>Alternative A would have local short-term negligible to minor adverse and long-and short-term beneficial effects. When the long-term beneficial effects of other past, on-going, and future plans, projects, and activities affecting visitor use and experience are combined with the short-term negligible to minor adverse and long- and short-term beneficial effects under alternative A, the cumulative effects would be parkwide long- term beneficial.</p>	<p>Alternative B would have local short-term negligible to minor adverse and long- term beneficial effects. When the long-term beneficial effects of other past, on-going, and future plans, projects, and activities affecting visitor use and experience are combined with the short-term negligible to minor adverse and long- term beneficial effects under alternative B, the cumulative effects would be parkwide long- term beneficial.</p>

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Chapter 3: Affected Environment and Environmental Consequences

METHODS FOR ANALYZING IMPACTS

Effects were evaluated for each retained impact topic in terms of type, context, duration, and intensity. Type describes whether impacts are beneficial or adverse, and direct or indirect:

- *Beneficial*: A positive change occurs in the condition or appearance of the resource or a change moves the resource toward a desired condition.
- *Adverse*: A change moves the resource away from a desired condition or detracts from its appearance or condition.
- *Direct*: An effect is caused by an action and occurs in the same time and place.
- *Indirect*: An effect is caused by an action, but is later in time or farther removed in distance, but is still reasonably foreseeable.

Context describes the area or location in which the impact will occur, such as site-specific, local, regional, or even broader. The methods description for each impact topic identifies the geographic area that was considered.

Duration describes the length of time an effect will occur, either short-term or long-term. These terms are defined in the “Methods” section for each impact topic.

Intensity describes the degree, level, or strength of an impact. For this analysis, intensity has been categorized as negligible, minor, moderate, and major. Intensity definitions are provided in the “Methods” section for each impact topic analyzed.

In addition to analyzing the fire management methods for each alternative, the effects of wildland fire were evaluated under the alternative A analyses for each impact topic. Because the effects of wildland fire would be no different under alternative B, the analysis is not repeated. The cultural resource impact topics include an evaluation of wildland fire under alternative B because there are subtle differences between the alternatives for those topics.

CUMULATIVE IMPACTS

For each impact topic, the alternatives were evaluated for their contribution to cumulative impacts, consistent with the Council on Environmental Quality (1978) regulations for implementing the National Environmental Policy Act. Cumulative effects are “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions.”

The cumulative impact scenario identifies the other past, ongoing, or reasonably foreseeable future actions in the park area that, with this action, could contribute to cumulative impacts. Cumulative impacts were determined by combining the impacts of each alternative with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other ongoing or reasonably foreseeable future projects at Petrified Forest National Park and, if applicable, the surrounding region. These were described earlier in this document under the heading, “Relationship of the Proposed Action to Other Planning Efforts.” In addition, the cumulative impact scenario includes the treatment of nonnative plants and the emission of air pollutants from regional power plants and urban areas that may affect air quality.

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

In this environmental assessment/assessment of effect, impacts to cultural resources are described in terms of type, context, duration, and intensity, which is consistent with the regulations of the Council on Environmental Quality (1978) that implement the National Environmental Policy Act. These impact analyses are also intended, however, to comply with the requirements of section 106 of the National Historic Preservation Act. In accordance with the Advisory Council on Historic Preservation's regulations for implementing section 106 (36 *Code of Federal Regulations* part 800, Protection of Historic Properties), impacts on cultural resources were identified and evaluated by (1) determining the area of potential effects; (2) identifying cultural resources present in the area of potential effects that are either listed in or eligible to be listed in the National Register of Historic Places; (3) applying the criteria of adverse effect to these cultural resources ; and (4) considering ways to avoid, minimize, or mitigate adverse effects.

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

The Council on Environmental Quality regulations and *Director's Order #12 and Handbook: Conservation Planning, Environmental Impact Analysis, and Decision Making* (NPS 2001) also call for a discussion of the appropriateness of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact, such as reducing the intensity of an impact from major to moderate or minor. Any resultant reduction in intensity of impact due to mitigation, however, is an estimate of the effectiveness of mitigation under the National Environmental Policy Act only. It does not suggest that the level of effect as defined by section 106 is similarly reduced. Although adverse effects under section 106 may be mitigated, the effect remains adverse.

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

CULTURAL LANDSCAPES

AFFECTED ENVIRONMENT

A cultural landscape is a reflection of human adaptation and use of natural resources and is often expressed in the way land is organized and divided, patterns of settlement, land use, systems of circulation, and the types of structures that are built. The character of a cultural landscape is defined both by physical materials such as roads, buildings, walls, and vegetation, and by use reflecting cultural values and traditions. The park includes several recognized cultural landscapes, including Rainbow Forest and Crystal Forest. The Painted Desert Inn and Headquarters Complex both contain potential for national register listing as cultural landscapes; however, they have not been formally evaluated.

The Rainbow Forest cultural landscape is a planned landscape designed by the National Park Service and constructed by the Civilian Conservation Corps in the 1930s. It was built to include a museum, concessions, housing, trails, picnic areas, bridge, and associated roads and parking areas. Upon its completion, it served as the visitor contact area and headquarters for the park. The landscape retains many of its character-defining features, such as the use of rustic design, a general harmonization of the built and natural environments, original sight lines between features, and overall arrangement and circulation patterns. Although its associated buildings have been deemed ineligible for individual national register consideration because of a loss of architectural integrity, Rainbow Forest has nevertheless been determined eligible for the national register as a designed historic landscape.

The Crystal Forest cultural landscape is considered to be an excellent example of early NPS design, a time in which design guidelines were being implemented to promote construction compatible with the surrounding natural features, resources, and views. As such, the design of Crystal Forest's parking areas and walking trails was purposely sparse and subdued. Today, contributing features of the historic designed landscape include parking layout and circulation, curbing and retaining walls, sandstone culverts, and views and vistas.

METHODS

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

In order for a cultural landscape to be listed in the national register, it must meet one or more of the following criteria of significance (Secretary of the Interior 1995b):

- A. Associated with events that have made a significant contribution to the broad patterns of our history;
- B. Associated with the lives of persons significant in our past;
- C. Embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic value, or represent a significant and distinguishable entity whose components may lack individual distinction; and
- D. Have yielded, or may be likely to yield, information important in prehistory or history.

The landscape must also have integrity of those patterns and features - spatial organization and land forms; topography; vegetation; circulation networks; water features; and structures/buildings, site furnishings or objects - necessary to convey its significance (Secretary of Interior 1995b).

For purposes of analyzing potential impacts to cultural landscapes, the thresholds of change for the intensity of an impact are defined as follows:

- *Negligible*: Impact 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 would be detectable but would not affect a character-defining pattern or feature of a National Register of Historic Places -eligible or -listed cultural landscape. For purposes of section 106, the determination of effect would be *no adverse effect*. **Beneficial**: preservation of character-defining patterns and features occurs in accordance with the Secretary of Interior's Standards (1995b). For purposes of section 106, the determination of effect would be *no adverse effect*.
- *Moderate: Adverse*: impact would alter a character-defining pattern or feature of the cultural landscape but would not diminish the integrity of the landscape to the extent that its national register eligibility is jeopardized. For purposes of section 106, the determination of effect would be *no adverse effect*. **Beneficial**: rehabilitation of a landscape or its patterns and features would occur in accordance with the Secretary of Interior's Standards (1995b). For purposes of section 106, the determination of effect would be *no adverse effect*.
- *Major: Adverse*: impact would alter a character-defining pattern or feature of the cultural landscape 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**: restoration of a landscape or its patterns and features would occur in accordance with the Secretary of Interior's Standards (1995b). For purposes of section 106, the determination of effect would be *no adverse effect*.
- *Short-term* impacts would last less than five years.
- *Long-term* impacts would last more than five years.
- *Permanent* impacts would last indefinitely.

REGULATIONS AND POLICIES

The treatment of a cultural landscape will preserve significant physical attributes, biotic systems, and uses when those uses contribute to historical significance. Treatment decisions will be based on a cultural landscape's historical significance over time, existing conditions, and use. Treatment decisions will consider both the natural and built characteristics and features of a landscape, the dynamics inherent in natural processes and continued use, and the concerns of traditionally associated peoples.

The treatment implemented will be based on sound preservation practices to enable long-term preservation of a resource's historic features, qualities, and materials. There are three types of treatment for cultural landscapes: preservation, rehabilitation, and restoration.

Cultural landscapes are listed in the national register when their significant cultural values have been documented and evaluated within appropriate thematic contexts and physical investigation determines that they retain integrity. Cultural landscapes are classified in the national register as sites or districts or may be included as contributing elements of larger districts. Current regulations and policies associated with cultural landscapes include the following:

- National Historic Preservation Act;

- Archeological and Historic Preservation Act;
- Executive Order 11593 - Protection and Enhancement of the Cultural Environment;
- Archeological Resources Protection Act;
- *Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation, as Amended and Annotated* (Secretary of the Interior 1983);
- Programmatic memorandum of agreement (National Park Service, Advisory Council on Historic Preservation, and National Council of State Historic Preservation Officers 2008);
- *Management Policies 2006* (NPS 2006); and
- *Director's Order #28: Cultural Resources Management* (NPS 1998).

IMPACTS OF ALTERNATIVE A, NO ACTION (FIRE SUPPRESSION)

Analysis

Impacts from wildfires would depend on the intensity and frequency of fire events and the success of fire suppression efforts in managing them. Contributing elements to the respective cultural landscapes could remain unchanged, could be temporarily lost, or could be irreparably damaged. For instance, wildfires could occur in an area distant from cultural landscapes, could cause permanent loss to historic buildings, or could lead to temporary loss of vegetation. As such, wildfires could result in varying degrees of diminished character of the cultural landscape. Hence, effects from wildfire on the cultural landscape would range from short-term, negligible to long-term, moderate, and adverse.

Wildfire suppression tactics using natural barriers to contain a fire would be conducted only in the northern wilderness area in the park. Because this area does not contain recognized or potential cultural landscapes, there would be no impacts resulting from this element of alternative B.

Hand crew suppression would be used to extinguish flames or to create fire breaks to prevent further spread of a wildfire. This treatment would not affect many of the characteristics of the landscapes at Rainbow Forest or Crystal Forest, such as the buildings or spatial organization. Effects on views and vistas resulting from fire breaks could be quickly repaired. However, vegetation contributing to the planned landscapes could be damaged by hand-held tools to a certain extent. Nevertheless, it is expected the vegetation would recover within a few years. Therefore, hand crew fire management activities would result in short-term, negligible to minor, adverse impacts to the cultural landscape.

Fire engines would be restricted to existing roads. Therefore, any disturbance to the elements contributing to the cultural landscapes at Rainbow Forest, Crystal Forest, or other potentially eligible cultural landscapes would be limited to hoses and foot traffic extending outward from engines parked on the road. Otherwise, no elements of the cultural landscapes would be appreciably affected by the use of engine suppression tools. Impacts to the cultural landscape would be localized, short-term, negligible to minor, and adverse.

Water dropped by aircraft to suppress wildfire, whether by helicopter or fixed-wing aircraft, would not result in any appreciable effects to elements that contribute to the cultural landscape, for example, changes to buildings, circulation patterns, or vegetation. Resource protection measures included in this alternative would stipulate that water or retardant would not be dropped directly onto historic structures from aircraft. Impacts would be localized, short-term, negligible, and adverse.

Cumulative Impacts

The park completed a cultural landscape treatment plan for the Painted Desert Inn in 2003 (NPS 2003), which included treatment recommendations for future planning. Additionally, the park successfully listed the Rainbow Forest landscape on the National Register of Historic Places in 2001. This plan and action have each resulted in long-term, beneficial impacts on the cultural landscape stemming from the recognition and subsequent protection of the Rainbow Forest landscape, in addition to the implementation of appropriate treatments to rehabilitate the Painted Desert Inn.

The park completed a revised general management plan that guides its long-term actions. That plan's preferred alternative includes a range of actions that would result in long-term, minor, adverse impacts and long-term, beneficial impacts to the park's cultural landscapes (NPS 2004a).

Past and present high levels of visitor use have resulted in a noticeable loss of petrified wood (a component of the visual quality of the landscape), and past projects have involved various incompatible additions and modifications. These have each resulted in a long-term, minor, adverse impact to the park's cultural landscapes. Continued high use of the area would result in further loss of wood and degradation of visual quality, resulting in a long-term, minor, adverse impact.

Implementation of alternative A would have localized, short- and long-term, negligible to moderate, adverse impacts on the park's cultural landscape. The adverse impacts of this alternative, in combination with the long-term, minor, adverse impacts and long-term beneficial impacts of other past, present, and reasonably foreseeable future actions, would result in long-term, negligible to minor, adverse cumulative impacts. The adverse effects of the no action alternative would be a very small component of the adverse cumulative impacts.

Conclusion

Use of hand crews to suppress wildfire would not appreciably affect elements of the cultural landscape such as buildings or spatial organization, while impacts to views and vistas, as well as to vegetation, would be short-term, negligible to minor, and adverse.

Because engine crews would occur on existing roads, only hoses and foot traffic have the potential to adversely impact the cultural landscape, and only to a short-term, negligible to minor extent.

Resource protection measures would ensure that aircraft do not drop water or retardant directly onto historic structures; therefore impacts would be negligible.

Wildfire suppression tactics using natural barriers to contain a fire would be conducted only in the northern wilderness area in the park that does not contain recognized or potential cultural landscapes; therefore no impacts would result from this suppression tactic.

Because contributing elements to the cultural landscapes could remain unchanged, could be temporarily lost, or could be irreparably damaged by a wildfire, resulting impacts from this type of event could range from negligible to long-term, moderate, and adverse.

The cumulative effects of the other plans, projects, and policies combined with the effects of alternative A would result in long-term, negligible to minor, adverse cumulative impacts.

IMPACTS OF ALTERNATIVE B, MULTIPLE FIRE MANAGEMENT STRATEGIES

Analysis

Impacts associated with wildfire suppression tactics including the use of hand crews, engine crews, and aircraft would be the same as described under alternative A and would result in short-term, negligible to minor, adverse impacts on the cultural landscapes.

Impacts associated with wildfire would be the similar to those described under alternative A. The size of wildfires that would need to be suppressed in the cultural landscapes would likely be smaller, potentially requiring smaller and fewer firelines and less ground disturbance by personnel and equipment. This could result in reduced impacts on cultural landscapes from reduced visible scars on the landscape, changes to viewsheds, and other effects as described under alternative A. The adverse effects would range from short-term and negligible to long-term and minor.

The use of herbicides would be conducted in a manner that would avoid any vegetative elements contributing to the park's inventoried cultural landscapes. Reduction of fuel loads via the use of herbicides would decrease the likelihood or intensity of fires near historic structures that contribute to the park's cultural landscapes. There would be a long-term, beneficial impact.

An array of tools and equipment would be used to thin existing vegetation to reduce fire fuel loads. Any vegetation contributing to recognized or potential cultural landscapes in the park would be avoided by field crews. By reducing fuel loads in the park, wildland fires would be less likely to affect the elements that contribute to the cultural landscape, such as buildings and vegetation. Therefore, manual and mechanical thinning would result in long-term, beneficial impacts to the cultural landscape.

As with manual and mechanical thinning tools, prescribed fire would reduce fuel loading in the park, thereby decreasing the likelihood or severity of wildfires and having a long-term, beneficial impact.

Cumulative Impacts

The cumulative impacts on cultural landscapes would be the same as described in alternative A and would be long-term, minor, adverse impacts, and long-term beneficial impacts. Implementation of alternative B would have short- and long-term, negligible, adverse to long-term, minor to moderate, adverse impacts, as well as long-term, beneficial impacts on the park's cultural landscape. The beneficial and adverse impacts of this alternative, in combination with the long-term, minor, adverse impacts, and long-term, beneficial impacts of other past, present, and reasonably foreseeable future actions, would result in long-term, negligible to minor, adverse cumulative impacts. The beneficial and adverse effects of alternative B would be a small component of the adverse cumulative impacts.

Conclusion

Impacts from wildfire suppression tactics including hand crews, engine crews, and aircraft would be the same as described in alternative A and would be short-term, negligible to minor, and adverse.

The impacts from wildfire would be similar to those discussed in alternative A; however, they would be somewhat lessened because of reductions in fuel loads, resulting in adverse impacts ranging from short-term, negligible to long-term, minor.

Herbicide use, manual and mechanical thinning, and prescribed fire would reduce fuel loading, thereby lowering the likelihood of wildfires, a long-term, beneficial impact to the cultural landscape.

The cumulative effects of the other plans, projects, and policies combined with the effects of alternative B would result in long-term, negligible to minor, adverse cumulative impacts.

Section 106 Summary

After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 *Code of Federal Regulations* section 800.5, Assessment of Adverse Effects), the National Park Service concludes that implementation of the preferred alternative would have no adverse effect on the cultural landscape of Petrified Forest National Park.

HISTORIC STRUCTURES

AFFECTED ENVIRONMENT

Notable historic structures found in the park include the Agate Bridge Comfort Station, the Painted Desert Inn, and the Painted Desert Headquarters Complex. The Agate Bridge Comfort Station was constructed in 1935 and is a one-story, pueblo-style building. The structure has been determined not eligible for national register listing; however, the National Park Service has made it a priority to preserve and maintain this structure.

The Painted Desert Inn is formally designated as a National Historic Landmark because of its historic and aesthetic qualities. The inn is located on the rim of the Painted Desert and has regional significance due to its association with New Deal work relief programs. It was built in 1924 and then rebuilt in the late 1930s by Civilian Conservation Corps workers. The two-story inn was constructed in a Pueblo Revival style and is recessed into a hillside. Notable interior features include a painted glass skylight and murals. The inn is currently used by park visitors and houses a bookstore and museum.

The Painted Desert Headquarters Complex is associated with the NPS Mission 66 initiative, which was a major nationwide program undertaken by the National Park Service during the 1950s and 1960s to improve park infrastructures. The complex was designed to house public spaces, workspaces, concessions, housing, a school, a post office, and a library. It was designed by Richard Neutra, whose designs are recognized as being representative of modern architecture. The complex has been determined potentially eligible for national register listing, and is also considered significant by the Arizona State Historic Preservation Office.

METHODS

In order for a structure or building to be listed in the National Register of Historic Places, it must meet one or more of the following criteria of significance (Secretary of the Interior 1997):

- A. Associated with events that have made a significant contribution to the broad patterns of our history;
- B. Associated with the lives of persons significant in our past;
- C. Embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic value, or represent a significant and distinguishable entity whose components may lack individual distinction; and
- D. Have yielded, or may be likely to yield, information important in prehistory or history.

In addition, the structure or building must possess integrity of location, design, setting, materials, workmanship, feeling, and association.

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 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 would be detectable but would not affect the character-defining features of a National Register of Historic Places-eligible or -listed structure or building. For purposes of section 106, the determination of effect would be *no adverse effect*. **Beneficial**: stabilization or preservation of character-defining features would occur in accordance with

the Secretary of the Interior's Standards (1995a). For purposes of section 106, the determination of effect would be *no adverse effect*.

- **Moderate: Adverse:** impact would alter a character-defining feature of the structure or building but would not diminish the integrity of the resource to the extent that its national register eligibility is jeopardized. For purposes of section 106, the determination of effect would be *no adverse effect*. **Beneficial:** rehabilitation of a structure or building would occur in accordance with the Secretary of Interior's Standards (1995a). For purposes of section 106, the determination of effect would be *no adverse effect*.
- **Major: Adverse:** impact would alter a character-defining feature 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:** restoration of a structure or building would occur in accordance with the Secretary of Interior's Standards (1995a).
- *Short-term* impacts would last less than five years.
- *Long-term* impacts would last more than five years.
- *Permanent* impacts would last indefinitely.

REGULATIONS AND POLICIES

Historic properties are inventoried and their significance and integrity are evaluated under national register criteria. The qualities that contribute to the eligibility for listing or listing of historic properties in the National Register of Historic Places are protected in accordance with the Secretary of the Interior's Standards, as amended and annotated (1983), unless it is determined through a formal process that disturbance or natural deterioration is unavoidable. Current laws and policies associated with historic structures include the following:

- National Historic Preservation Act;
- Archeological and Historic Preservation Act;
- Executive Order 11593 - Protection and Enhancement of the Cultural Environment;
- Archeological Resources Protection Act;
- *Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation, as Amended and Annotated* (1983);
- Programmatic memorandum of agreement (National Park Service, Advisory Council on Historic Preservation, and National Council of State Historic Preservation Officers 2008);
- *Management Policies 2006* (NPS 2006), and
- *Director's Order #28: Cultural Resources Management* (NPS 1998).

IMPACTS OF ALTERNATIVE A, NO ACTION (FIRE SUPPRESSION)

Analysis

Historic structures (and modern structures) would be the focus of fire protection during wildfires. Furthermore, the historic structures in the national park are in landscape settings that would not be susceptible to fire damage. Impacts would be influenced by fire location, intensity, and frequency. Therefore, wildfires could result in varying degrees of diminished character of the park's historic

structures. Adverse impacts on historic structures from wildfire would range from short-term, negligible to permanent, minor, and adverse.

Wildfire suppression strategies using natural barriers and breaks would be conducted only in the northern wilderness area in the park. Because this area does not contain historic structures, there would be no impacts resulting from this element of alternative A.

Hand-held firefighting tools would be used to extinguish flames or to create fire breaks to prevent further spread of the fire. This treatment tool has no capacity to adversely impact historic structures in the park. Therefore, hand crew suppression would result in no impacts to historic structures.

Because engine crews would remain on existing roads, engine suppression responses contain no elements that would affect historic structures. No impacts to historic structures would be negligible.

Resource protection measures included in this alternative would stipulate that water or retardant would not be dropped from aircraft directly onto historic structures from aircraft. Therefore, impacts would be negligible.

Cumulative Impacts

The cultural landscape treatment plan for the Painted Desert Inn (NPS 2003) contained treatment recommendations for rehabilitation of the historic inn structure, a long-term beneficial impact. The park's general management plan included plans for adaptive use of historic structures requiring modifications that would result in some loss of character-defining features, a permanent, moderate to major, adverse impact. Past modifications of historic structures in the park have resulted in diminished integrity of some character-defining features, and repair and maintenance projects have sometimes been insufficient to keep pace with deterioration (NPS 2004a), leading to additional permanent, moderate to major, adverse impacts.

Overall, these past, current, and future plans and actions would result in impacts to the park's historic structures ranging from localized long-term beneficial to permanent, moderate to major, and adverse.

Implementation of alternative A would have negligible to permanent, minor, adverse impacts on the park's historic structures. The impacts of this alternative, in combination with the long-term, beneficial and permanent, moderate to major, adverse impacts of other past, present, and reasonably foreseeable future actions, would result in a permanent, moderate, adverse cumulative impact. The effects of the no action alternative would slightly contribute to the adverse cumulative impact.

Conclusion

Hand-held firefighting tools and engine crews would not come into contact with historic structures. Suppression tactics involving dropping water or retardant from aircraft would avoid striking historic structures. As such, impacts from these three fire suppression tools would be negligible.

Historic structures would be the focus of fire protection during wildland fires and are in landscape settings that are not particularly susceptible to fire damage. Impacts would be influenced by fire location, intensity, and frequency, and adverse impacts on historic structures would range from short-term, negligible to permanent, minor, and adverse.

When the impacts of this alternative are combined with other plans, actions, and policies, the resulting cumulative impact would be permanent, moderate, and adverse.

IMPACTS OF ALTERNATIVE B, MULTIPLE FIRE MANAGEMENT STRATEGIES

Analysis

Impacts associated with wildfire suppression tactics including the use of hand crews, engine crews, and aircraft would be the same as described under alternative A and would result in negligible impacts to historic structures.

Impacts associated with wildfire would be similar to those described under alternative A. The adverse effects on historic structures from managing wildfires under this alternative would be less than the effects under alternative A because of fuel reductions. Wildfires would be of smaller size, would result in less contact with historic structures, and would produce less smoke damage to historic structures before fires are extinguished. Adverse impacts would range from short-term and negligible to long-term and minor.

The use of herbicides has no capacity to adversely affect historic structures in the park. Reductions of fuel loads via the use of herbicides would decrease the likelihood or intensity of fires near historic structures. As such, there would be a long-term, beneficial impact.

Hand-held tools would be used to thin existing vegetation to reduce fuel loads. These tools would not come into direct contact with historic structures; therefore, there would be no adverse impacts. By reducing fuel loads in the park, wildfire events would be less likely to affect historic structures. Thus, manual thinning would result in long-term, beneficial impacts to historic structures.

Any prescribed fire treatments occurring under alternative B would account for the presence of historic structures, thereby avoiding any adverse impacts. As with manual thinning tools discussed above, prescribed fire could be used to reduce fuel loads in the park, which would decrease the likelihood or severity of wildfire events. This would result in a long-term, beneficial impact to historic structures.

Cumulative Impacts

The cumulative impacts on historic structures would be the same as described in alternative A and would be long-term beneficial and permanent, moderate to major, and adverse. Implementation of alternative B would have long-term beneficial and short-term, negligible to long-term, minor, and adverse impacts on the park's historic structures. The impacts of this alternative, in combination with the impacts of other past, present, and reasonably foreseeable future actions, would result in permanent, minor, adverse cumulative impacts. The beneficial and adverse effects of the preferred alternative would slightly reduce the adverse cumulative impact.

Conclusion

Impacts from wildfire suppression tactics including hand crews, engine crews, and aircraft would be the same as described under alternative A and would result in negligible impacts to historic structures.

Impacts associated with wildfire would be similar to those described under alternative A, but the intensity would be lower. The range of adverse effects on historic resources from wildland fires would be lessened in comparison to alternative A because of the reduced fuel loads. Therefore, adverse impacts from wildland fires would range from short-term and negligible to long-term and minor.

Herbicide application, manual and mechanical thinning, and prescribed fires would not adversely affect historic structures, but the resulting fuel load reduction would beneficially impact historic structures to a minor degree by reducing fire probability or intensity.

Suppression tactics containing wildfire using natural barriers and breaks would result in no impacts because this would not be used in areas of the park that contain historic structures.

When the impacts from this alternative are combined with other actions, plans, and policies, the resulting cumulative impacts would be permanent, minor, and adverse.

Section 106 Summary

After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 *Code of Federal Regulations* section 800.5, Assessment of Adverse Effects), the National Park Service concludes that implementation of the preferred alternative would have *no adverse effect* on the historic structures of Petrified Forest National Park.

ARCHEOLOGICAL RESOURCES

AFFECTED ENVIRONMENT

Prehistoric resources are extensive in Petrified Forest National Park. Over 900 recorded sites representing Paleoindian, Archaic, Basketmaker, Puebloan, and Navajo cultures exist in the park. Pit houses, campsites, multi-room pueblos, projectile points, ceramics, and other resources comprise the park's archeological record. Pictographs are rare, but large concentrations of petroglyphs are etched into the desert varnish that forms on the sandstone that is widespread in the park. There is evidence that the park has numerous unrecorded sites within its boundaries. Twelve of the 600 recorded sites have been excavated, while the others form a regionally significant source of future scientific information (NPS 2004a).

Historic archeological resources are also located throughout the park. The central part of the park contains widespread evidence of historic use and travel. The 35th parallel route, followed by Whipple and Beale, crosses the park near the Painted Desert headquarters, as does the Prescott and Santa Fe mail route. Later, the Santa Fe Railroad and Route 66 crossed the park. Other areas of the park hold sites that represent the expanse of the park's history, from the 19th century through the 1950s (NPS 2004a).

The 35th parallel route / Beale Wagon Road was one of the three major immigrant routes to California prior to the Civil War that brought large numbers of people through northern Arizona. It was surveyed and constructed between 1857 and 1859 by Lieutenant Edward F. Beale, who commanded the Army's experimental camel corps in Arizona. The Beale Road was a precursor to the 1882 transcontinental Atlantic and Pacific Railroad (Santa Fe), which later became the Star Stage line. Until the railroad arrived, the Beale Road was one of the most important roads in Arizona. It continued to be used until the 1940s. Traces of the route are still visible in the park and are listed on the National Register of Historic Places (NPS 2004a).

Route 66 once extended for 2,000 miles from Chicago, Illinois to Santa Monica, California. It played a major role in the westward migration of Americans fleeing the Dust Bowl, in the boom in tourist travel following World War II, and in other aspects of 20th century history. A portion of the abandoned Route 66 roadbed and some associated structures (telephone poles) are still visible cutting across the northern section of the park. There is the potential for subsurface historical archeological resources along the road corridor. For instance, two former roadside attraction/curio shops associated with Route 66 were located in the park and now have archaeological components. The roadbed itself was evaluated for inclusion on the National Register of Historic Places in 1995 and deemed ineligible (NPS 2004a).

METHODS

Certain important research questions about human history can only be answered by the actual, physical material of cultural resources. Archeological resources have the potential to answer, in whole or in part, such research questions.

In order for an archeological resource to be eligible for the National Register of Historic Places it must meet one or more of the following criteria of significance (Secretary of the Interior 1997):

- A. Associated with events that have made a significant contribution to the broad patterns of our history;
- B. Associated with the lives of persons significant in our past;

- C. Embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic value, or represent a significant and distinguishable entity whose components may lack individual distinction; and
- D. Have yielded, or may be likely to yield, information important in prehistory or history. In addition, the archeological resource must possess integrity of location, design, setting, materials, workmanship, feeling, association.

For purposes of analyzing impacts to archeological resources either listed in or eligible to be listed in the national register, the thresholds of change for intensity of an impact are defined below:

- *Negligible*: Impact is at the lowest levels of detection - barely measurable with no perceptible consequences, either adverse or beneficial, to archeological resources. For purposes of section 106, the determination of effect would be *no adverse effect*.
- *Minor: Adverse*: disturbance of a site is detectable but results in little, if any, loss of significance or integrity and the national register eligibility of the site is unaffected. For purposes of section 106, the determination of effect would be *no adverse effect*. **Beneficial**: maintenance/preservation of a site occurs. For purposes of section 106, the determination of effect would be *no adverse effect*.
- *Moderate: Adverse*: disturbance of a site does not diminish the significance or integrity of the site to the extent that its national register eligibility is jeopardized. For purposes of section 106, the determination of effect would be *no adverse effect*. **Beneficial**: stabilization of the site occurs. For purposes of section 106, the determination of effect would be *no adverse effect*.
- *Major: Adverse*: disturbance of a site diminishes the significance and integrity of the site 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**: active intervention to preserve the site occurs. For purposes of section 106, the determination of effect would be *no adverse effect*.
- *Short-term* impacts would last less than five years.
- *Long-term* impacts would last more than five years.
- *Permanent* impacts would last indefinitely.

REGULATIONS AND POLICIES

Under the laws and policies listed below, archeological sites are identified and inventoried, their significance is determined and documented, and they are protected in an undisturbed condition unless it is determined through formal processes that disturbance or natural deterioration is unavoidable. In those cases where disturbance or deterioration is unavoidable, the site is professionally documented and salvaged. Current regulations and policies associated with archeological resources include the following:

- National Historic Preservation Act;
- Archeological and Historic Preservation Act;
- Executive Order 11593 - Protection and Enhancement of the Cultural Environment;
- Archeological Resources Protection Act;
- Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation;
- Programmatic memorandum of agreement (National Park Service, Advisory Council on Historic Preservation, and the National Council of State Historic Preservation Officers 2008);

- *Management Policies 2006* (NPS 2006); and
- *Director's Order #28: Cultural Resources Management* (NPS 1998).

IMPACTS OF ALTERNATIVE A, NO ACTION (FIRE SUPPRESSION)

Analysis

Fires can damage artifacts by destroying or degrading cultural material, rendering identification and documentation more difficult. The amount of damage depends on the severity and duration of the fire, as well as whether artifacts are on the surface of the ground or buried. Fast-moving fires typically burn through an area at a low heat with minimal damage to buried resources, while some damage would likely occur to surface resources. Slow fires combined with abundant accumulated fuel tend to burn at higher temperatures and can damage both surface and subsurface resources.

Fire behavior in the park aligns closely with the former scenario, i.e., fires are fast-moving because the park is generally arid with sparse vegetation. A fire with short residence time would result in a very limited heat pulse below the ground surface. Much of the vegetative root mass would be unaffected, thereby maintaining soil matrix and archeological resources intact. Some surface artifacts would potentially be adversely affected by smudging, crazing, and cracking. Effects of the fire would mostly involve the production of black or light brown carbonaceous residues, which would not impact the scientific value of the objects (Buenger 2003). Therefore, the effects of a wildfire on archeological resources would be localized, permanent, negligible to minor, and adverse.

Suppressing wildfire in the northern wilderness area by containing it using natural barriers and breaks would have the same impacts on archeological resources as wildland fire. Effects would be localized, permanent, negligible, to minor, and adverse.

Under alternative A, use of hand-held firefighting tools would be used to extinguish flames or to create fire breaks to prevent further spread of the fire. Resource protection measures would be specifically designed to limit impacts to the park's archeological resources through avoidance of areas known to contain archeological sites to the greatest extent possible. Therefore, hand crew fire management activities would result in localized, negligible to permanent, minor, adverse, impacts to archeological resources.

Fire engines would remain on existing roads and water would be sprayed from hoses in a manner that does not substantially disturb the soil. Therefore, any ground disturbance from use of engine suppression tools would be limited to hoses and foot traffic extending outward from engines parked on the road. Impacts to archeological resources would be negligible. Use of aircraft during suppression activities could result in ground disturbance from water being dropped to the extent that soil strata are mixed or archeological resources are exposed. Such ground disturbance would vary according to several factors, some of which include vegetative ground cover, topographic slope, direction and angle of water impact, and height of drop. In general, the areas in the park that could support a fire would likely have sufficient ground cover and root mass to resist substantial ground disturbance. In addition, water spray would be broad to cover a large area of flame, reducing the impact energy of a water stream. Therefore, any ground disturbance associated with the use of aircraft during suppression activities would result in localized, permanent, negligible to minor, adverse effects.

Cumulative Impacts

The park's archeological resources are subject to a variety of disturbances, including erosion and other natural processes and forces that can uproot vegetation and dislodge adjacent sites; vegetation

with deep roots that can disturb buried sites; ground-disturbing construction and rehabilitation activities; inadvertent visitor use impacts; and artifact looting. These factors contribute to parkwide, permanent, minor, adverse impacts on archeological resources. The park's general management plan (NPS 2004a) also included actions that would result in ground disturbance in several areas of the park; however none were anticipated to result in more than permanent, minor, adverse effects. As such, cumulative effects to archeological resources would be parkwide, permanent, negligible to minor, and adverse.

Implementation of alternative A would have localized, permanent, negligible to minor, adverse impacts on the park's archeological resources. The impacts of this alternative, in combination with the parkwide, negligible to minor, adverse impacts of other past, present, and reasonably foreseeable future actions, would result in a parkwide, permanent, negligible to minor, adverse cumulative impact. The negligible to minor effects of the no action alternative would slightly contribute to the adverse cumulative impacts.

Conclusion

The impacts on archeological resources from wildfire or from suppressing wildfire in the northern wilderness area by using natural barriers and breaks to confine the fire would be localized, permanent, negligible to minor, and adverse, as short residence time and limited heat pulse would prevent more substantial effects.

Although resource protection measures would limit impacts, creation of fire breaks by hand crews could result in localized, negligible to minor adverse effects.

Ground disturbance from engine crews would be negligible, while effects from water or retardant dropped from aircrafts would result in localized, negligible to minor, adverse impacts because ground cover and root mass would prevent substantial ground disturbance.

This alternative, in combination with other actions, plans, and policies, would result in parkwide, permanent, negligible to minor, adverse cumulative impact.

IMPACTS OF ALTERNATIVE B, MULTIPLE FIRE MANAGEMENT STRATEGIES

Analysis

Impacts associated with wildfire suppression tactics including the use of hand crews, engine crews, and aircraft would be the same as discussed in alternative A and would be localized, permanent, negligible to minor, and adverse.

Impacts associated with the use of engine crews would be negligible and would be the same as those discussed in alternative A. Wildfire in grasslands can be characterized by short residence time, resulting in very limited heat pulse below the ground surface. Much of the grass root mass is unaffected, maintaining soil matrix and archeological resources intact. Some surface artifacts would be adversely affected by smudging, crazing, and cracking. Therefore, the effects of a wildfire on archeological resources would be localized, permanent, negligible to minor, and adverse.

Treating vegetation in the park with herbicides could potentially expose parts of important prehistoric and historic sites, making them more vulnerable to vandalism and unauthorized collecting. However, treatments would be carefully selected in consultation with the park's cultural resources staff so they would not inadvertently expose or disturb known artifacts and features. Use of best management practices would help protect sites so that removal of plants on archeological sites that are vulnerable to collecting or recreational uses would have localized, long-term, negligible

to minor, adverse impacts on individual sites, depending on the location, site visibility following treatment, and site vulnerability.

Under alternative B, hand-held tools such as chainsaws would be used to thin existing vegetation to reduce fuel loads. Any ground disturbance associated with thinning would be surficial and unlikely to disturb archeological resources. Impacts would be negligible. Use of wheeled or tracked vehicles for mechanical thinning could inadvertently damage sites. The use of mechanical tools to reduce fuel loads would be conducted along paved roads in the park, which have been subject to prior ground disturbance. Nevertheless, park staff would plan routes in advance to avoid any known sites. With resource identification and site avoidance, impacts from use of wheeled or tracked vehicles would be negligible.

The use of both manual and mechanical thinning to reduce fuel loading in the park would likely reduce the frequency, duration, and intensity of wildfires. This would result in localized, long-term, beneficial impacts to archeological resources.

Under alternative B, prescribed fire would be used as a fuel reduction tool. Fires in the arid, sparsely vegetated ecosystems in the park can be characterized by short residence time, resulting in a very limited heat pulse below the ground surface. As described for wildland fires in alternative A, some surface artifacts would be adversely affected by fire in the form of smudging, crazing, and cracking. The effects of prescribed fire on archeological resources would be localized, permanent, negligible to minor, and adverse.

The use of prescribed fire to reduce fuel loading in the park would likely reduce the frequency, duration, and intensity of wildfires, resulting in long-term, beneficial impacts to archeological resources. Other impacts could include additional, localized soil erosion and loss of vegetation, which in turn could remove artifacts from their original context and potentially increase cases of artifact looting due to the resultant exposure. These indirect impacts would be negligible to minor and adverse.

Cumulative Impacts

The cumulative impacts on archeological resources would be the same as described in alternative A and would be permanent, negligible to minor, and adverse. Implementation of alternative B would have long-term, beneficial impacts, as well as permanent, negligible to minor, adverse impacts on the park's archeological resources. The impacts of this alternative, in combination with the negligible to minor adverse impacts of other past, present, and reasonably foreseeable future actions, would result in parkwide, permanent, negligible to minor, adverse cumulative impact. The impacts of alternative B would only slightly contribute to the overall cumulative impacts.

Conclusion

Impacts from wildfire suppression tactics including hand crews and aircraft would be localized, permanent, negligible to minor, and adverse as discussed in the analysis for alternative A. Likewise, as with alternative A, impacts from engine crew activities would be negligible.

Herbicide treatment would be conducted using resource protection measures to prevent exposure or disturbance of known resources and would have localized, long-term, negligible to minor, adverse impacts, depending on a site's location, visibility following treatment, and vulnerability.

Manual and mechanical thinning would have only surficial ground disturbance and therefore negligible impacts. Manual and mechanical thinning and prescribed fire would result in fuel load reductions, which would be a long-term, beneficial impact.

The impacts of fire, whether a prescribed burn or wildfire, on archeological resources would be localized, permanent, negligible to minor, and adverse, as short residence time and limited heat pulse would prevent more substantial effects.

When alternative B is combined with other actions, plans, and policies, the resulting cumulative impact would be parkwide, permanent, negligible to minor, and adverse.

Section 106 Summary

After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 *Code of Federal Regulations* section 800.5, Assessment of Adverse Effects), the National Park Service concludes that implementation of the preferred alternative would have *no adverse effect* on the archeological resources of Petrified Forest National Park.

VEGETATION

AFFECTED ENVIRONMENT

A vegetation classification was prepared for Petrified Forest National Park (Thomas *et al.* 2009). The classification identified seven shrubland alliances, three dwarf-shrubland alliances, five herbaceous alliances, one dwarf shrubland-herbaceous alliance, two shrubland-herbaceous alliances, and one sparse vegetation alliance, as well as unvegetated areas that characterize the plant communities of the park. None of the sampling efforts for the classification identified a community with enough tree cover to be considered a woodland or forest.

Soil and terrain conditions in Petrified Forest National Park have resulted in a mosaic of grass and shrub communities. Sparse stands of juniper are found on rocky upper slopes and mesa caps. A stand of pinyon-juniper occurs on Chinde Mesa along the park's far northern boundary. Grasslands occupy middle and upper plateau areas where soils are deeper and richer. Desert plant communities developed in the lower elevations, where soils are heavy and water availability is low.

Sheep and cattle grazed in the Petrified Forest area until 1936, when grazing was excluded from the southern part of the park. Since grazing was totally eliminated from the park in 1962, vegetation has recovered in areas adversely affected by grazing. In 1981, a perimeter fence was erected to prevent trespass grazing on park lands.

The most diverse area for plants is the Puerco River corridor, where 40 species, 30 of which are native to North America, occur. Willows, cottonwoods, and the dominant nonnative shrub, tamarisk, grow in the Puerco River riparian zone. Shrubs typical of the Great Basin's cool desert, including big sagebrush, shadscale, greasewood, and winterfat, also occur in the park (Thomas *et al.* 2009). Other grassland and shrubland communities had relatively high levels of diversity as well.

Thomas *et al.* (2009) found that the following seven vegetation classes represent more than 83% of the park's vegetation:

- New Mexico Saltbush / Galleta – Alkali Sacaton Shrub Herbaceous Vegetation (24.2%);
- Four-wing Saltbush / Galleta Shrubland (14.4%);
- New Mexico Saltbush Badland Sparse Vegetation (14.4%);
- Barren Badlands (12.3%);
- Sandsage Colorado Plateau Shrubland (6.8%);
- Arizona Siltbush Sparse Vegetation (5.7%); and
- Torrey's Jointfir Shrubland – Bigelow's Sagebrush Sparse Vegetation (5.6%).

Vegetation in the park, even in the more densely vegetated areas, frequently covers less than 25% of the ground surface and is characterized as "extremely patchy" by Thomas *et al.* (2009). This results in a low potential for fire to carry either far or fast.

METHODS

Impacts on vegetation were evaluated using the process described in "Methods for Analyzing Impacts." Impact threshold definitions are as follows.

- *Negligible*: The impact on individual plants and/or vegetation communities would not be measurable. The abundance or distribution of individuals would not be affected or would be slightly affected. Ecological processes and biological productivity would not be affected.

- *Minor*: The action would not decrease or increase the area's biological productivity. It would affect the abundance or distribution of individual plants in a localized area but would not affect the viability of local or regional populations or communities.
- *Moderate*: The action would change biological productivity in a small area. It would affect a local population sufficiently to change plant abundance or distribution, but would not affect the viability of the regional population or communities. Changes to ecological processes would be of limited extent.
- *Major*: The action would change biological productivity in a relatively large area. The action would affect a regional or local population of a species sufficiently to change abundance or distribution to the extent that the population or communities would not be likely to return to its/their former level (adverse), or would return to a sustainable level (beneficial). Important ecological processes would be altered.
- *Short-term* impacts would recover in less than one year.
- *Long-term* impacts would require one or more years to recover.

REGULATIONS AND POLICIES

Current regulations and policies associated with vegetation include the following:

- Plant Protection Act of 2000, *7 United States Code 7701 et seq.* (supersedes the Federal Noxious Weed Act of 1974, except Sections 1 and 15);
- Consolidated Natural Resources Act of 2008 (Public Law 110-229);
- Executive Order 13112 (February 1999), Control of Invasive Species, as amended by Executive Order 13286;
- *Director's Order #77: Natural Resources Management Guideline* (NPS 1991); and
- *Management Policies 2006* (NPS 2006).

IMPACTS OF ALTERNATIVE A, NO ACTION (FIRE SUPPRESSION)

Analysis

Although fire is relatively rare in the grasslands and shrublands in the park, research suggests that stand-replacing fires occurred at frequencies of about 7 to 10 years in grassland communities (Simonin 2000 and 2001). Grassland fires in deserts are usually low-severity and rapid. With perennial grasses, fires generally remove only a single year's growth without burning deep into root crowns, enabling grasses to sprout in the following growing season (Simonin 2000). Fires in shrub-dominated communities may result in longer recovery times for woody vegetation. The immediate effects of wildfire would be a reduction in primary production, although in the long term, the community could benefit from debris removal and the regeneration of native species. In communities with a larger shrub or tree component, recovery would likely take longer. As a result, the effects of wildland fire on vegetation would be short- and long-term, minor, adverse and beneficial, and most likely local, as desert fires do not often have continuity of fuels to carry long distances.

Wildfire suppression would affect vegetation, depending on the community type, time of year, and extent of the fire, particularly in the short-term. Wildfire suppression would be accomplished through the aggressive suppression actions throughout the park or through the use of natural fire breaks and barriers in the northern wilderness portion of the park.

Wildfire suppression using natural barriers to contain a fire would only be used in the northern wilderness area of the park and would only be implemented for fires that do not threaten human safety, property, or park resource values. Grassland fires in the park's desert environment are typically of low-intensity and small size. In the last 20 years, fires in the park have averaged 0.1 acres. The effects of this wildfire suppression strategy are the same as those described previously for wildfire. There would be short- and long-term, minor, adverse impacts that would result from a reduction in primary production in the area burned. Long-term, minor, benefits would accrue from debris removal and regeneration of native species. If a fire exceeded the wildfire suppression parameters, then additional suppression actions would be implemented and the effects on vegetation would be the same as those described for the other suppression tactics.

The effects of fire suppression using hand crews would primarily include the area where vegetation would be flattened using flappers when extinguishing flames or removed along firelines to prevent further spread of a fire. Crews would access the fireline on foot and fight the fire along the fire front, only if conditions provided for safe operations. The magnitude of these short-term adverse effects would be proportional with the size of the fire and extent of fireline construction. The removal of vegetation in digging firelines or the effects of field crews repeatedly traversing an area would result in limited soil compaction and reduced vegetative growth (McNearney *et al.* 2002). These adverse impacts would be localized and short-term and likely would range from negligible to minor.

The effects of using engine crews to suppress a wildfire would be similar to the effects from hand crews, with additional effects from crews laying hose and walking repeatedly through vegetation. Engines would not leave established roads or travel corridors. The magnitude of these short-term, adverse effects would be proportional with the size of the fire and extent of fireline building. Repeated travel along a single path by firefighters laying hose could result in limited soil compaction and reduced vegetative growth (McNearney *et al.* 2002). The adverse impacts would range from negligible to minor. Intensity would be related to the magnitude of the fire and suppression actions and would be restricted to small, local areas. The use of water delivered by an engine to suppress a wildfire would not typically result in adverse impacts to vegetation and in some cases could be beneficial in a short-term, local manner, particularly during dry periods.

Using aircraft to suppress a wildfire would have fewer direct adverse impacts on vegetation than hand or engine crews because there would be no ground disturbance. The use of water and/or retardant delivered by aircraft to suppress a wildfire would not typically result in adverse impacts to vegetation and in some cases could be beneficial in a short-term, local manner, particularly during dry periods.

Cumulative Impacts

The other plans and projects implemented in the park are primarily management and resource-oriented plans that assist the National Park Service in meeting the park's mandate now and in the future. As a result, these plans and projects would contribute beneficially to cumulative impacts on vegetation by their inherent resource protection nature. The contribution of alternative A to the cumulative effects on vegetation would be mixed, as some benefits to vegetation would occur as a result of wildfire. The magnitude of fire suppression actions would largely determine the intensity and contribution of adverse effects. Effects of other projects and plans would be beneficial in the long term, as nonnative plant control actions were undertaken.

The cumulative beneficial effects of the other plans, projects, and policies combined with the negligible to minor adverse effects of alternative A on vegetation would result in overall, parkwide, long-term, beneficial effects on park vegetation.

Conclusion

Suppressing a wildfire using hand and engine crews under alternative A would result in adverse impacts that would be short-term and range from negligible to minor, depending on the magnitude of the fire and suppression efforts. The use of water to suppress fire could provide a short-term benefit to vegetation, particularly during periods of drought. The local, minor, adverse impacts from wildland fire, aside from those resulting from fire suppression, would be short-term for herbaceous species because plant recovery within a year would be likely. Long-term, adverse effects to woody species would be likely in the event of high-intensity fire.

Suppressing wildfire in the northern wilderness area by containing fire using natural barriers and breaks would have the same effects on vegetation as described for wildfire events, short- and long-term, minor, and adverse.

The cumulative effects of the other plans, projects, and policies combined with the effects of alternative A on vegetation would be beneficial.

IMPACTS OF ALTERNATIVE B, MULTIPLE FIRE MANAGEMENT STRATEGIES

Analysis

The impacts from wildfire and suppression efforts on vegetation under alternative B would be the same as those described for alternative A because the same fire suppression tactics would be used.

The effects of wildfire on vegetation would be similar to those described for alternative A and would be short- and long-term, minor, and adverse. Fuel reduction activities under alternative B would provide a small, additional benefit by reducing fuel loads, thus potentially lessening the intensity of a wildfire.

The use of herbicides to control unwanted vegetative fuel buildup would have a negligible, short-term, local, adverse impact on vegetation as a result of trampling and foot traffic associated with the field staff implementing the control. The application of herbicides would be targeted to unwanted nonnative vegetation and would be implemented when winds are calm to avoid dispersal. As a result, the use of herbicides would have long-term benefits to native vegetation as nonnative species, and their competition for scarce water resources, would be reduced.

The benefits of thinning of vegetation to reduce fuel loads would be twofold. First, reduced fuel loads would lessen the intensity of wildfire and second, thinning efforts would be focused on unwanted, nonnative species. Successful thinning would result in localized, short- and long-term, beneficial effects on vegetation.

Reduced fuel loads would reduce the intensity of a wildfire, potentially improving the ability of hand or engine crews to operate along a fireline safely. A more intense fire could require crews to retreat and establish firelines at a distance from an intense fire, thus resulting in a larger area burned and a longer time to suppress the fire. Additionally, the mortality of woody species could be lowered if fire intensity were reduced. This is particularly true in cases where nonnative grass invasions have increased the fuel load and the potential for faster-moving, more intense fires in shadscale dominant salt-desert shrub communities (Simonin 2001).

Prescribed fire would be used to burn debris piles that would be collected by park staff or using broadcast burning to reduce fuel loads. Burning would occur at locations where the fire would have minimal effect on other resources. Burning would be deferred during high winds or other conditions that would make control difficult. The focused use of prescribed fire under alternative B would result in local, short-term, adverse, and beneficial impacts. The adverse impacts to vegetation would be associated with trampling and foot traffic of crews gathering debris as well as the loss of

aboveground biomass in the case of broadcast burns. The impacts would be short-term, negligible, and local. The benefits would be long-term, as reduced fuel loads would lessen the potential for intense wildfire that would have a greater tendency to kill vegetation. Lower intensity fires allow plants to regenerate in a manner similar to their response to browsing or from seed if the seedbank is not destroyed by intense fire (Howard 2003).

Cumulative Impacts

As described for alternative A, the other plans and projects implemented in the park are primarily management and resource-oriented plans that would contribute beneficially to cumulative impacts on vegetation because of their inherent resource protection nature. Combined with the short-term, minor, adverse impacts and long-term benefits associated with alternative B, the cumulative effects would be beneficial with successful implementation of the resource and value protection aspects of the other plans and projects.

Conclusion

The impacts from wildfire and suppression efforts on vegetation under alternative B would be the same as those described for alternative A for the same reasons previously described.

Manual and mechanical thinning would result in short- and long-term, beneficial effects on vegetation because of reduced fuel loads and the control of nonnative species. Similarly, herbicide use would result in benefits as nonnative species would be controlled and their contribution to fuel loads would be reduced. There would be localized, short-term, negligible to minor, adverse effects on vegetation as a result of trampling.

Prescribed fire would have short-term, local, negligible, adverse impacts on plant populations as a result of trampling by field crews or broadcast burns, and short- and long-term, beneficial effects on vegetation as fuel loads would be reduced and the potential for high intensity fires would be lessened.

The cumulative effects of the other plans, projects, and policies combined with the effects of alternative B on vegetation would be mainly beneficial and incrementally greater than those associated with alternative A.

WILDLIFE

AFFECTED ENVIRONMENT

The short-grass prairie, riparian areas, and mixed desert shrublands in the park provide cover and forage for many native wildlife species. Pronghorn (*Antilocapra americana*), coyote (*Canis latrans*), black-tailed jackrabbit (*Lepus californicus*), and desert cottontail (*Sylvilagus audubonii*) are common. Gunnison's prairie dog (*Cynomys gunnisoni*) is present in the park, and while it has special status elsewhere, it has no special status in Petrified Forest National Park because the U.S. Fish and Wildlife Service considers the population in Arizona to reside in a prairie habitat, while the at-risk populations reside in montane habitats. Many bird species, such as flycatchers (Tyrannidae family), warblers (Sylviidae and Cettiidae families), and sparrows (Passeridae family), migrate through the area, relying on the insects and seeds found in these habitats (Holmes and Johnson 2010). Common reptiles include the collared lizard (*Crotaphytus collaris*), sagebrush lizard (*Sceloporus graciosus*), Painted Desert whiptail lizard (*Aspidoscelis tigris*), and Hopi rattlesnake (*Crotalus viridis nuntius*) (NPS 2010).

Because the amount of surface water in the park is limited, the availability of water from man-made stock tanks takes on additional importance to wildlife. These water sources serve as hatching areas for insects and amphibians, feeding grounds for bats, stopover areas for migratory birds, and watering sites for larger animals, many of which have likely become habituated to the reliability of these water sources (NPS 2010).

METHODS

The analysis recognizes that many wildlife species are highly mobile and can easily move beyond the area of disturbance and beyond the park boundaries if necessary. The mitigation measures in chapter 2 would be implemented as part of the project and are accounted for in the analyses of effects. Impact threshold definitions for wildlife and their habitats are as follows.

- *Negligible*: Wildlife would not be affected or the effects would be at or below the level of detection and so slight that they would not be of any measurable consequence to the population.
- *Minor*: Effects on individual animals and/or their respective habitats would be detectable, although the effects would be localized and would be small and of little consequence to the species' population.
- *Moderate*: Effects on individual animals and their habitat would be readily detectable, with consequences occurring at a local population level.
- *Major*: Effects on individual animals and their habitat would be obvious and would have substantial consequences on a population level.
- *Short-term* effects would last less than one year.
- *Long-term* effects would last longer than one year.

REGULATIONS AND POLICIES

Current regulations and policies related to the analyses of effects on wildlife in the park include the following:

- Migratory Bird Treaty Act of 1918;

- Consolidated Natural Resources Act of 2008;
- *Director's Order #77: Natural Resources Management Guideline* (1991); and
- *Management Policies 2006* (NPS 2006).

IMPACTS OF ALTERNATIVE A, NO ACTION (FIRE SUPPRESSION)

Analysis

The effects of a wildfire on wildlife, aside from the effects of any kind of fire suppression, would be commensurate with the size of the fire, its duration, and the types of habitat burned. For ground-nesting bird species, fire would not have an effect outside the nesting season. The adverse effect would be short-term, local, and up to minor if a nest was destroyed. Mobile species would experience negligible, short-term, adverse effects because they could escape from the effects of flames. More immobile species, if unable to find refuge, could experience up to minor adverse effects, including some individual mortalities, but a wildfire in the park would not have population-level effects.

Suppressing wildfire in the northern wilderness area by containing it using natural barriers and breaks would only be implemented for fires that do not threaten human safety, property, or park resources or values. The effects on wildlife would be the same as those described for a wildfire and would be short-term, local, negligible to minor, and adverse. If a fire were to exceed the wildfire suppression parameters, then additional suppression actions would be implemented and the effects on wildlife would be the same as those described for the various suppression tools presented under alternative A.

The effects of wildfire suppression using hand and engine crews on wildlife would be similar because the primary impact would be disturbance of wildlife species by human presence and movements. However, because the suppression actions would be in response to an active wildfire, it is likely that wildlife would already be disturbed. Mobile species would likely disperse away from the fire area, and burrowing species would take refuge underground. As a result, the adverse impacts of alternative A from wildfire suppression on wildlife would range from negligible to minor and would be local and short-term.

Use of aircraft for wildfire suppression would likely be supported by crews on the ground. Therefore, the effects of the hand and engine crews would be compounded by the impacts associated with the low-level aircraft flights and/or the hovering of helicopters. Mobile wildlife directly in the path of low-level aircraft overflights would likely disperse, and burrowing species would take refuge underground. However, because the low-level flights would be in response to an active fire on the ground, it is likely that wildlife would already have taken these actions. As a result, impacts would be adverse, local, negligible to minor, and short-term because of the short duration of aircraft engine noise.

Based on the above analysis, fire management activities under alternative A would not adversely affect populations of migratory birds or their habitats.

Cumulative Impacts

The other plans and projects implemented in the park are primarily management and resource oriented plans that assist the National Park Service in meeting Petrified Forest National Park's mandate now and in the future. Ongoing park resource management plans involve potential short-term, adverse effects on wildlife; primarily because of temporary disturbances associated with normal park management activities. In the long term, these plans and projects implement actions that

protect natural resources, including wildlife. The protection of wildlife would represent a substantial cumulative benefit. The negligible to minor adverse effects of alternative A would reduce the long-term benefits to wildlife, but the contribution of alternative A to the cumulative impacts would be small. Thus, the long-term cumulative effects to wildlife would be beneficial.

Conclusion

The effects of wildfire on wildlife would be directly related to the size and duration of the fire with local, short-term, adverse impacts ranging from negligible to minor for mobile species and those outside of their breeding season. Up to minor adverse impacts would occur for immobile species that were unable to escape the fire or for ground-nesting birds with unhatched eggs or unfledged young.

The adverse effects to wildlife species from suppressing wildfire in the northern wilderness area by containing fire using natural barriers and breaks would be negligible to minor, short-term and local. There would be no population-level impacts.

The effects on wildlife from fire suppression using hand and engine crews, primarily human presence and traffic, would be adverse, negligible to minor, local, and short-term. Use of aircraft to suppress fire would consist of short, intense disturbances associated with aircraft engines at low altitudes. However, wildlife would likely have already dispersed in reaction to the fire the aircraft would be responding to and therefore, no additional effects would be likely.

The cumulative effects of other plans and projects, combined with the impacts of alternative A would be beneficial, as the long-term beneficial effects of other management plans and projects would outweigh the negligible to minor adverse impacts of alternative A on wildlife.

IMPACTS OF ALTERNATIVE B, MULTIPLE FIRE MANAGEMENT STRATEGIES

Analysis

The effects of alternative B on wildlife from the use of hand, engine crew, and aircraft to suppress wildfire, as well as the impacts from fire, would be the same as those described for alternative A. These impacts would be local, short- and long-term, and negligible to minor. Because fire suppression tools used on wildfire would be the same under either alternative, there would be no difference in effects. A small additional benefit would be gained from reducing fuel loads under alternative B and thus potentially lessening the intensity of a wildfire.

The use of herbicides to control unwanted vegetative fuel buildup would have a negligible, local adverse impact on wildlife. The application of herbicides would be targeted to specific unwanted nonnative vegetation and would be implemented when winds were calm to avoid unnecessary dispersal. The vegetation targeted would inherently not be considered valuable wildlife habitat because it would be nonnative, exotic species.

The use of hand-held tools to reduce fuel loads, including gasoline-powered line trimmers and chain saws (manual thinning) and the use of vehicles to implement mowing and cutting (mechanical thinning) would have negligible to minor, short-term, local adverse impacts on wildlife primarily as a result of disturbance. Thinning activities would be restricted during breeding seasons in habitats known to support breeding wildlife species. Most wildlife would avoid direct impacts by temporarily dispersing. The duration of thinning activities in any particular habitat would not likely result in disturbance lasting more than one day, thus resulting in short-term and local adverse effects to wildlife. Benefits could accrue for wildlife in the long term from the lowered intensity of wildfires because of reduced fuel loads.

Prescribed fire would be used to burn piles of collected woody debris or broadcast burning to reduce fuel loads. Tumbleweed, when dead and dry, often collects along fencelines and would be gathered and moved to unvegetated locations where it could be piled and burned. Similarly, other large woody debris that would result from thinning actions could be burned in appropriately located piles if it was not suitable for scattering around the habitat it was originally found. The adverse effects on wildlife as a result of these prescribed burns would result from disturbance and temporary dispersal caused by fire management personnel and their activities and would be characterized as local, short-term, and negligible to minor.

Based on the above analysis, fire management and fuel reduction activities under alternative B would not adversely affect populations of migratory birds or their habitats. Fuel reduction actions taken under this alternative would reduce the potential for damaging wildfires, providing a benefit to migratory birds through enhanced protection of habitat.

Cumulative Impacts

The other plans and projects implemented in the park are primarily management and resource oriented plans that assist the National Park Service in meeting Petrified Forest National Park's mandate now and in the future. Ongoing park resource management plans involve potential short-term, adverse effects on wildlife; primarily because of temporary disturbances associated with normal park management activities. In the long term, these plans and projects implement actions that would protect natural resources, including wildlife. The protection of wildlife would represent a substantial cumulative benefit. When combined with the short-term, localized, negligible to minor adverse effects of alternative B, the cumulative effects on wildlife would be long-term and beneficial.

Conclusion

The effects of alternative B on wildlife as a result of wildfire, and fire suppression tactics including hand, engine crew, and aircraft would be the same as those described for alternative A.

Under alternative B, the effects of manual and mechanical thinning on wildlife would be short-term, local, negligible to minor and adverse because wildlife would be forced to disperse and/or react to human activities and the local alteration of habitat.

The use of prescribed fire would have negligible to minor, short-term local adverse effects on wildlife from the local disturbance and presence of work crews.

The cumulative effects of alternative B for wildlife would not differ from the cumulative impacts described for alternative A, namely long-term and beneficial.

AIR QUALITY

AFFECTED ENVIRONMENT

Within the Clean Air Act, Congress addressed the need to protect and enhance the quality of the nation's air resources and deal with the dangers that air pollution presents to public health and welfare. Most of the nation is identified as class II with regard to air quality protection and enhancement. However, national parks greater than 6,000 acres and in existence before 1977 were automatically designated as class I, which conveys the highest level of protection and allows very little deterioration of air quality.

Petrified Forest National Park is a class I air quality area. Under the Clean Air Act, the U.S. Environmental Protection Agency established federal standards for pollutants from stationary and mobile sources. Goals include preventing significant deterioration in areas where air quality exceeds national standards, and improving air quality in areas that do not meet standards (known as nonattainment areas).

Federal land managers have an affirmative responsibility to protect the air quality related values and to consider whether any proposed major emitting facility within, or outside, the area will have an adverse impact on such values. As defined by the Federal Land Managers' Air Quality Related Values Workgroup (2008), an air quality related value is "A resource . . . that may be adversely affected by a change in air quality. The resource may include visibility or a specific scenic, cultural, physical, biological, ecological, or recreational resource . . . for a particular area."

National Ambient Air Quality Standards

The Clean Air Act requires the U.S. Environmental Protection Agency to set National Ambient Air Quality Standards for pollutants considered harmful to public health and the environment. The Clean Air Act established two types of national air quality standards; primary and secondary. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, and damage to animals, crops, vegetation, and buildings. Standards have been set for six principal pollutants, called "criteria" pollutants (carbon monoxide [CO], lead [Pb], nitrogen dioxide [NO₂], ozone [O₃], particulate matter [PM-10], and sulfur dioxide [SO₂]) (USEPA 2010).

Air Quality at Petrified Forest National Park

In general, the park experiences very little air pollution due to its remote nature. However, both local and distant air pollutant sources do affect air quality in the park. Large power plants in Navajo, Coconino, and Apache counties in Arizona and San Juan and McKinley counties in New Mexico are the largest nearby point sources of sulfur dioxide and nitrogen oxides. Pollutants also travel great distances to the park from industrial and urban areas of southern California, southern Arizona, and northern Mexico. Interstate highway I-40 courses through the park and the 20-plus miles of paved park roads allow for the contribution of combustion engine emissions that could affect local air quality. The park's air quality meets ambient standards for specified pollutants, and activities in the park are not considered to contribute to the deterioration of air quality.

Air quality impacts from wildland fires are distinguished from the air quality impacts from prescribed fires because emissions from these two sources have, in the past, been treated separately under the Clean Air Act and state fire regulations (Sandberg *et al.* 2002). The primary air pollutant from wildfire and prescribed fire is smoke. Prescribed fires are generally designed so that smoke does not move

into sensitive areas. Wildland fire, however, can occur at any time of the year, and may occur when prevailing winds would move smoke into sensitive areas.

Smoke contains particulate matter, and it is difficult to measure the effects of smoke on a community because particulate standards are based on 24-hour and annual averages. Further, smaller smoke plumes may degrade air quality for only a few hours, while large wildfires may have smoke plumes that persist for several days or as long as the fire is active. In addition to particulate matter, globally, fires are a significant contributor of carbon dioxide and other greenhouse gasses in the atmosphere (Sandberg *et al.* 2002), but gas emission are highly dependent on specific fire weather conditions, area burned, and fuel loads.

An air quality related value is a resource that may be adversely affected by a change in air quality. Air quality related values of Petrified Forest National Park are those resources that are potentially sensitive to air pollution, and include vegetation, wildlife, soils, and visibility. At present, visibility has been identified as the most sensitive air quality related value in the park. Small air pollution particles cause haze and obscure visibility in the park. The visibility of the subtle pastel colors of the Painted Desert may be particularly sensitive to changes in haziness (NPS 2012a).

Climate Change Effects on Air Quality

Climate change and air quality are closely coupled. Ozone is a significant greenhouse gas, and particulates can influence the climate by scattering, reflecting, and /or absorbing incoming solar radiation (USEPA 2010). Due to climate change, there may be a declining air quality in cities through changes in dispersion rates of pollutants, the production of ozone and particle pollution, and the strength of emissions from the biosphere, fires, and dust. Alterations in hydrology and vegetation communities, in conjunction with more severe droughts, could alter local air quality through increased dust and more intense fires releasing more particulates and carbon dioxide.

METHODS

Air quality was analyzed for both alternatives based on the effects of fire in Petrified Forest National Park. Impacts on air quality were evaluated using the process described in “Methods for Analyzing Impacts” and applying the mitigation measures in chapter 2.

Impact thresholds for air quality are defined as follows:

- *Negligible*: Impacts would not be detectable or measurable. Visibility would not be affected.
- *Minor*: Impacts would be measurable, but air quality parameters would be within all Class I criteria. Visibility would be within the range of historical conditions.
- *Moderate*: Changes in air quality would be readily apparent, but Class I parameters would be met, with only occasional exceedances. Air quality would be outside historic baselines on a limited basis. Mitigation would be necessary to offset adverse effects and would likely be successful.
- *Major*: Changes in air quality would be readily measurable, and some Class I parameters would be equaled or exceeded for extended periods of time. Extensive mitigation measures would be necessary, and their success would not be assured.
- *Short-term* impacts to air quality would recover in 7 days or less following the action.
- *Long-term* impacts to air quality recovery would take more than 7 days following the action.

REGULATIONS AND POLICIES

Current regulations and policies related to the analyses of effects on air quality in the park:

- Clean Air Act as amended in 1991;
- Consolidated Natural Resources Act of 2008;
- *NPS-77: Natural Resources Management Guideline* (1991); and
- *National Park Service Management Policies 2006* (NPS 2006)

IMPACTS OF ALTERNATIVE A, NO ACTION (FIRE SUPPRESSION)

Analysis

The intensity of the impacts of wildfire on air quality would be directly related to the size, duration, and intensity of the fire; the type of fuels burned; and the local atmospheric conditions (including wind and weather). For wildfire, the impacts on air quality would be related to smoke and particulate matter dispersed into the air. Wildfire would adversely affect visibility, reducing recreational values at scenic vistas and cause potential health effects to residents and visitors with respiratory ailments. Because wildfires in the park's habitats are typically small, fast-moving grassland fires, the adverse impacts would likely be negligible to minor, short-term, and widespread.

The impacts on air quality from suppressing wildfire in the northern wilderness area by containing fire using natural barriers and breaks (the only location where the wildland fire suppression strategy would be used), would be the same as those described for wildfire.

The impacts of wildfire suppression using hand crews, engine crews, and aircraft under alternative A would have one common result; successful suppression of the fire. Fire suppression would represent a short-term, local, beneficial effect because the adverse impacts of smoke emissions on air quality would be eliminated. Pollutant transport, primarily particulate matter in the form of smoke, would be stopped and benefits to visibility, recreational pursuits, and respiratory health would result. There would be negligible effects on air quality associated with fire engine and/or aircraft emissions. These effects would be no greater than the short-term, local, negligible, adverse impacts to air quality resulting from vehicles and aircraft that typically transit the region.

Cumulative Impacts

The other plans and projects implemented in the park are primarily management and resource oriented plans that assist the National Park Service in meeting the park's mandate now and in the future. As a result, these plans and policies would contribute beneficially to cumulative impacts on air quality by their inherent resource protection nature. The beneficial impacts of suppression activities under alternative A would have a relatively minor contribution to the overall long-term beneficial cumulative effects on air quality.

Conclusion

Fire suppression would have beneficial impacts on air quality because the release of particulate matter and visibility restrictions would be reduced. The use of fire trucks and aircraft would cause local, short-term, negligible, and adverse impacts to air quality associated with combustion engine emissions. The impacts on air quality from wildfire would be in direct proportion to the intensity and extent of the fire and would be local to widespread, negligible to minor, adverse, and short-term.

Under alternative A, the beneficial impacts of suppression activities on air quality, combined with the beneficial impacts of implementation of resource protection plans in the park, would have a long-term, beneficial, cumulative effect on air quality.

IMPACTS OF ALTERNATIVE B, MULTIPLE FIRE MANAGEMENT STRATEGIES

Analysis

Under alternative B, the impacts of wildfire on air quality would be the same as those described under alternative A and would be localized to widespread, negligible to minor, short-term, and adverse.

Under alternative B, the effects on air quality from wildfire suppression using hand crews, engine crews, and aircraft would be the same as those described for alternative A. Primarily, the effects would be beneficial, local, and short-term as particulate matter and smoke releases were controlled and suppressed.

The use of herbicides to control unwanted vegetative fuel buildup would have no effect on air quality. The application of herbicides would be targeted to specific vegetation so that there would not be a broadcast impact that could become windborne and affect air quality. The use of herbicides to reduce nonnative vegetation could result in a beneficial effect with regard to fire due to reduced fuel loads and less potential for smoke and generation of particulate matter. Nonnative grasses can increase fine fuels that can cause fire to carry faster and further than in native vegetation communities (Simonin 2001).

The use of hand-held tools to reduce fuel loads, including gasoline-powered line trimmers and chain saws would have negligible, local adverse impacts on air quality because of combustion engine emissions. Reduced fuel loads would have a beneficial impact on air quality in the event of either an unplanned or planned fire as reduced fuel loads would lead to lower smoke and particulate matter emissions from the fire. Mechanical thinning would have an incrementally greater adverse effect on air quality than manual thinning because of the increased emissions associated with the vehicles towing the mowing implements; however, due to the limited frequency and duration of use, both thinning tools would result in negligible adverse impacts to air quality.

The potential adverse impacts of prescribed burning, whether pile or broadcast burning, would be associated with decreased visibility, increased airborne particulate matter, and the potential for increased respiratory effects to persons downwind. Burn permits would be required by the Arizona Department of Environmental Quality. Open burning can be approved if the action is “Needed for open outdoor fires for the purposes of weed abatement, prevention of a fire hazard or instruction in the methods of fighting fires (ADEQ 2012).” An application for a burn permit should be submitted when detailed information regarding a potential prescribed burn is known. The burn permit application can be accessed online at:

<http://www.azdeq.gov/environ/air/permits/download/application.pdf>

The application should be submitted to:

Arizona Department of Environmental Quality
ATTN: Air Quality Division
1110 W. Washington Street
Phoenix, AZ 85007
Phone #: (602) 771-2338

Additionally, local fire departments should be informed regarding proposed open burns well prior to implementing the burn if there is a potential effect on a specific fire department’s jurisdiction.

Prescribed burning would only occur under ideal weather conditions and would be associated with burning accumulated vegetative debris that would be collected and piled away from sensitive resources or broadcast burning to reduce fuel loads. An approved prescribed burn plan would include consideration of smoke dispersal, and visual monitoring during the project. Therefore, the adverse impacts of prescribed fire on air quality would not exceed negligible to minor and would be local and short-term.

Cumulative Impacts

Under alternative B, the effects on air quality would be similar to those described for alternative A. Additional impacts would include negligible emissions from hand-held power tools and vehicles used in manual and mechanical thinning activities and the negligible to minor local short-term adverse impacts of prescribed fires. Overall, the cumulative impacts would continue to be beneficial, as the successful implementation of resource and value protection management plans and projects would outweigh the adverse impacts of alternative B.

Conclusion

Under alternative B, the effects on air quality from wildfire or suppressing wildfire in the northern wilderness area by containing fire using natural barriers and breaks would be the same as those described under alternative A, and would be localized to widespread, negligible to minor, short-term, and adverse. The effects would be directly proportional to the intensity, duration, and extent of the fire.

Fire suppression tactics would have impacts on air quality similar to those described for alternative A and would be beneficial and short-term. Engine emissions from fire trucks, aircraft, and hand-held power tools would cause local, negligible, adverse, short-term impacts to air quality. A reduction of fuels from manual and mechanical thinning would result in beneficial effects to air quality because of reduced particulates and smoke, although there would be negligible adverse impacts to air quality from engine emissions.

Considering the mitigation measures that would be implemented, the adverse impacts to air quality from prescribed fire under alternative B would not exceed negligible to minor and would be local and short-term.

Under alternative B, the beneficial impacts of suppression activities and negligible to minor adverse effects of other fire management activities would have a relatively minor contribution to the long-term beneficial cumulative effects of other plans and projects on air quality.

WILDERNESS CHARACTER

AFFECTED ENVIRONMENT

Introduction

The 1964 Wilderness Act defines wilderness:

A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

The Wilderness Act, NPS *Management Policies 2006*, and Director's Order #41, "Wilderness Preservation and Management" provide guidance for wilderness management. Policies state that "if a compromise of wilderness resource or character is unavoidable, only those actions that preserve wilderness character and/or have localized, short-term adverse impacts will be acceptable." Wilderness should be an area where the earth and its community of life are untrammelled by humans. It should retain its primeval character and influence without permanent improvements. The purpose of wilderness in the national parks includes the preservation of wilderness character and wilderness resources in an unimpaired condition (NPS 2006).

No temporary roads, motor vehicles, motorized equipment, landing of aircraft, other form of mechanical transport (including bicycles), and structures or installations are allowed on wilderness lands. Temporary exceptions for emergency situations are allowed. Administrative use of motorized or mechanized equipment is allowed only if (1) such use is required for management of the wilderness and (2) the equipment is the minimum required to conduct the task.

Wilderness in Petrified Forest National Park

Petrified Forest National Wilderness Area was one of the first designated wilderness areas in the national park system. It was designated by Congress on 23 October 1970 (84 Stat. 1105) and is composed of 50,260 acres in two separate units. The Painted Desert unit in the northern segment of the park (referred to as the northern wilderness area in this document) comprises 43,020 acres and consists of rugged, steep, and remote terrain. The Rainbow Forest unit in the southeast segment of the park (referred to as the southern wilderness area in this document) is comprised 7,240 acres and its more gradual terrain is more easily accessible from the developed areas of the park. Figure 1 shows the wilderness boundaries in the park.

The park staff is currently developing a wilderness management plan for the two designated wilderness areas in the pre-expansion portion of the national park. NPS *Management Policies 2006* require that all NPS lands be studied for possible inclusion in the national wilderness preservation system. Thus a wilderness study will be required for the 125,000 acres added to the park in 2004. However, because most of the addition lands are still in private ownership, the wilderness study has been deferred until a substantial part of the private lands has been acquired.

Wilderness Character

Wilderness character is ideally described as the unique combination of (a) natural environments that are relatively free from modern human manipulation and impacts; (b) opportunities for personal experiences in environments that are relatively free from the encumbrances and signs of modern society; and (c) symbolic meanings of humility, restraint, and interdependence in how individuals and society view their relationship to nature (Landres *et al.* 2008). Based on section 2(c), “Definition of Wilderness” from the Wilderness Act of 1964, four qualities of wilderness make the idealized description of wilderness character relevant, tangible, and practical to the management and stewardship of all wildernesses, regardless of size, location, or other unique place-specific attributes (Landres *et al.* 2008):

Untrammeled: Wilderness is essentially unhindered and free from modern human control or manipulation.

Natural: Wilderness ecological systems are substantially free from the effects of modern civilization.

Undeveloped: Wilderness retains its primeval character and influence and is essentially without permanent improvement or modern human occupation.

Solitude or Primitive and Unconfined Recreation: Wilderness provides outstanding opportunities for solitude or primitive and unconfined recreation.

Untrammeled. Lands in the park have been impacted by prehistoric and historic human use, dating back to approximately 2,000 years ago.

The Petrified Forest National Park Wilderness Area has been affected primarily by the forces of nature and is largely untrammeled by humans. The biophysical environment has gone largely un-manipulated and thus the untrammeled quality of the area has not been greatly affected. The National Park Service takes few intentional actions that might affect plants, animals, soil, water, or natural fire in this wilderness area.

Authorized actions that occur in the park and can affect the untrammeled quality include maintenance of the boundary fence, treatments to control nonnative and invasive species (including tamarisk and Russian thistle), ecosystem restoration, and activities related to paleontological and archeological work. Additionally, the purpose of Petrified Forest National Park is to preserve, protect, and provide opportunities to experience globally significant Late Triassic paleontological resources, nationally significant archeological sites, and scenic and natural resources, including the Painted Desert, and to foster scientific research and public understanding and appreciation of park resources. The collection and preservation of these resources, though impacting to the untrammeled nature of the wilderness area, are necessary to fulfill the purpose of the park (NPS 2011).

Undeveloped. The two wilderness units of Petrified Forest National Park are free of any permanent improvements or modern human occupation. Its remoteness, the lack of water, extreme topography, and harsh conditions have limited land use and development of the area. The wilderness areas do not contain trails, signs, campsites, or accessible water sources. The only evidence of past use (such as rusted out vehicles and old road traces) speaks to the challenging conditions of the area and the inability of modern humans to establish a permanent foothold. However, there are signs of prehistoric human occupations (such as petroglyphs, artifacts, and dwellings) that do not detract from the undeveloped character of the area (NPS 2011).

Authorized mechanized use in the wilderness area occurs in the northeast corner of the park. The park accesses this area once or twice annually via a small portion of an unimproved road that enters the wilderness to perform fence maintenance and for patrols (Caffey 2012).

Natural. Within the park's wilderness area, the integrity of the ecosystem relies on natural processes for renewal and regeneration. Evolving landforms prevail and reveal the stories of geologic time. The interaction of the underlying geology with unfettered natural processes results in a unique landscape type that was and is unsuitable for development. This is especially so in the northern wilderness area where the rugged terrain consists of badlands, buttes, and mesas. As a result, this preserved and undisturbed wilderness area provides rare opportunities to witness natural processes acting on the landscape. Geologic and climatic systems provided the foundation for the ecosystems that developed in the wilderness area.

Geologic processes influenced and shaped the ecological diversity which is now characteristic of the wilderness. Pristine short grass prairie, badlands, sand dunes, playa lakes, and riparian areas are among the distinct ecological zones that occur across the variable elevations in the region's semi-arid climate.

Activities that occur in the park wilderness area that can affect the natural quality include social trails (which can result in damage to cryptobiotic soils), the building of rock cairns, cattle trespass, ATV trespass, littering and vandalism, and the removal of archeological and paleontological resources from their natural context. This delicate ecosystem does not recover easily from impacts, and the loss of connectivity with surrounding landscapes is also a threat to keystone species living in or near the wilderness areas (including prairie dogs and pronghorn) (NPS 2011).

Outstanding Opportunities for Solitude or Primitive, Unconfined Recreation. Primitive (nonmotorized) forms of recreation are allowed in wilderness. Within the wilderness areas at Petrified Forest National Park, hiking, backpacking, and horseback riding are permitted. Overnight camping is only allowed in the wilderness area of the park and requires a backcountry permit. With low visitation and lack of infrastructure, the wilderness area provides opportunities for solitude, and is the epitome of primitive and unconfined types of recreation. The park does not provide visitors with suggested travel routes or destinations, and thereby provides visitors with a sense of freedom to explore.

The wilderness areas include meandering topography, undeveloped views, pristine soundscapes, and dark night skies that visitors with the opportunity to experience solitude, freedom, and spirituality in a setting that is undisturbed by modern human influences.

Impacts to the solitude or primitive and unconfined types of recreation include degraded viewsheds, soundscapes, and night skies. Wind-blown trash, air tours, and climate change can also have profound effects on the experience of visitors. It is important to note conditions are not uniform throughout the northern and southern wilderness areas and some threats are greater in certain sections of the wilderness (NPS 2011).

METHODS

The implementation of some fuel reduction actions associated with alternative B would require a minimum requirement analysis. The rationale for the use of mechanized equipment and other motorized tools in and over wilderness is included in the attached minimum requirement decision guide (see appendix C). The primary reasons for using motorized tools are to ensure visitor and firefighter safety, afford effective access, and to protect park resources.

Impacts on wilderness character were considered for all wilderness portions of the park that could be affected by fire management activities. Impact threshold definitions for wilderness character are as follows. The mitigation measures in chapter 2 would be implemented as part of the project and are accounted for in the analyses of effects, which are organized by fire management tool.

- *Negligible:* Changes in the wilderness character and associated values would not be measurable.

- *Minor*: Changes to the wilderness character and associated values would be slightly detectable.
- *Moderate*: Changes to the wilderness character and associated values would be readily apparent.
- *Major*: Changes to the wilderness character and associated values would be substantial and may have permanent consequences.
- *Short-term* effects would last less than one year
- *Long-term* effects would last longer than one year

REGULATIONS AND POLICIES

Current regulations and policies related to the analyses of effects on wilderness in the park include the following:

- Wilderness Act of 1964;
- Director's Order #41: Wilderness Preservation and Management; and
- NPS *Management Policies 2006* (NPS 2006).

IMPACTS OF ALTERNATIVE A, NO ACTION (FIRE SUPPRESSION)

Analysis

Fire is relatively rare in the grasslands and shrublands in the park and are usually of low-severity and rapid. Wildfires would have negligible impacts to the untrammeled, undeveloped, and natural qualities of wilderness. During a wildfire event, impacted areas of the park that were deemed unsafe for visitors would be temporarily closed. Temporary closures would impact opportunities for solitude or primitive and unconfined type of recreation in the closed area. The temporary nature of these closures combined with low visitation to the park's wilderness areas would result in local, short-term, negligible to minor adverse impacts to this wilderness quality.

Under alternative A, wildfire would be treated using fire suppression tactics. Wildfires that occur in the northern wilderness area that do not threaten human safety, property, or park resources or values may be suppressed by containing fire using natural barriers and breaks. Impacts would be the same as those described above from wildfire.

Manual suppression utilizing hand tools and/or hand operated power tools could occur in both of the park's wilderness areas under the no action alternative. The use of aircraft to transport water and/or retardant to a fire location could also occur, depending on the severity of the fire and its location. However, the use of aircraft for fire suppression in the park has been extremely rare and has not occurred in the past 20 years. The use of mechanized tools and/or aircraft to suppress fire would be temporary, typically lasting less than a day. Implementation of these suppression tactics, either by hand crew and/or aircraft would adversely affect the untrammeled quality of the wilderness. However, because of the relative infrequency of fire in the park and the associated infrequency of suppression actions, impacts to the untrammeled wilderness quality would be short-term and minor to moderate in intensity. The presence of these tools and their associated noise would result in local, short-term, minor to moderate adverse impacts to the undeveloped quality of wilderness.

Fire suppression tactics under alternative A would remove a naturally occurring process from the park's landscape. Despite the fact that the park is in a non-fire dependent ecosystem, the suppression of a natural process would result in local, long-term, minor to moderate, adverse impacts to the

natural quality of wilderness. However, due to the historic suppression of all fires in the park, fuel loads may be larger than they would be naturally and therefore wildland fires could burn hotter and more aggressive than they would otherwise. As a result, suppression of fire and protection of flora and fauna at risk from wildfire impacts could benefit the natural quality of wilderness in the short-term.

The health and safety of visitors is a high priority of the National Park Service. During the suppression of fires in wilderness, visitors may be excluded from certain areas for their safety. Temporary closures and the noise associated with the use of hand-held tools and/or aircraft may temporarily impact opportunities for solitude or primitive and unconfined type of recreation in the wilderness. However, these impacts would only last as long as the equipment was present or the closure was in place. Based on both the infrequent visitor use of the wilderness areas in the park and the relative infrequency of fire in these areas, the impacts to this wilderness quality would be local, short-term and negligible to minor in intensity.

Because of the rugged terrain and the lack of roads and vehicle access in areas adjacent to the wilderness areas, engine crews would not be commonly used in the park's wilderness areas under alternative A. Access is available via an unimproved road along the north eastern boundary of the park and the northern wilderness area. The impacts of using this tool would adversely affect the untrammeled quality of wilderness. However, given the relative infrequency of fire in the park and the subsequent infrequency of suppression implementation, impacts to the untrammeled wilderness quality would be short-term and minor to moderate in intensity. The presence of motorized equipment and their associated noise would result in local, short-term, minor to moderate adverse impacts to the undeveloped quality of wilderness.

Cumulative Impacts

The other plans and projects implemented in the park are primarily management and resource oriented plans and policies that assist the National Park Service in meeting the Petrified Forest National Park's mandate now and in the future. Ongoing park resource management plans provide frameworks for guiding actions that would protect natural resources. By protecting natural resources, these plans would also protect wilderness values, which would provide long-term, beneficial effects on wilderness.

The spread of invasive exotic species in the region threatens natural resources and ecosystems. Non-native species may be inadvertently introduced to wilderness areas by visitors and by other species. Controlling exotic vegetation in the wilderness would cause short-term, minor, adverse effects on the natural and untrammeled qualities of wilderness by adversely affecting resources, such as soils, water quality, and soundscape in a manner that would be apparent to observant visitors. Long-term impacts from the control of nonnative species would be beneficial to the natural wilderness quality.

The park staff is currently developing a wilderness management plan for the two designated wilderness areas in the pre-expansion portion of the national park. They will also conduct a wilderness study for the 125,000 acres added to the park in 2004 once a substantial part of the private lands have been acquired. Once complete, the wilderness management plan will establish long-term management goals for wilderness and result in long-term benefits to wilderness character.

When the short-term, beneficial and minor adverse and substantial widespread long-term beneficial effects of other past, on-going, and future plans, projects, and activities affecting wilderness character are combined with the short- and long-term negligible to moderate adverse and short-term beneficial effects under alternative A, the cumulative effects would be widespread long-term beneficial.

Conclusion

The following impacts would be associated with alternative A:

- The presence and implementation of fire suppression using hand crews and aircraft would have local, short-term, minor to moderate adverse impacts on the untrammeled and undeveloped wilderness qualities.
- Suppression of all wildfire would result in local, long-term, minor, adverse impacts to the natural quality of wilderness. However, the suppression of aggressive wildfire could benefit the natural quality of wilderness in the short-term.
- The use of mechanized fires suppression equipment and the temporary closure of certain areas during a wildfire would result in local, short-term, negligible to minor and adverse impacts to opportunities for solitude or primitive and unconfined type of recreation.
- Wildfire would result in negligible impacts to the untrammeled, undeveloped, and natural qualities of wilderness. Wildfire could result in local, short-and long-term, adverse impacts to the natural quality of wilderness depending on the location and severity. Suppressing wildfire in the northern wilderness area by containing fire using natural barriers and breaks would have the same impacts as a wildfire.

When the short-term, negligible to moderate adverse and short- and long-term beneficial effects of other past, on-going, and future plans, projects, and activities affecting wilderness character are combined with the short- and long-term negligible to moderate adverse and short-term beneficial effects under alternative A, the cumulative effects on park wilderness would be long-term beneficial.

IMPACTS OF ALTERNATIVE B, MULTIPLE FIRE MANAGEMENT STRATEGIES

Analysis

Under alternative B, the impacts wildfire suppression using hand crews and aircraft suppression efforts on wilderness character in the park would be the same as those described for alternative A and would include the following:

- The presence and implementation of hand crews and aircraft would have local, short-term, minor to moderate adverse impacts on the untrammeled and undeveloped wilderness qualities.
- Suppression of wildfire would limit a natural process and result in local, long-term, minor to moderate, adverse impacts to the natural quality of wilderness. However, the suppression of aggressive wildfire could benefit the natural quality of wilderness in the short-term.
- The use of mechanized equipment and the temporary closure of certain areas during a wildfire would result in local, short-term, negligible to minor and adverse impacts to opportunities for solitude or primitive and unconfined type of recreation.
- Wildfire would result in negligible impacts to the untrammeled, undeveloped, and natural qualities of wilderness. Wildfire could result in local, short-and long-term, adverse impacts to the natural quality of wilderness depending on the location and severity.

The impacts associated with the use of engines to suppress wildfire under alternative B would be the same as under alternative A.

Use of approved herbicides on nonnative vegetation to reduce fuel loads and proliferation would consist of localized spot treatment application by park staff. The use and application of herbicide

would result in local, short-term, minor, and adverse impacts to the untrammeled and undeveloped qualities of wilderness.

During herbicide application, the areas being treated may be temporarily closed to park visitors. Due to the localized and short duration of these closures, the impact to opportunities for solitude or primitive and unconfined type of recreation would be negligible.

Treating nonnative vegetation would reduce the fuel load and help to reduce the frequency and size of wildfire events and lessen the potential for disruption or change of wilderness character associated with suppression actions. Use of herbicides would also reduce the amount of nonnative vegetation and help maintain natural flora and fauna communities. These actions would result in local long-term benefits to the natural quality of wilderness and to opportunities for solitude or primitive and unconfined type of recreation.

Manual thinning of vegetation with hand-held motorized tools to reduce fuel load during a wildfire may occur in either of the park's two wilderness areas. Impacts associated with manual thinning would be similar to those described under alternative A for hand crews, engine, and aircraft fire suppression tactics.

The presence of motorized tools and their associated noise would have local, short-term, minor to moderate adverse impacts on the untrammeled and undeveloped wilderness qualities.

The use of manual thinning to enhance the natural process of fire and to protect flora and fauna at risk from unwanted fire impacts and aggressive suppression response would result in local long-term benefits to the natural quality of wilderness.

The noise produced from hand- tools being used for manual thinning and the potential for temporary closures would result in local, short-term, negligible to minor and adverse impacts to opportunities for solitude or primitive and unconfined type of recreation. Mechanical thinning of vegetation to reduce fuel loads would primarily consist of mowing areas along paved road corridors and would not occur in the park's wilderness areas.

The use of prescribed fire would not occur in the wilderness areas of Petrified Forest National Park.

Cumulative Impacts

Past, current, and foreseeable future actions within and outside the park that cumulatively could impact wilderness character in Petrified Forest National Park would be the same as those described for alternative A. Collectively, these other actions would result in short-term, negligible to moderate adverse and short and long-term beneficial cumulative impacts on wilderness character in the park.

When the local, short-term, minor adverse and widespread, short- and long-term beneficial effects of other past, on-going, and future plans, projects, and activities affecting wilderness character are combined with the local, short- and long-term, negligible to moderate, adverse and short- and long-term beneficial effects under alternative B, the cumulative effects on park wilderness would be long-term beneficial.

Conclusion

The following impacts would be associated with alternative B:

- The presence and implementation of fire suppression using crews and motorized equipment and fuel reduction activities would have local, short-term, minor to moderate adverse impacts on the untrammeled and undeveloped wilderness qualities.

- Suppression of wildfire would limit a natural process and result in long-term, minor, adverse impacts to the natural quality of wilderness. However, the suppression of unnaturally aggressive wildfire could benefit the natural quality of wilderness in the short-term.
- Herbicide use would be localized to treat nonnative vegetation contributing to excess fuel loads and would result in short-term, minor, and adverse impacts.
- The use of mechanized fire suppression and manual fuel reduction equipment and the temporary closure of certain areas during a wildfire or fuel reduction activities would result in short-term, negligible to minor and adverse impacts to opportunities for solitude or primitive and unconfined type of recreation.
- Mechanized fuel reduction techniques would not be used in wilderness.
- Wildfire would result in negligible impacts to the untrammelled, undeveloped, and natural qualities of wilderness. Wildland fire could result in short- and long-term adverse impacts to the natural quality of wilderness depending on the location and severity.
- Manual thinning of vegetation and the removal of nonnative vegetation would help maintain natural flora and fauna communities, reduce fuel load, and enhance the natural process of fire which would result in long-term benefits to the natural quality of wilderness and to opportunities for solitude or primitive and unconfined type of recreation.

When the short-term, minor, adverse and short- and long-term widespread beneficial effects of other past, on-going, and future plans, projects, and activities affecting wilderness character are combined with the local short- and long-term negligible to moderate adverse and short- and long-term beneficial effects under alternative B, the cumulative effects would be widespread long-term beneficial.

HEALTH AND SAFETY

AFFECTED ENVIRONMENT

The health and safety of visitors, fire personnel, park staff, and adjacent landowners is a high priority of the National Park Service. Wildland fires and fire management activities can present risks to the public, firefighters, and park staff. No deaths or serious injuries to visitors, adjacent property owners, park staff, or firefighters from wildland fire or fire management activities have occurred at Petrified Forest National Park. However, access into the northern wilderness area of the park is difficult and the safety of firefighters is of particular concern during efforts to suppress fires in this area. The risks include the potential for injury, lack of available water, and the risk of becoming lost and disoriented in the largely unmarked terrain.

METHODS

The larger context for analyzing the impact of each alternative on public health and safety is established by the legislation establishing the national park, as well as *Management Policies* (NPS 2006). NPS policies provide service-wide guidelines and mandates for public health and safety. The saving of human life takes precedence over all other management actions as the National Park Service strives to protect human life. The National Park Service does this within the constraints of the 1916 Organic Act. The primary—and very substantial—constraint imposed by the Organic Act is that discretionary management activities may be undertaken only to the extent that they will not impair park resources and values.

Effects on public health and safety were evaluated and determined qualitatively based on the professional judgment of NPS staff and consultants. The primary sources of information used in this analysis included existing park management documents, NPS policy documents, and unpublished observations and insights from knowledgeable park staff.

The predicted intensity of impacts was based on the following criteria:

- *Negligible*: Public health and safety would not be affected, or the effects would be at low levels of detection and would not have an appreciable effect on public health or safety.
- *Minor*: The effect would be detectable, but would not have an appreciable effect on public health and safety.
- *Moderate*: The effects would be readily apparent and would result in substantial, noticeable effects to public health and safety.
- *Major*: The effects would be swiftly apparent and would result in substantial, noticeable effects to public health and safety.
- *Short-term*: Effects would occur only during and shortly after a specified action or treatment.
- *Long-term*: Effects would persist well beyond the duration of a specified action or treatment.

REGULATIONS AND POLICIES

Current regulations and policies associated with health and safety include the following:

- Director's Order #50 and *Reference Manual 50, Safety and Health*;
- Director's Order #58 and *Reference Manual 58, Structural Fire Management*;
- Director's Order #83 and *Reference Manual 83, Public Health*;

- Director's Order #51 and *Reference Manual 51, Emergency Medical Services*;
- Director's Order #30 and *Reference Manual 30, Hazard and Solid Waste Management*;
- *Management Policies 2006* (NPS 2006); and
- Occupational Safety and Health Administration regulations in 29 *Code of Federal Regulations*.

IMPACTS OF ALTERNATIVE A, NO ACTION (FIRE SUPPRESSION)

Analysis

During a wildfire, impacted areas of the park that were deemed unsafe for visitors would be temporarily closed and any visitors in these areas would be escorted to safety. As a result, impacts to the health and safety of visitors and park staff would be short-term, negligible, and adverse.

Due to the rugged terrain and extreme temperatures of the park's backcountry, visitation to these areas is low. Therefore, most of the park's visitors would not be near wildfires in these parts of the park. However, due to their remote nature, if visitors were in these areas during a wildfire, it would take longer for park personnel to reach them. Because of low visitation and the small size of typical fires in the park's non fire-dominated ecosystem, the likelihood of visitors being in the vicinity of a fire in the backcountry is not high and impacts to health and safety in the backcountry would be short-term, minor, and adverse.

Wildfires within the northern wilderness area would be suppressed by containing fire using natural barriers and breaks if the fire did not threaten human safety, property, or park resources. Monitoring and confining the fire would be conducted by trained NPS firefighting staff. Using this suppression tactic would limit firefighter exposure to the fire and the rugged terrain and therefore, result in long-term beneficial effects to health and safety.

Smoke and particulate matter in the atmosphere resulting from a wildfire at the park could affect the respiratory systems and vision of park staff and visitors. The severity of the fire's effect would depend on each individual's sensitivity to these irritants. It is assumed that the duration of their exposure would range from a few hours to a full day (fires in this region rarely burn for more than a day). Due to closures of the immediate area and the short duration of most fires in the park, smoke exposure from wildfire under alternative A would have local to widespread, short-term, negligible to minor, adverse effects on health and safety.

The health and safety of visitors, fire personnel, park staff, and adjacent landowners are high priorities of the National Park Service. In keeping with these priorities, fire suppression tactics would be selected based on fire conditions and safety considerations. Implementation methods would be performed by trained staff, using the appropriate safety gear and tools, and would follow safety procedures laid out by the National Park Service, the state of Arizona, the U.S. Forest Service, and the Bureau of Indian Affairs. The use of hand crews and engines to suppress fire would require firefighting personnel to be closer to a wildland fire than during use of aircraft. However, the use of the aircraft would involve an inherent risk and, therefore, impacts from all three suppression tactics would be similar. Due to safety procedures and the use of trained personnel, impacts to the health and safety of firefighting and park personnel would be short-term, minor, and adverse.

In the event of a wildfire, the impacted areas of the park would be temporarily closed to visitors and any visitors in these areas would be safely escorted out of the area. As a result, impacts to visitor health and safety from fire suppression tactics would be short-term, negligible, and adverse. The suppression of wildland fires would reduce the duration and extent of a fire and would result in local to widespread, long-term, beneficial effects to health and safety in the park.

Cumulative Impacts

The other plans and projects implemented in the park are primarily management and resource oriented plans and policies that assist the National Park Service in meeting the Petrified Forest National Park's mandate now and in the future. As a result, these plans and policies would contribute beneficially to cumulative impacts on health and safety inherently.

The 2013 *Interagency Standards for Fire and Fire Aviation Operations* and the interagency agreements (the Department of the Interior State Fire Management Plan, the Joint Powers Agreement, and the White Mountain Zone Agreements) between the U.S. Forest Service, the Department of the Interior, the Bureau of Indian Affairs, and the state of Arizona outline principles, policy statements, and interagency cooperation in place for fire prevention, preparedness, suppression and related fire management activities. These safety standards provide widespread long-term beneficial impacts to health and safety in the park in regard to fire management and fire suppression.

When the widespread long-term beneficial effects of other past, on-going, and future plans, projects, and activities affecting visitor health and safety are combined with the local short-term negligible to minor adverse and long-term beneficial effects under alternative A, the cumulative effects would be widespread long-term beneficial.

Conclusion

Alternative A would have localized, short-term, negligible to minor, adverse impacts given the small size and infrequency of wildfires in the park and minimal visitation outside of the developed areas. Long-term beneficial effects on health and safety in the park would accrue from suppression of wildfires. When the long-term beneficial effects of other past, on-going, and future plans, projects, and activities affecting visitor health and safety are combined with the effects under alternative A, the cumulative effects would be widespread long-term beneficial.

IMPACTS OF ALTERNATIVE B, MULTIPLE FIRE MANAGEMENT STRATEGIES

Analysis

Under alternative B, the impacts from wildfire and suppression efforts on health and safety in the park would be the same as those described for alternative A. Impacts would be local, short-term, negligible to minor adverse and long-term beneficial.

Use of approved herbicides on nonnative vegetation to reduce fuel loads and proliferation would consist of spot treatment application by trained park staff. Herbicide application would be conducted in accordance with manufacturer label directions. The area being treated would be closed to park visitors if there were any risk associated with the herbicide. As a result, impacts to health and safety from herbicide use would be local, short-term, negligible, and adverse.

Manual thinning of vegetation with hand-held tools and mechanical thinning of vegetation to reduce fuel loads would be completed by trained park staff. The area being thinned would be closed to park visitors if there were any risk associated with the machinery and/or debris. As a result, impacts to health and safety from manual thinning of vegetation would be short-term, negligible, and adverse.

Prescribed fires, whether pile or broadcast burns, would be planned to minimize impacts to health and safety and the risk of the fire expanding beyond the intended boundaries. Prescribed fires would be conducted with trained park firefighting staff. Due to planning efforts, use of interagency and National Park Service safety procedures, application of mitigation measures, and use of trained personnel, impacts to the health and safety of firefighting and park personnel from prescribed fire

would be short-term, minor, and adverse. During a prescribed fire event, affected areas of the park would be temporarily closed. As a result impacts to visitors would be short-term, negligible, and adverse.

Impacts from the smoke and particulate matter in the atmosphere resulting from a prescribed fire would be similar to those described under alternative A for wildfire. However, prescribed fires could be smaller and burn for less time than wildfires. Impacts to health and safety would vary based on an individual's sensitivity and proximity to smoke or other irritants but typically would be localized, short-term, negligible to minor, and adverse.

Overall, the use of fuel reduction methods would help control a prescribed fire, and/or reduce the duration and extent of a wildfire and therefore result in local to widespread, long-term, beneficial effects to health and safety.

Cumulative Impacts

Past, current, and foreseeable future actions within and outside the park that cumulatively could impact health and safety in Petrified Forest National Park would be the same as those described for alternative A. Collectively, these other actions would result in widespread long-term beneficial cumulative impacts on health and safety in the park.

When the long-term beneficial effects of other past, on-going, and future plans, projects, and activities affecting visitor use and experience are combined with the local, short-term, negligible to minor, adverse and long-term beneficial effects under alternative B, the cumulative effects would be widespread long-term beneficial.

Conclusion

Alternative B would have short-term negligible to minor adverse impacts associated with suppression and fuel reduction activities on firefighters, park staff, and visitors. Long-term beneficial effects on health and safety would result from reduced fuel loads that would minimize the size and intensity of future wildfires. When the widespread long-term beneficial effects of other past, on-going, and future plans, projects, and activities affecting health and safety are combined with the localized short-term negligible to minor adverse and long-term beneficial effects under alternative B, the cumulative effects would be widespread long-term beneficial.

VISITOR USE AND EXPERIENCE

AFFECTED ENVIRONMENT

Petrified Forest National Park is located in eastern Arizona, near Interstate 40. The Painted Desert Visitor Center complex serves as the primary entry point to the park and includes a bookstore, orientation movie, hands-on exhibits, restaurant, gift shop, and post office. The Rainbow Forest museum complex is located near the park's south entrance and includes an orientation movie, bookstore, fossil exhibits, limited food service, a gift shop, and Giant Logs, Long Logs, and Agate House trail access. The Painted Desert Inn National Historic Landmark is located two miles north of the Painted Desert Visitor Center and includes a bookstore, museum exhibits, and Wilderness and Rim Trail access.

A 2001 visitor study indicated that park visitors tend to be highly educated and have relatively high incomes, often arriving in groups – usually families. Approximately three-quarters of the visitors are there for the first time, and the average duration of visits is 2.4 hours. The typical visitor is usually visiting Petrified Forest National Park as part of a trip that includes other nearby national parks. Seeing petrified wood and the Painted Desert are the most common reasons for a visit, although the park also offers opportunities for day hiking, picnicking, viewing historic properties, and auto touring. Although backcountry opportunities exist, such experiences are infrequent due to the extreme conditions of the climate and landscape. The park estimates that visitation to the backcountry is as low as 100-200 visitors per year (Parsons 2012).

Over the past ten years, visitation averaged 593,559, with a peak of 664,725 visitors in 2010 and a low of 543,714 in 2008 (NPS 2012b). As shown in figure 2, the number of monthly visits hovers around the 20,000 to 30,000 mark during the offseason months of November through February, then incrementally rises during the spring before peaking in June and July (nearly 100,000 visits per month in 2011) and then slowly tapering over the fall months (NPS 2012b).

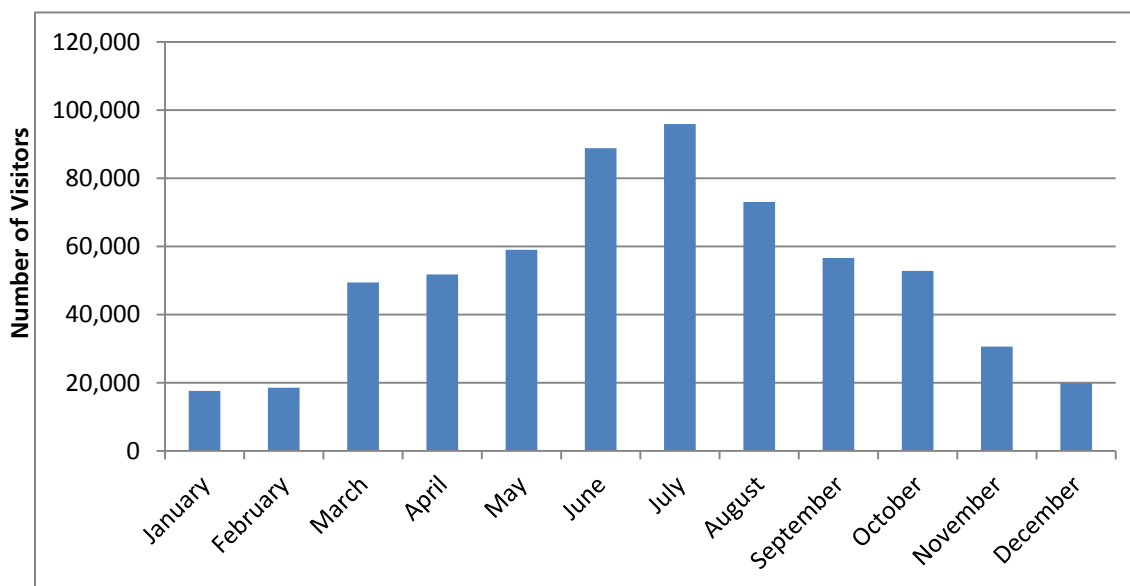


Figure 2: National Park Visitation Statistics for 2011

METHODS

The impact on the ability of the visitor to experience a full range of park resources was analyzed by examining resources mentioned in the park significance statement. The following definitions are used to define intensity levels:

- *Negligible*: Visitors would not be affected or changes in visitor use and/or experience would be below or at the level of detection. Any effects would be short-term. The visitor would not likely be aware of the effects associated with the alternative.
- *Minor*: Changes in visitor use and/or experience would be detectable, although the changes would be slight and likely short-term. The visitor would be aware of the effects associated with the alternative, but the effects would be slight.
- *Moderate*: Changes in visitor use and/or experience would be readily apparent and likely long-term. The visitor would be aware of the effects associated with the alternative and would likely be able to express an opinion about the changes.
- *Major*: Changes in visitor use and/or experience would be readily apparent and have important long-term consequences. The visitor would be aware of the effects associated with the alternative and would likely express a strong opinion about the changes.
- *Short-term*: Effects would occur only during and shortly after a specified action or treatment.
- *Long-term*: Effects would persist well beyond the duration of a specified action or treatment, or would not be associated with a particular action.

REGULATIONS AND POLICIES

Current regulations and policies associated with visitor use and experience include the following:

- Americans with Disabilities Act;
- Architectural Barriers Act;
- 1998 Executive Summary to Congress;
- National Parks and Recreation Act of 1978;
- National Park Service *Management Policies 2006* (NPS 2006);
- National Park Service Organic Act; and
- Rehabilitation Act

IMPACTS OF ALTERNATIVE A, NO ACTION (FIRE SUPPRESSION)

Analysis

Possible impacts to visitor use and experience during a wildfire event would include reduced visibility, adverse health and safety effects, temporary road closures, and noise intrusions (depending on suppression tactics). Due to the infrequency of wildfires in the park, these impacts would be local to widespread, short-term, negligible to minor, and adverse and would vary depending on an individual's sensitivity and location.

Following a wildfire, possible impacts to visitor use and experience would include altered viewsheds, potential loss of interpretative media, and increased interpretative opportunities. Impacts to viewsheds and interpretive media would be local, short-term, and negligible to minor, depending on

the severity of damage. Interpretive opportunities could educate visitors about the park's resources and management goals, providing short-and long-term beneficial effects.

Wildland fires in the northern wilderness area would be contained using natural barriers and breaks if the fire did not threaten human safety, property, or park resources. As a result, the area around wildfires burning in the northern wilderness area would be closed to visitors. These closures would have localized short-term adverse impacts on the visitor use and experience. However, due to the limited visitation in this area, the small size of most wildfires in the park, and the temporary nature of these closures, most visitors would not be impacted and impacts would be negligible in intensity.

Implementation of wildfire suppression tactics including hand and engine crews in response to wildfires could result in temporary disruption of access and use to park visitors in certain areas, including roads, visitor facilities, or other interpretive areas. Due to the limited accessibility of the park with only one road and because most visitors only spend about two and a half hours in the park, these temporary closures would result in localized short-term adverse impacts to the visitor experience. However, because of the infrequency of wildfires in park, these impacts would be negligible to minor in intensity and would vary depending on the time of year, location, and the duration of the closure.

The use of the aircraft to suppress wildfire could result in temporary disruption of access and use of the park by visitors. Due to the infrequent nature of wildfires in the park, these temporary closures would result in local, short-term, negligible to minor, adverse effects, depending on the time of year, location, and duration of the closures. Additionally, aircraft use would increase noise levels in parts of the park. Aircraft noise intrusions would be short-term, minor, and adverse, depending on the visitor's distance from the area being treated and the number of aircraft in operation. It should be noted that the use of aircraft to suppress wildfire has not been necessary in the park in over 20 years given the small size and infrequent nature of wildland fires that occur in the park.

Cumulative Impacts

The other plans and projects implemented in the park are primarily management and resource oriented plans and projects that assist the National Park Service in meeting the park's mandate now and in the future. As a result, these plans and projects contribute substantial parkwide beneficial impacts on visitor use and experience inherently.

When the long-term beneficial effects of other past, on-going, and future plans, projects, and activities affecting visitor use and experience are combined with the local short-term negligible to moderate adverse and long- and short-term beneficial effects under alternative A, the cumulative effects would be parkwide long-term beneficial. The beneficial and adverse effects of alternative A would contribute slightly to the beneficial cumulative impact.

Conclusion

Alternative A would have local short-term negligible to minor adverse impact from temporary area closures and noise associated with suppression activities. Long-and short-term beneficial effects on visitor use and experience would result from educational and interpretative opportunities. When the parkwide long-term beneficial effects of other past, on-going, and future plans, projects, and activities affecting visitor use and experience are combined with the localized short-term negligible to minor adverse and long- and short-term beneficial effects under alternative A, the cumulative effects would be parkwide long-term beneficial.

IMPACTS OF ALTERNATIVE B, MULTIPLE FIRE MANAGEMENT STRATEGIES

Analysis

The impacts from wildfire and suppression efforts on visitor use and experience under alternative B would be the same as those described for alternative A for the same reasons. Short-term impacts would be localized, negligible to minor, and both adverse and beneficial. Long-term impacts would be beneficial.

Use of approved herbicides on nonnative vegetation to reduce fuel loads and proliferation would consist of spot treatment application by trained park staff. Depending on the location of treatment, the application process could result in very temporary closures to visitors. Due to their very temporary nature, these closures would result in localized, short-term, negligible adverse impacts to visitor use and experience.

Use of herbicides would visually reduce the amount of nonnative vegetation in the park and would result in a reduced fuel load that would help minimize the frequency of wildfire. Therefore, the use of herbicides on nonnative vegetation would result in localized long-term beneficial effects to visitor use and experience.

Manual thinning of vegetation to reduce fuel loads prior to a prescribed fire or during a wildfire would utilize hand-held mechanized tools and would typically occur in the vicinity of structures. Mechanical thinning would utilize mechanized lawn mowers and would occur along paved road corridors in the park. Use of these tools would result in noise intrusions to the visitor experience. The noise intrusions produced from the use of mechanized equipment for fuel reduction would result in local, short-term, and negligible to minor impacts to visitor use and experience depending on their proximity to the area being thinned. Any temporary closures associated with manual and mechanical thinning would have similar impacts to those closures described under alternative A and would result in local, short-term, negligible to minor, and adverse impacts.

Visual impacts to the visitor experience from manual and mechanical thinning would be associated with the presence of work crews and the visual evidence of the thinning. Manual thinning would be targeted towards vegetation around park structures and would be sensitive to historic structures and landscapes. These practices could improve the appearance of park structures and landscapes. Mechanical thinning may be used to cut swaths of grasslands to control the spread of a wildfire. These swath cuts would be temporarily noticeable to park visitors until the grasses grew back. Due to their temporary nature, the visual presence of work crews and the visual evidence of manual and mechanical thinning on the landscape would result in local, short-term, negligible to minor, adverse and beneficial impacts to the visitor experience.

Prescribed fires, whether pile or broadcast burns, would occur on a small scale and would be in contained areas in the park. They would be planned in accordance with weather conditions and lower visitation times to minimize road closures and impacts to health and safety. Any temporary closures would have similar impacts to those closures described above under alternative A. Other possible impacts to visitor use and experience would be similar to those described for wildfires under alternative A; however, due to the planning efforts that would take place prior to a prescribed fire, their planned containment, and small size, impacts to visitor use and experience would be short-term, negligible to minor, and adverse.

Following a prescribed fire, impacts to visitor use and experience would include the visual evidence of the fire. Prescribed fire would be limited to burning accumulated vegetative debris and small-scale broadcast burns to reduce fuel loads. Given the size and extent of prescribed burns in the park and the relatively quick recovery of vegetation, the visual impacts would be localized, short-term,

negligible, and adverse. Over the long-term, prescribed fire would reduce fuel loads and the visual presence of vegetative debris resulting in beneficial effects to visitor use and experience.

Cumulative Impacts

Past, current, and foreseeable future actions within and outside the park that cumulatively could impact visitor use and experience would be the same as those described for alternative A.

When the parkwide, long-term, beneficial effects of other past, on-going, and future plans, projects, and activities affecting visitor use and experience are combined with the localized, short-term, negligible to minor, adverse and long- and short-term beneficial effects under alternative B, the cumulative effects would be parkwide long-term and beneficial. The beneficial and adverse effects of alternative B would contribute slightly to the beneficial cumulative impact.

Conclusion

Alternative B would have local short-term negligible to minor adverse and long- term beneficial effects on visitor use and experience. When the parkwide long-term beneficial effects of other past, on-going, and future plans, projects, and activities affecting visitor use and experience are combined with the short-term negligible to minor adverse and long- term beneficial effects under alternative B, the cumulative effects would be parkwide long- term beneficial.

Chapter 4: Consultation and Coordination

SCOPING PROCESS AND PUBLIC INVOLVEMENT

Scoping is an early and open process used to determine the breadth of environmental issues and alternatives to be addressed in an environmental assessment and assessment of effect. Petrified Forest National Park conducted both internal scoping with appropriate NPS staff and external scoping with the public and interested and affected groups and agencies. Copies of the scoping notice, press release, letters to agencies and tribes are included in appendix B.

INTERNAL SCOPING

An internal scoping meeting was held on January 19, 2012 at Petrified Forest National Park. Participants included the project interdisciplinary team, representatives from the NPS Intermountain Regional Office, and the consultant preparing the environmental assessment. Products included the clarification of the project scope and features, information on site visit findings, scoping and consultation, definition of the action alternative, determination of the relevant impact topics, and identification of issues.

EXTERNAL SCOPING

The following actions were taken to inform the public about the intent to prepare this National Environmental Policy Act environmental assessment for Petrified Forest National Park. The public scoping period was from March 17 through June 18, 2012.

A press release was issued on May 17, 2012.

Scoping letters or notices were sent to approximately 220 people and organizations on the national park's mailing list. These included local, tribal, state, and federal agencies; organizations; and individuals.

The scoping notice was made available electronically on the National Park Service Planning, Environment, and Public Comment website at: <http://parkplanning.nps.gov/pefo>, from October 2 through October 26, 2012.

Public scoping produced one response, as follows.

The U.S. Fish and Wildlife Service Ecological Services Arizona Field Office notified the park of methods to identify the federal special status species that may be found in the project area and emphasized the protocol for threatened and endangered species to be considered in relation to federal actions. The response also recommended the National Park Service comply with Section 404 of the Clean Water Act if necessary, as well as contact the Arizona Game and Fish Department, Arizona Department of Agriculture, and any associated Tribes.

The agency response letter is provided in appendix B. The contents of the environmental assessment were reviewed to ensure that all of the concerns identified in public scoping were adequately addressed.

AGENCY CONSULTATION

The agencies, organizations, and experts who were consulted in the process of preparing this environmental assessment are listed below. Where specific information from one of these people was cited, complete source information was provided in the “Bibliography” section in chapter 5.

- U.S. Fish and Wildlife Service
- Arizona Game and Fish Department
- Arizona State Historic Preservation Office

NATIVE AMERICAN CONSULTATION

A number of tribes traditionally, and currently, are affiliated with the Petrified Forest area. Traditionally associated tribes include those listed below. Responses to the scoping letters sent at project inception were not received; however, all associated tribes will continue to be kept informed about the status of the environmental assessment. When the environmental assessment is released to the public, the National Park Service will again send letters to the tribes, formally asking for their input.

The following tribes were contacted to participate in the planning process:

- Hopi Tribe;
- Navajo Nation;
- Pueblo of Zuni; and
- White Mountain Apache Tribe.

LIST OF PREPARERS

The people identified in table 3 were primarily responsible for preparing this environmental assessment. The Table includes preparers' roles in preparing this document, and/or their expertise/experience."

Table 3: Preparers

National Park Service, Petrified Forest National Park	
Brad Traver	Superintendent
Pat Thompson	Chief of Resource Management
Greg Caffey	Chief Ranger
Brian Wray	Ranger / Park Wildland Fire Specialist
Bill Reitze	Archeologist / GIS Specialist
National Park Service, Inventory and Monitoring, Southern Colorado Plateau Network	
Jim DeCoster	Plant Ecologist
National Park Service, Intermountain Region	
Lisa Hanson	NEPA coordinator
National Park Service, Four Winds Fire Program	
Dave Dukart	Fuels Specialist and Acting Fire Management Officer
Parsons	
Don Kellett	Environmental scientist. B.S. in wildlife biology, 22 years of experience. Task manager.
Timberley Belish	Environmental scientist. B.S. in biology, M.S. in ecology and evolution, and 21 years of experience. Technical reviewer.
Alexa Miles	Environmental scientist. B.A. in environmental studies, M.S. in landscape architecture, and 9 years of experience. Contributing author.
Bruce Snyder	Environmental scientist. B.S. in biology, M.S. in wildlife biology, and 35 years of experience. Project manager for Parsons, document preparation oversight.
Seth Wilcher	Cultural resources specialist. Masters in Historic Preservation, 8 years experience. Contributing author.

LIST OF RECIPIENTS

This environmental assessment is being made available to the public, federal, state, and local agencies and organizations in press releases as well as in some local public places. Paper copies of the environmental assessment are available at the park's visitor centers. It is also available online at the project website <http://parkplanning.nps.gov/pefo>.

The following agencies, tribes, and organizations are on the mailing list for the project and were informed of the preparation of the environmental assessment.

FEDERAL AGENCIES

U.S. Fish and Wildlife Service
U.S. Forest Service, Tonto National Forest
U.S. Geological Survey
Natural Resources Conservation Service

AMERICAN INDIAN TRIBES

Hopi Tribe
Navajo Nation
Pueblo of Zuni
White Mountain Apache Tribe

STATE AND LOCAL AGENCIES

Arizona Commission of Indian Affairs
Arizona Department of Environmental Quality
Arizona Department of Public Safety
Arizona Department of Transportation
Arizona Department of Water Resources
Arizona Game & Fish Department
Arizona Office of Tourism
Arizona State Historic Preservation Officer
Arizona State Parks
City of Holbrook
City of Winslow
Apache County
Navajo County

Chapter 5: References

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**APPENDIX A
NATIONAL PARK SERVICE MEMORANDUMS: USE OF HEALTHY FOREST
INITIATIVE HAZARDOUS FUELS REDUCTION
CATEGORICAL EXCLUSION (2008 AND 2012)**

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United States Department of the Interior

NATIONAL PARK SERVICE

1849 C Street, N.W.

Washington, D.C. 20240

ELECTRONIC TRANSMISSION ONLY – NO HARD COPY TO FOLLOW
May 28, 2008

L7615 (2310)

Memorandum

To: Regional Directors

From: (Acting) Associate Director Natural Resource Stewardship and Science /s/ *Mary Foley*

Subject: Healthy Forests Initiative Hazardous Fuels Reduction Categorical Exclusion

Recently the Ninth Circuit Court of Appeals invalidated the use of the Department of Agriculture's "Healthy Forest Initiative Hazardous Fuel Reduction Categorical Exclusion." While the Court did not specifically address the validity of the Department of the Interior's similar Categorical Exclusion, the use of that exclusion by the National Park Service is to be discontinued for new projects relying on the "Hazardous Fuel Reduction Categorical Exclusion" for those units of the National Park System located within the jurisdiction of the Ninth Circuit. A "new" project is defined as one that hasn't begun implementation on the ground. Projects that are currently in progress may be completed.

The jurisdiction of the Ninth Circuit includes the states of Alaska, Arizona, California, Hawaii, Idaho, Montana, Nevada, Oregon, Washington, and U.S. territories in the Pacific, including Guam.

National Park System Units not located within the Ninth Circuit may continue to use the "Hazardous Fuel Reduction Categorical Exclusion" as appropriate and with documentation through the use of an environmental screening form and categorical exclusion documentation.

If you have any questions concerning this issue, please contact Jacob Hoogland, Chief, Environmental Quality Division at 202/513-7188 or Jeff Manley, Deputy Fire Program Planning at 208/387-5221.

cc: Regional Environmental Coordinators and Fire Management Employees

~~~~~

Mary Foley, Ph.D.  
Associate Director (Acting)  
Natural Resource Stewardship and Science  
National Park Service  
1849 C St NW  
Room 3130  
Washington D.C. 21001  
202 208 3884  
202 273 4431 (fax)  
617 784 4728 (cell)



# United States Department of the Interior

NATIONAL PARK SERVICE  
1849 C Street, N.W.  
Washington, D.C. 20240

IN REPLY REFER TO:

APR 24 2012

Memorandum

To: Regional Directors

From: Associate Director, Natural Resource Stewardship and Science

for

Associate Director, Visitor and Resource Protection

Subject: Use of Healthy Forest Initiative Hazardous Fuels Reduction Categorical Exclusion

On May 28, 2008, the acting Associate Director for Natural Resource Stewardship and Science issued a memorandum prohibiting use of the Healthy Forest Initiative Hazardous Fuels Reduction Categorical Exclusion (HFICE) (found at 43 CFR 46.210(k) and Director's Order 12 (DO-12) Handbook Section 3.4 (G)(1)) for any new treatments within the 9<sup>th</sup> Circuit's jurisdiction in response to a lawsuit (Sierra Club v. Bosworth, 510 F.3d 1016). The jurisdiction of the 9<sup>th</sup> Circuit includes the states of Alaska, Arizona, California, Hawaii, Idaho, Montana, Nevada, Oregon, Washington, and U.S. territories in the Pacific, including Guam.

Due to issues that could arise should the HFICE continue to be used by park units outside of the 9<sup>th</sup> Circuit, this memorandum expands the prohibition on use of the HFICE to all park units service-wide. Due to the fiscal and programmatic impacts of the expanded prohibition, the phased approach described below should be implemented, with the intent of obtaining full compliance with the service-wide prohibition within three years of the date of this memorandum.

For park units outside of the 9<sup>th</sup> Circuit, existing Fire Management Plans (FMP) or amendments to plans that used the HFICE may remain in effect for up to three years from the date of this memorandum. Unless prior written authorization is obtained from the Associate Director for Natural Resource Stewardship and Science, through the Associate Director for Visitor and Resource Protection, FMPs not in compliance at the end of three years will be suspended, and fuels work and wildfires managed for benefit may not be permitted until such a time as an approved FMP and related compliance is in place.

Use of the HFICE for individual fuels treatments will also be allowed outside of the 9<sup>th</sup> Circuit for up to three years from the date of this memorandum. However, you should begin to reduce reliance on the use of the HFICE immediately.

It is strongly recommended that fuels work be incorporated into a programmatic FMP and covered by an associated NEPA compliance document (environmental assessment or

environmental impact statement). The FMP should describe the routine scope of the anticipated fuels program, and the related environmental analysis should evaluate the effects of such a program.

The FMP should include a description of a typical program of fuels work representative of the long-term fuels program. A list of anticipated fuels treatments for five out-years should be included in an FMP appendix and updated annually or as needed. The list of treatments may be amended and updated to include specific new treatments and remove completed or outdated ones.

New treatments added to the revised program of work should be evaluated through use of an environmental screening form (ESF) and reviewed to determine whether the revised program of work remains within the scope and effects outlined in the FMP and related NEPA compliance document. If the review finds no new impacts other than those already analyzed in the FMP and related compliance document, and use of a categorical exclusion (CE) is appropriate pursuant to DO-12 and the DO-12 Handbook, then the ESF should document the application of the CE found in the DO-12 Handbook at Section 3.4 (A)(1) (“*Changes or amendments to an approved action when such changes would cause no or only minimal environmental impact*”) and work should proceed according to procedures outlined in the FMP. If new fuels treatments evaluated using the ESF are found to be beyond the scope and effects contained in the approved FMP and related NEPA compliance document, then additional NEPA reviews, pursuant to DO-12 and the DO-12 Handbook, would be necessary.

The Environmental Quality Division and Fire Management Program Center will evaluate the feasibility of creating a new NPS-specific CE for certain hazardous fuels treatments. However, promulgation of a new CE would be a lengthy process, and therefore it is strongly recommended that you proceed as quickly as possible to reduce reliance on the HFICE.

As a reminder, there are various compliance processes other than the HFICE available for program managers to deal with common situations. Please consult with your Fire Program planning contacts and park or regional compliance specialists as needed.

This memorandum and any subsequent documents that implement its directives are intended only to improve the internal management of the National Park Service; they are not intended to, and do not, create any right or benefit, substantive or procedural, enforceable at law or equity by a party against the United States, its departments, agencies, instrumentalities or entities, its officers or employees, or any other person.

If you have any questions concerning this issue, please contact Patrick Walsh, Chief, Environmental Planning & Compliance Branch, Environmental Quality Division, at (303) 987-6620; or Jeff Manley, Deputy, Fire Program Planning, National Interagency Fire Center, at (208) 387-5221.

cc:

Regional Environmental Coordinators  
Regional Fire Management Officers  
Director, Fire & Aviation Management

**APPENDIX B**  
**PRESS RELEASE, SCOPING LETTERS, AND RESPONSES**

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United States Department of the Interior

NATIONAL PARK SERVICE

Petrified Forest National Park

1 Park Road

P.O. Box 2217

Petrified Forest, AZ 86028

Tel: (928) 524-6228

Fax: (928) 524-3567



H4217 (PEFO)

May 17, 2012

Dear Friends and Neighbors,

The National Park Service (NPS) will be preparing an environmental assessment (EA) which will analyze the environmental effects of a new fire management plan that is proposed for Petrified Forest National Park, Arizona. The proposed fire management plan is intended to be both strategic and operational, guiding the full range of fire program activities that support land and resource management objectives.

The purpose of the proposed fire management plan for the Petrified Forest National Park is to comply with new national and NPS policies and to incorporate new scientific information into fire management planning within parks. In addition, the proposed fire management plan intends to ensure the health and safety of firefighters, NPS staff, and the public; protect cultural and natural resources within the park and properties adjacent to the park; and enhance public education and expand training for NPS staff regarding fire management and safety.

An environmental assessment will be prepared in compliance with the National Environmental Policy Act (NEPA) to provide the decision-making framework that 1) analyzes a reasonable range of alternatives to meet project objectives, 2) evaluates issues and impacts to monument resources and values, and 3) identifies mitigation measures to lessen the degree or extent of these impacts.

The NPS encourages public participation throughout the planning process. There will be two opportunities to comment formally on the project—once during initial project scoping and again following release of the environmental assessment. The NPS is currently in the scoping phase of the proposed project and invites the public to submit written suggestions, comments, and concerns regarding the project online at the NPS Planning, Environment, and Public Comment (PEPC) website at: <http://parkplanning.nps.gov/pefo>.

Comments also may be sent to the address below no later than June 18, 2012. If you have questions about the project or would like more information, please contact Patricia Thompson, Chief of Resources, at (928) 524-6228 ext 267 or [Patricia\\_Thompson@nps.gov](mailto:Patricia_Thompson@nps.gov).

Written comments can be sent to:

Petrified Forest National Park  
ATTN: Fire Management Plan EA Comments  
1 Park Road  
P.O. Box 2217  
Petrified Forest, AZ 86028

Sincerely,

Bradley S. Traver  
Superintendent



United States Department of the Interior  
NATIONAL PARK SERVICE  
Petrified Forest National Park  
1 Park Road  
P.O. Box 2217  
Petrified Forest, AZ 86028  
Tel: (928) 524-6228  
Fax: (928) 524-3567



H4217 (PEFO)

May 18, 2012

Mr. Steve Spangle, Field Supervisor  
U.S. Fish and Wildlife Service  
2321 West Royal Palm Road, Suite 103  
Phoenix, AZ 85021

Subject: *Scoping Notice – Fire Management Plan Environmental Assessment, Petrified Forest National Park, Arizona*

Dear Mr. Spangle,

The National Park Service (NPS) will be preparing an environmental assessment (EA) which will analyze the environmental effects of a new fire management plan that is proposed for Petrified Forest National Park, Arizona. The proposed fire management plan is intended to be both strategic and operational, guiding the full range of fire program activities that support land and resource management objectives.

The purpose of the proposed fire management plan for the Petrified Forest National Park is to comply with new national and NPS policies and to incorporate new scientific information into fire management planning within parks. In addition, the proposed fire management plan intends to ensure the health and safety of firefighters, NPS staff, and the public; protect cultural and natural resources within the park and properties adjacent to the park; and enhance public education and expand training for NPS staff regarding fire management and safety.

The project area is comprised of the entirety of NPS ownership within the boundaries of Petrified Forest National Park, in Navajo and Apache Counties, Arizona. Please refer to the attached figure for a graphic that shows the project location, i.e. – the park boundaries. The National Park is located within the USGS Pilot Rock, Chinde Mesa, North Mill Well, Little Lithodendron Tank, Kachina Point, Pinta, Sorrel Horse Mesa, Adamana, Padilla Tank, and Agate House 7.5' topographic map quadrangles. The public land survey township / range / section coordinates are shown in table 1.

**Table 1. Petrified Forest National Park Public Land Survey Coordinates**

| Township | Range   | Sections                                                                                                                                  |
|----------|---------|-------------------------------------------------------------------------------------------------------------------------------------------|
| 20 North | 23 East | 1, 2, 3, 10, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 27, 34, 35, 36, all.                                                                 |
| 20 North | 24 East | 1 – 36, all                                                                                                                               |
| 20 North | 25 East | 4, 5, 6, 7, 8, 9, 16, 17, 18, all.                                                                                                        |
| 19 North | 23 East | 1, 2, 3, 10, 11, 12, 13, 14, 15, all.                                                                                                     |
| 19 North | 24 East | 2, 3, 4, 5, 6, 7, 8, 9, 10, all; section 11, NW ¼ and N ½ NE ¼, sections 16, 17, 18, 21, 28, 33, all; the SW ¼ of the SW ¼ of section 27. |



| <b>Township</b> | <b>Range</b> | <b>Sections</b>                                                                                                                 |
|-----------------|--------------|---------------------------------------------------------------------------------------------------------------------------------|
| 18 North        | 24 East      | 4, 9, all; section 10, SW ¼ sections 13, 14, 15, 16, 21, 22, 23, 24, 25, 26, 27, 28, 33, 34, 35, 36, all.                       |
| 17 North        | 24 East      | 2, 11, 14, 23, 26, W halves; sections 3, 4, 5, 6, 7, 8, 9, 10, 15, 16, 17, 18, 19, 20, 21, 22, 27, 28, 29, 30, 31, 32, 33, all. |
| 17 North        | 23 East      | 34, 35, 36, all.                                                                                                                |
| 16 North        | 24 East      | 3 and 10, W ½'s; sections 4, 5, 6, 7, 8, 9, all.                                                                                |
| 16 North        | 23 East      | 1, 2, 11, 12, all; sections 3, 10, E ½'s.                                                                                       |

We are requesting any information your office may have regarding the presence of listed Federal threatened, endangered, or candidate species, species proposed for listing, and designated or proposed critical habitats, which may be affected by this project within Petrified Forest National Park. This request is being made pursuant to Section 7 of the Endangered Species Act. The EA will provide an in-depth evaluation of the potential effects to any listed or proposed species that use the habitats in the park.

We look forward to your participation in this process and believe that it will help ensure that federally listed species are adequately considered and evaluated in the EA. In keeping with the requirements of Section 7 consultation and National Park Service policy, when the EA is complete, we will make a copy available for your review and comment.

We would appreciate any preliminary input you may have by June 18, 2012. If you have questions about the project or would like more information, please contact Patricia Thompson, Chief of Resources, at (928) 524-6228 ext 267 or [Patricia\\_Thompson@nps.gov](mailto:Patricia_Thompson@nps.gov).

Comments can be sent to:

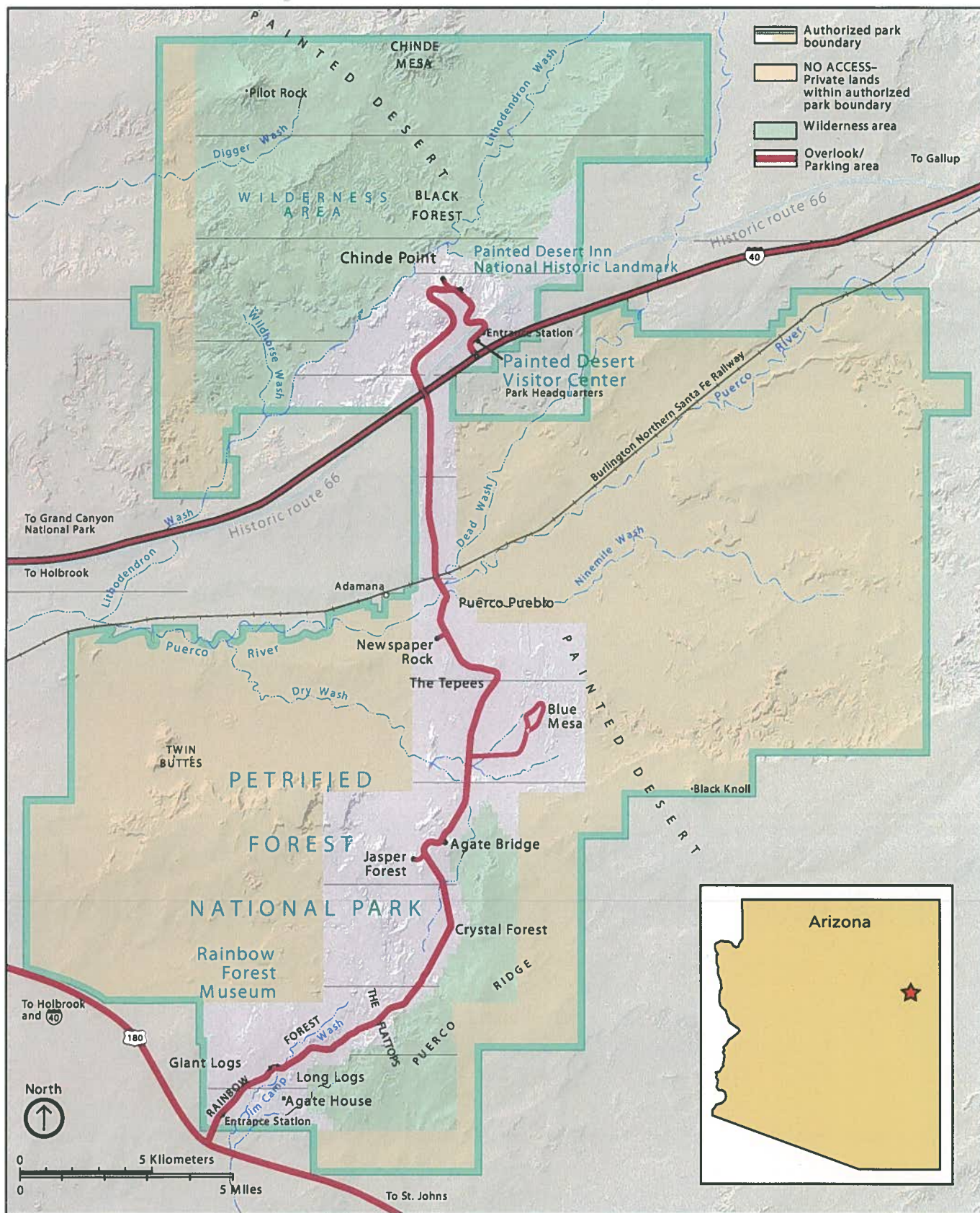
Petrified Forest National Park  
Attn: Fire Management Plan EA  
1 Park Road  
P.O. Box 2217  
Petrified Forest, AZ 86028

Sincerely,



Bradley S. Traver  
Superintendent

Enclosure



## PROJECT AREA MAP

Petrified Forest National Park

United States Department of the Interior / National Park Service





# United States Department of the Interior

U.S. Fish and Wildlife Service  
Arizona Ecological Services Office  
2321 West Royal Palm Road, Suite 103  
Phoenix, Arizona 85021-4951  
Telephone: (602) 242-0210 Fax: (602) 242-2513



In reply refer to:

AESO/SE  
02EAAZ00-2012-SL-0273

June 29, 2012



## Memorandum

To: Superintendent, National Park Service, Petrified Forest National Park, Petrified Forest, Arizona (Attn: Bradley S. Traver)

From: Field Supervisor

Subject: Proposed New Fire Management Plan, Petrified Forest National Park, Navajo and Apache Counties, Arizona

Thank you for your recent request for information on threatened or endangered species, or those that are proposed to be listed as such under the Endangered Species Act of 1973, as amended (ESA), which may occur in your project area. The Arizona Ecological Service Field Office has posted lists of the endangered, threatened, proposed, and candidate species occurring in each of Arizona's 15 counties on the Internet. Please refer to the following web page for species information in the county where your project occurs:

<http://www.fws.gov/southwest/es/arizona> (see attached lists)

If you do not have access to the Internet or have difficulty obtaining a list, please contact our office and we will mail or fax you a list as soon as possible.

After opening the web page, find County Species Lists on the main page. Then click on the county of interest. The arrows on the left will guide you through information on species that are listed, proposed, candidates, or have conservation agreements. Here you will find information on the species' status, a physical description, all counties where the species occurs, habitat, elevation, and some general comments. Additional information can be obtained by going back to the main page. On the left side of the screen, click on Document Library, then click on Documents by Species, then click on the name of the species of interest to obtain General Species Information, or other documents that may be available. Click on the "cactus" icon to view the desired document.

Please note that your project area may not necessarily include all or any of the species in a list. The information provided includes general descriptions, habitat requirements, and other information for each species on the list. Under the General Species Information, citations for the Federal Register (FR) are included for each listed and proposed species. The FR is available at most Federal depository libraries. This information should assist you in determining which species may or may not occur within your project area. Site-specific surveys could also be

helpful and may be needed to verify the presence or absence of a species or its habitat as required for the evaluation of proposed project-related impacts.


Endangered and threatened species are protected by Federal law and must be considered prior to project development. If the action agency determines that listed species or critical habitat may be adversely affected by a federally funded, permitted, or authorized activity, the action agency will need to request formal consultation with us. If the action agency determines that the planned action may jeopardize a proposed species or destroy or adversely modify proposed critical habitat, the action agency will need to enter into a section 7 conference. The county list may also contain candidate or conservation agreement species. Candidate species are those for which there is sufficient information to support a proposal for listing; conservation agreement species are those for which we have entered into an agreement to protect the species and its habitat. Although candidate and conservation agreement species have no legal protection under the Act, we recommend that they be considered in the planning process in the event that they become listed or proposed for listing prior to project completion.

If any proposed action occurs in or near areas with trees and shrubs growing along watercourses, known as riparian habitat, we recommend the protection of these areas. Riparian areas are critical to biological community diversity and provide linear corridors important to migratory species. In addition, if the project will result in the deposition of dredged or fill materials into waterways, we recommend you contact the Army Corps of Engineers which regulates these activities under Section 404 of the Clean Water Act.

The State of Arizona and some of the Native American Tribes protect some plant and animal species not protected by Federal law. We recommend you contact the Arizona Game and Fish Department and the Arizona Department of Agriculture for State-listed or sensitive species, or contact the appropriate Native American Tribe to determine if sensitive species are protected by Tribal governments in your project area. We further recommend that you invite the Arizona Game and Fish Department and any Native American Tribes in or near your project area to participate in your informal or formal Section 7 Consultation process.

Some projects may potentially impact species that are protected under the Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 U.S.C. sec. 703-712) and/or bald and golden eagles protected under the Bald and Golden Eagle Protection Act (BEGPA). Prohibitions under the MBTA include the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except as specifically authorized by the FWS. If you believe migratory birds will be affected by the project, we recommend you contact our Migratory Bird Permit Office, P.O. Box 709, Albuquerque, NM 87103, (505) 248-7882 or by email [FW2\\_birdpermits@fws.gov](mailto:FW2_birdpermits@fws.gov). For more information regarding the MBTA and permitting process, please visit the following web site: <http://www.fws.gov/migratorybirds/mbpermits.html>. For information on protections for bald eagles under the BEGPA, please refer to the FWS's National Bald Eagle Management Guidelines (72 FR 31156) and regulatory definition of the term "disturb" (72 FR 31132) that were published in the Federal Register on June 5, 2007. Existing take authorizations for bald eagles issued under the ESA became covered under the BEGPA via a final rule published in the Federal Register on May 20, 2008 (73 FR 29075).

For additional communications regarding this project, please refer to consultation number 02EAAZ00-2012-SL-0273. We appreciate your efforts to identify and avoid impacts to listed and sensitive species in your project area. If we may be of further assistance, please feel free to contact Brenda Smith (928) 556-2157 for projects in Northern Arizona, Debra Bills (602) 242-0210 (x239) for projects in central Arizona and along the Lower Colorado River, and Jean Calhoun (520) 670-6150 (x223) for projects in southern Arizona.

  
for Steven L. Spangle

Enclosures (2)

cc: Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ  
Brenda Smith, Assistant Field Supervisor, Fish and Wildlife Service, Flagstaff, AZ

W:\Cathy Gordon\administration\species ltrs\complete\NPS New Fire Management Plan. Petrified Forest National Park.docx:cgg



United States Department of the Interior  
NATIONAL PARK SERVICE  
Petrified Forest National Park  
1 Park Road  
P.O. Box 2217  
Petrified Forest, AZ 86028  
Tel: (928) 524-6228  
Fax: (928) 524-3567



H4217 (PEFO)

May 18, 2012

Mr. Larry Voyles, Director  
Arizona Game and Fish Department  
5000 W. Carefree Highway  
Phoenix, AZ 85086

Subject: *Scoping Notice – Fire Management Plan Environmental Assessment, Petrified Forest National Park, Arizona*

Dear Mr. Voyles,

The National Park Service (NPS) will be preparing an environmental assessment (EA) which will analyze the environmental effects of a new fire management plan that is proposed for Petrified Forest National Park, Arizona. The proposed fire management plan is intended to be both strategic and operational, guiding the full range of fire program activities that support land and resource management objectives.

The purpose of the proposed fire management plan for the Petrified Forest National Park is to comply with new national and NPS policies and to incorporate new scientific information into fire management planning within parks. In addition, the proposed fire management plan intends to ensure the health and safety of firefighters, NPS staff, and the public; protect cultural and natural resources within the park and properties adjacent to the park; and enhance public education and expand training for NPS staff regarding fire management and safety.

The project area is comprised of the entirety of NPS ownership within the boundaries of Petrified Forest National Park, in Navajo and Apache Counties, Arizona. Please refer to the attached figure for a graphic that shows the project location, i.e. – the park boundaries. The National Park is located within the USGS Pilot Rock, Chinde Mesa, North Mill Well, Little Lithodendron Tank, Kachina Point, Pinta, Sorrel Horse Mesa, Adamana, Padilla Tank, and Agate House 7.5' topographic map quadrangles. The public land survey township / range / section coordinates are shown in table 1.

**Table 1. Petrified Forest National Park Public Land Survey Coordinates**

| <b>Township</b> | <b>Range</b> | <b>Sections</b>                                                           |
|-----------------|--------------|---------------------------------------------------------------------------|
| 20 North        | 23 East      | 1, 2, 3, 10, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 27, 34, 35, 36, all. |
| 20 North        | 24 East      | 1 – 36, all                                                               |
| 20 North        | 25 East      | 4, 5, 6, 7, 8, 9, 16, 17, 18, all.                                        |
| 19 North        | 23 East      | 1, 2, 3, 10, 11, 12, 13, 14, 15, all.                                     |



| <b>Township</b> | <b>Range</b> | <b>Sections</b>                                                                                                                           |
|-----------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| 19 North        | 24 East      | 2, 3, 4, 5, 6, 7, 8, 9, 10, all; section 11, NW ¼ and N ½ NE ¼, sections 16, 17, 18, 21, 28, 33, all; the SW ¼ of the SW ¼ of section 27. |
| 18 North        | 24 East      | 4, 9, all; section 10, SW ¼ sections 13, 14, 15, 16, 21, 22, 23, 24, 25, 26, 27, 28, 33, 34, 35, 36, all.                                 |
| 17 North        | 24 East      | 2, 11, 14, 23, 26, W halves; sections 3, 4, 5, 6, 7, 8, 9, 10, 15, 16, 17, 18, 19, 20, 21, 22, 27, 28, 29, 30, 31, 32, 33, all.           |
| 17 North        | 23 East      | 34, 35, 36, all.                                                                                                                          |
| 16 North        | 24 East      | 3 and 10, W ½'s; sections 4, 5, 6, 7, 8, 9, all.                                                                                          |
| 16 North        | 23 East      | 1, 2, 11, 12, all; sections 3, 10, E ½'s.                                                                                                 |

We are requesting any information your office may have regarding the presence of state-listed threatened or endangered species, species of special concern, and designated or proposed critical habitats, which may be affected by this project within Petrified Forest National Park.

We look forward to your participation in this process and believe that it will help ensure that state-listed species are adequately considered and evaluated in the EA. We are consulting with the U.S. Fish and Wildlife Service to evaluate federally listed species. When the EA is complete, we will make a copy available for your review and comment.

We would appreciate any preliminary input you may have by June 18, 2012. If you have questions about the project or would like more information, please contact Patricia Thompson, Chief of Resources, at (928) 524-6228 ext 267 or [Patricia\\_Thompson@nps.gov](mailto:Patricia_Thompson@nps.gov).

Comments can be sent to:

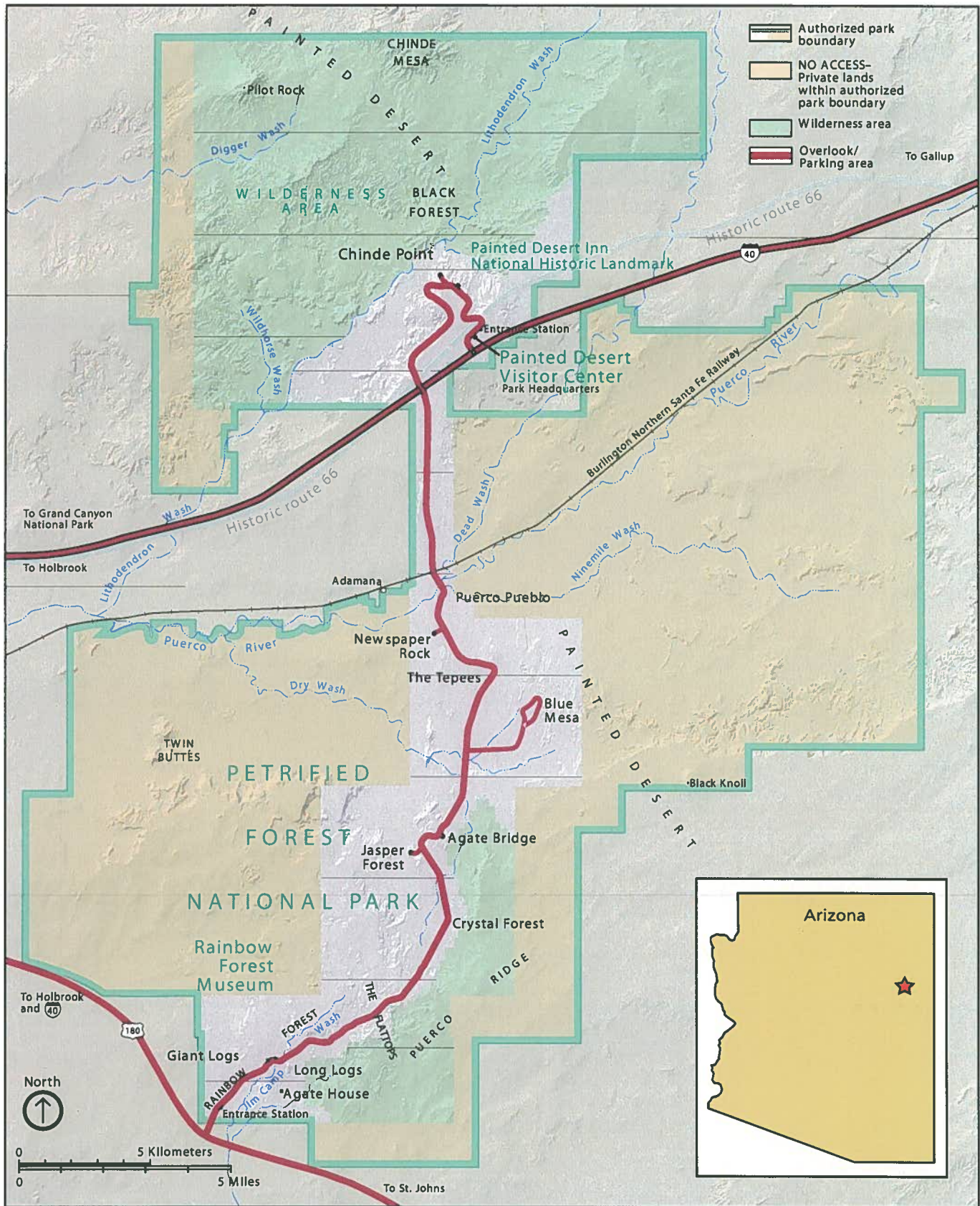
Petrified Forest National Park  
Attn: Fire Management Plan EA  
1 Park Road  
P.O. Box 2217  
Petrified Forest, AZ 86028

Sincerely,



Bradley S. Traver  
Superintendent

Enclosure



## PROJECT AREA MAP

Petrified Forest National Park

United States Department of the Interior / National Park Service





United States Department of the Interior  
NATIONAL PARK SERVICE  
Petrified Forest National Park  
1 Park Road  
P.O. Box 2217  
Petrified Forest, AZ 86028  
Tel: (928) 524-6228  
Fax: (928) 524-3567



H4217 (PEFO)

May 18, 2012

Mr. James Garrison  
State Historic Preservation Officer  
Arizona State Parks  
1300 W. Washington Street  
Phoenix, AZ 85007

Subject: *Scoping Notice – Fire Management Plan Environmental Assessment, Petrified Forest National Park, Arizona*

Dear Mr. Garrison,

The National Park Service (NPS) will be preparing an environmental assessment (EA) which will analyze the environmental effects of a new fire management plan that is proposed for Petrified Forest National Park, Arizona. The proposed fire management plan is intended to be both strategic and operational, guiding the full range of fire program activities that support land and resource management objectives.

The purpose of the proposed fire management plan for the Petrified Forest National Park is to comply with new national and NPS policies and to incorporate new scientific information into fire management planning within parks. In addition, the proposed fire management plan intends to ensure the health and safety of firefighters, NPS staff, and the public; protect cultural and natural resources within the park and properties adjacent to the park; and enhance public education and expand training for NPS staff regarding fire management and safety.

The project area is comprised of the entirety of NPS ownership within the boundaries of Petrified Forest National Park, in Navajo and Apache Counties, Arizona. Please refer to the attached figure for a graphic that shows the project location, i.e. – the park boundaries. The National Park is located within the USGS Pilot Rock, Chinde Mesa, North Mill Well, Little Lithodendron Tank, Kachina Point, Pinta, Sorrel Horse Mesa, Adamana, Padilla Tank, and Agate House 7.5' topographic map quadrangles. The public land survey township / range / section coordinates are shown in table 1.

**Table 1. Petrified Forest National Park Public Land Survey Coordinates**

| <b>Township</b> | <b>Range</b> | <b>Sections</b>                                                           |
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| 20 North        | 24 East      | 1 – 36, all                                                               |
| 20 North        | 25 East      | 4, 5, 6, 7, 8, 9, 16, 17, 18, all.                                        |
| 19 North        | 23 East      | 1, 2, 3, 10, 11, 12, 13, 14, 15, all.                                     |

| <b>Township</b> | <b>Range</b> | <b>Sections</b>                                                                                                                           |
|-----------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| 19 North        | 24 East      | 2, 3, 4, 5, 6, 7, 8, 9, 10, all; section 11, NW ¼ and N ½ NE ¼, sections 16, 17, 18, 21, 28, 33, all; the SW ¼ of the SW ¼ of section 27. |
| 18 North        | 24 East      | 4, 9, all; section 10, SW ¼ sections 13, 14, 15, 16, 21, 22, 23, 24, 25, 26, 27, 28, 33, 34, 35, 36, all.                                 |
| 17 North        | 24 East      | 2, 11, 14, 23, 26, W halves; sections 3, 4, 5, 6, 7, 8, 9, 10, 15, 16, 17, 18, 19, 20, 21, 22, 27, 28, 29, 30, 31, 32, 33, all.           |
| 17 North        | 23 East      | 34, 35, 36, all.                                                                                                                          |
| 16 North        | 24 East      | 3 and 10, W ½'s; sections 4, 5, 6, 7, 8, 9, all.                                                                                          |
| 16 North        | 23 East      | 1, 2, 11, 12, all; sections 3, 10, E ½'s.                                                                                                 |

An environmental assessment will be prepared in compliance with the National Environmental Policy Act (NEPA) to provide the decision-making framework that 1) analyzes a reasonable range of alternatives to meet project objectives, 2) evaluates issues and impacts to park resources and values, and 3) identifies mitigation measures to lessen the degree or extent of these impacts.

In accordance with 36 CFR §800.3(c), we take this opportunity to formally initiate the §106 consultation process with you. We are currently in the scoping phase of this project, and invite you to submit your written comments online at the NPS Planning, Environment, and Public Comment website at <http://parkplanning.nps.gov/pefo>. Or, you may submit written comments to the Superintendent at the address below.

We would appreciate any preliminary input you may have by June 18, 2012. If you have questions about the project or would like more information, please contact Patricia Thompson, Chief of Resources, at (928) 524-6228 ext 267 or [Patricia\\_Thompson@nps.gov](mailto:Patricia_Thompson@nps.gov).

Comments can be sent to:

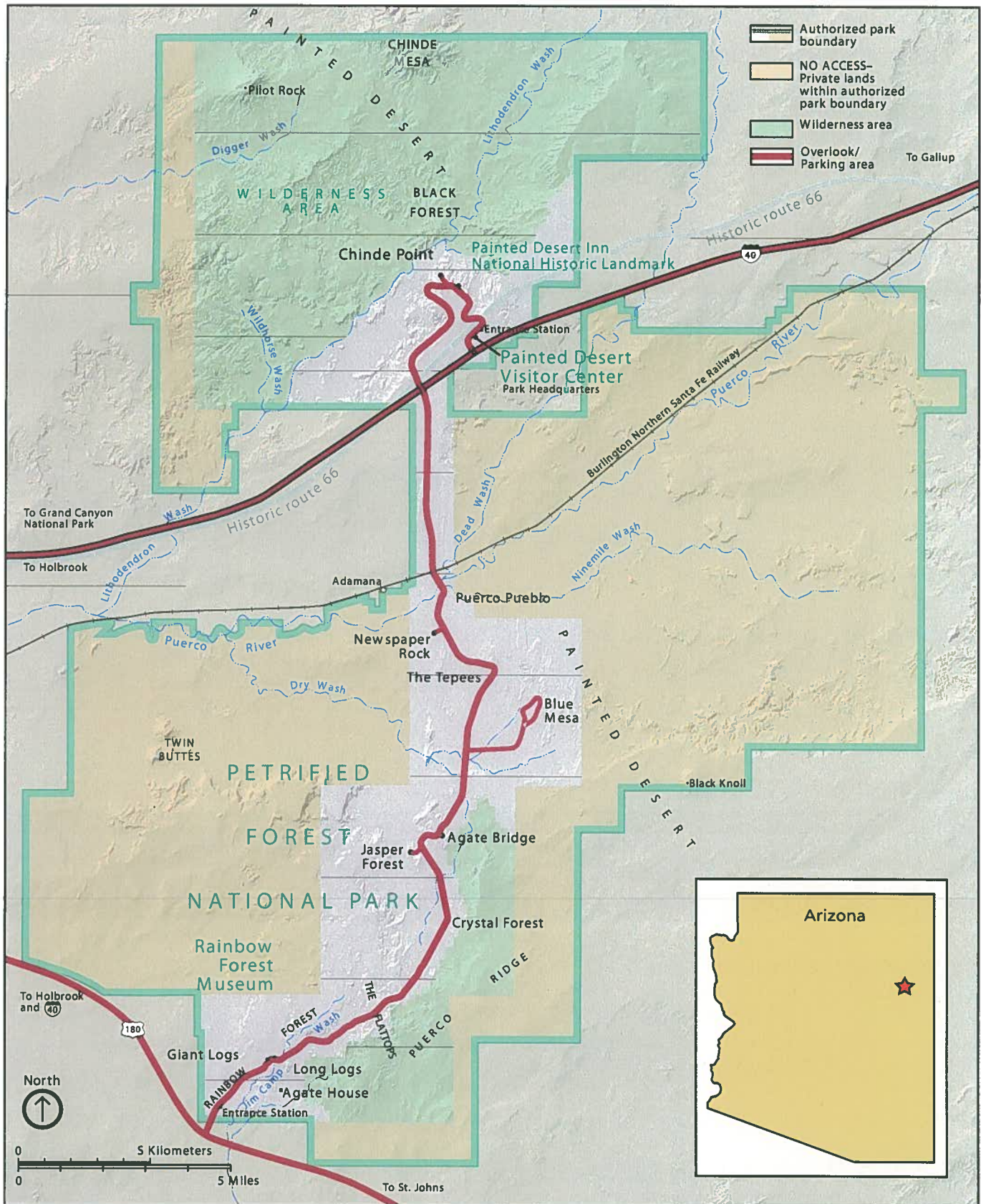
Petrified Forest National Park  
Attn: Fire Management Plan EA  
1 Park Road  
P.O. Box 2217  
Petrified Forest, AZ 86028

Sincerely,



Bradley S. Traver  
Superintendent

Enclosure



**PROJECT AREA MAP**  
**Petrified Forest National Park**  
 United States Department of the Interior / National Park Service





United States Department of the Interior

NATIONAL PARK SERVICE

Petrified Forest National Park

1 Park Road

P.O. Box 2217

Petrified Forest, AZ 86028

Tel: (928) 524-6228

Fax: (928) 524-3567



H4217 (PEFO)

May 17, 2012

Chairman LeRoy Shingoitewa  
Hopi Tribe  
P.O. Box 123  
Kykotsmovi, AZ 86039

Subject: *Scoping Notice – Fire Management Plan Environmental Assessment, Petrified Forest National Park, Arizona*

Dear Chairman Shingoitewa,

The National Park Service (NPS) will be preparing an environmental assessment (EA) which will analyze the environmental effects of a new fire management plan that is proposed for Petrified Forest National Park, Arizona. The proposed fire management plan is intended to be both strategic and operational, guiding the full range of fire program activities that support land and resource management objectives.

The purpose of the proposed fire management plan for the Petrified Forest National Park is to comply with new national and NPS policies and to incorporate new scientific information into fire management planning within parks. In addition, the proposed fire management plan intends to ensure the health and safety of firefighters, NPS staff, and the public; protect cultural and natural resources within the park and properties adjacent to the park; and enhance public education and expand training for NPS staff regarding fire management and safety.

The project area is comprised of the entirety of NPS ownership within the boundaries of Petrified Forest National Park. Please refer to the attached figure for a graphic that shows the project location, i.e. – the park boundaries. This project will be conducted in accordance with §106 of the National Historic Preservation Act (NHPA) and other applicable laws, regulations, and policies.

To honor our government to government relationship, we hereby extend this opportunity to you for comment on this project. We look forward to your participation in this process and believe that it will help ensure that cultural resources are adequately considered and evaluated in the EA. When the EA is complete, we will make a copy available for your review and comment.

We would appreciate any preliminary input you may have by June 18, 2012. If you have questions about the project or would like more information, please contact Patricia Thompson, Chief of Resources, at (928) 524-6228 ext 267 or [Patricia\\_Thompson@nps.gov](mailto:Patricia_Thompson@nps.gov).

Comments can be sent to:

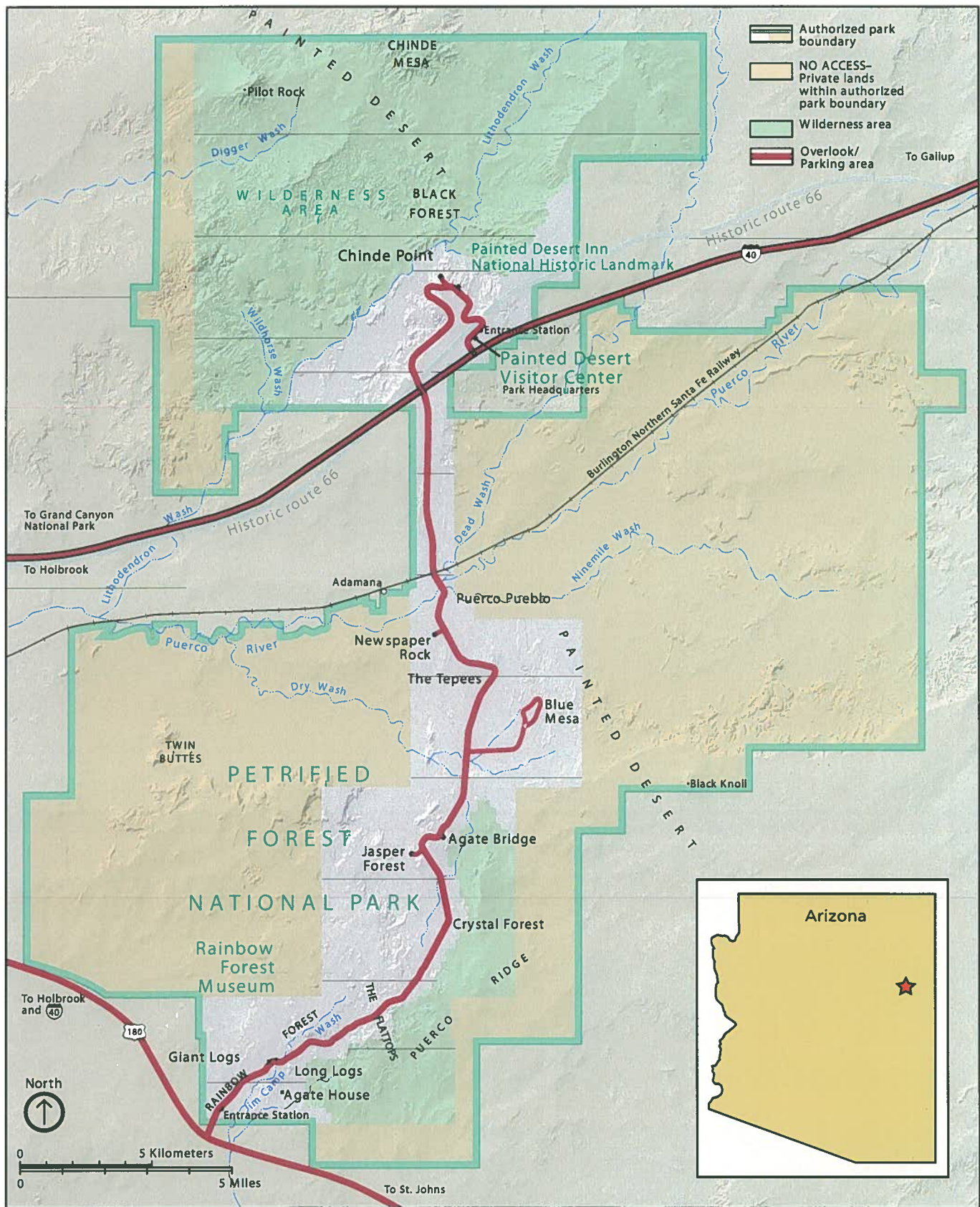
Petrified Forest National Park  
Attn: Fire Management Plan EA  
1 Park Road  
P.O. Box 2217  
Petrified Forest, AZ 86028

Sincerely,

A handwritten signature in black ink that reads "Bradley S. Traver". The signature is written in a cursive, flowing style.

Bradley S. Traver  
Superintendent

Enclosure



## PROJECT AREA MAP

### Petrified Forest National Park

United States Department of the Interior / National Park Service





United States Department of the Interior

NATIONAL PARK SERVICE

Petrified Forest National Park  
1 Park Road  
P.O. Box 2217  
Petrified Forest, AZ 86028  
Tel: (928) 524-6228  
Fax: (928) 524-3567



H4217 (PEFO)

May 17, 2012

Governor Arlen Quetawki Sr.  
Pueblo of Zuni  
P.O. Box 339  
Zuni, NM 87327

Subject: *Scoping Notice – Fire Management Plan Environmental Assessment, Petrified Forest National Park, Arizona*

Dear Governor Quetawki,

The National Park Service (NPS) will be preparing an environmental assessment (EA) which will analyze the environmental effects of a new fire management plan that is proposed for Petrified Forest National Park, Arizona. The proposed fire management plan is intended to be both strategic and operational, guiding the full range of fire program activities that support land and resource management objectives.

The purpose of the proposed fire management plan for the Petrified Forest National Park is to comply with new national and NPS policies and to incorporate new scientific information into fire management planning within parks. In addition, the proposed fire management plan intends to ensure the health and safety of firefighters, NPS staff, and the public; protect cultural and natural resources within the park and properties adjacent to the park; and enhance public education and expand training for NPS staff regarding fire management and safety.

The project area is comprised of the entirety of NPS ownership within the boundaries of Petrified Forest National Park. Please refer to the attached figure for a graphic that shows the project location, i.e. – the park boundaries. This project will be conducted in accordance with §106 of the National Historic Preservation Act (NHPA) and other applicable laws, regulations, and policies.

To honor our government to government relationship, we hereby extend this opportunity to you for comment on this project. We look forward to your participation in this process and believe that it will help ensure that cultural resources are adequately considered and evaluated in the EA. When the EA is complete, we will make a copy available for your review and comment.

We would appreciate any preliminary input you may have by June 18, 2012. If you have questions about the project or would like more information, please contact Patricia Thompson, Chief of Resources, at (928) 524-6228 ext 267 or [Patricia\\_Thompson@nps.gov](mailto:Patricia_Thompson@nps.gov).

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Attn: Fire Management Plan EA  
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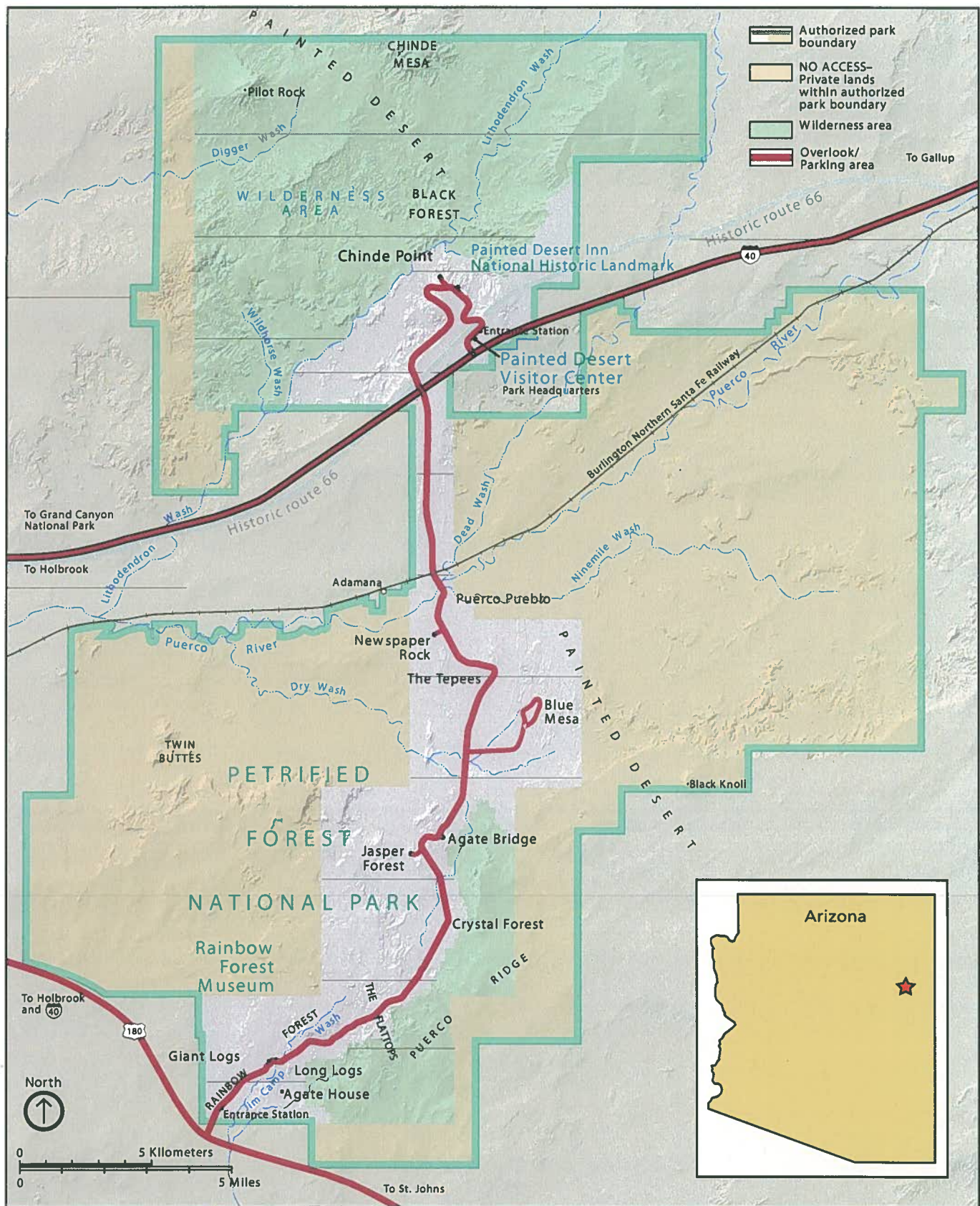
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A handwritten signature in black ink that reads "Bradley S. Traver". The signature is written in a cursive, flowing style.

Bradley S. Traver  
Superintendent

Enclosure





**PROJECT AREA MAP**  
**Petrified Forest National Park**  
 United States Department of the Interior / National Park Service



United States Department of the Interior

NATIONAL PARK SERVICE

Petrified Forest National Park  
1 Park Road  
P.O. Box 2217  
Petrified Forest, AZ 86028  
Tel: (928) 524-6228  
Fax: (928) 524-3567



H4217 (PEFO)

May 17, 2012

Chairman Ronnie Lupe  
White Mountain Apache Tribe  
P.O. Box 1150  
Whiteriver, AZ, 85941

Subject: *Scoping Notice – Fire Management Plan Environmental Assessment, Petrified Forest National Park, Arizona*

Dear Chairman Lupe,

The National Park Service (NPS) will be preparing an environmental assessment (EA) which will analyze the environmental effects of a new fire management plan that is proposed for Petrified Forest National Park, Arizona. The proposed fire management plan is intended to be both strategic and operational, guiding the full range of fire program activities that support land and resource management objectives.

The purpose of the proposed fire management plan for the Petrified Forest National Park is to comply with new national and NPS policies and to incorporate new scientific information into fire management planning within parks. In addition, the proposed fire management plan intends to ensure the health and safety of firefighters, NPS staff, and the public; protect cultural and natural resources within the park and properties adjacent to the park; and enhance public education and expand training for NPS staff regarding fire management and safety.

The project area is comprised of the entirety of NPS ownership within the boundaries of Petrified Forest National Park. Please refer to the attached figure for a graphic that shows the project location, i.e. – the park boundaries. This project will be conducted in accordance with §106 of the National Historic Preservation Act (NHPA) and other applicable laws, regulations, and policies.

To honor our government to government relationship, we hereby extend this opportunity to you for comment on this project. We look forward to your participation in this process and believe that it will help ensure that cultural resources are adequately considered and evaluated in the EA. When the EA is complete, we will make a copy available for your review and comment.

We would appreciate any preliminary input you may have by June 18, 2012. If you have questions about the project or would like more information, please contact Patricia Thompson, Chief of Resources, at (928) 524-6228 ext 267 or [Patricia\\_Thompson@nps.gov](mailto:Patricia_Thompson@nps.gov).

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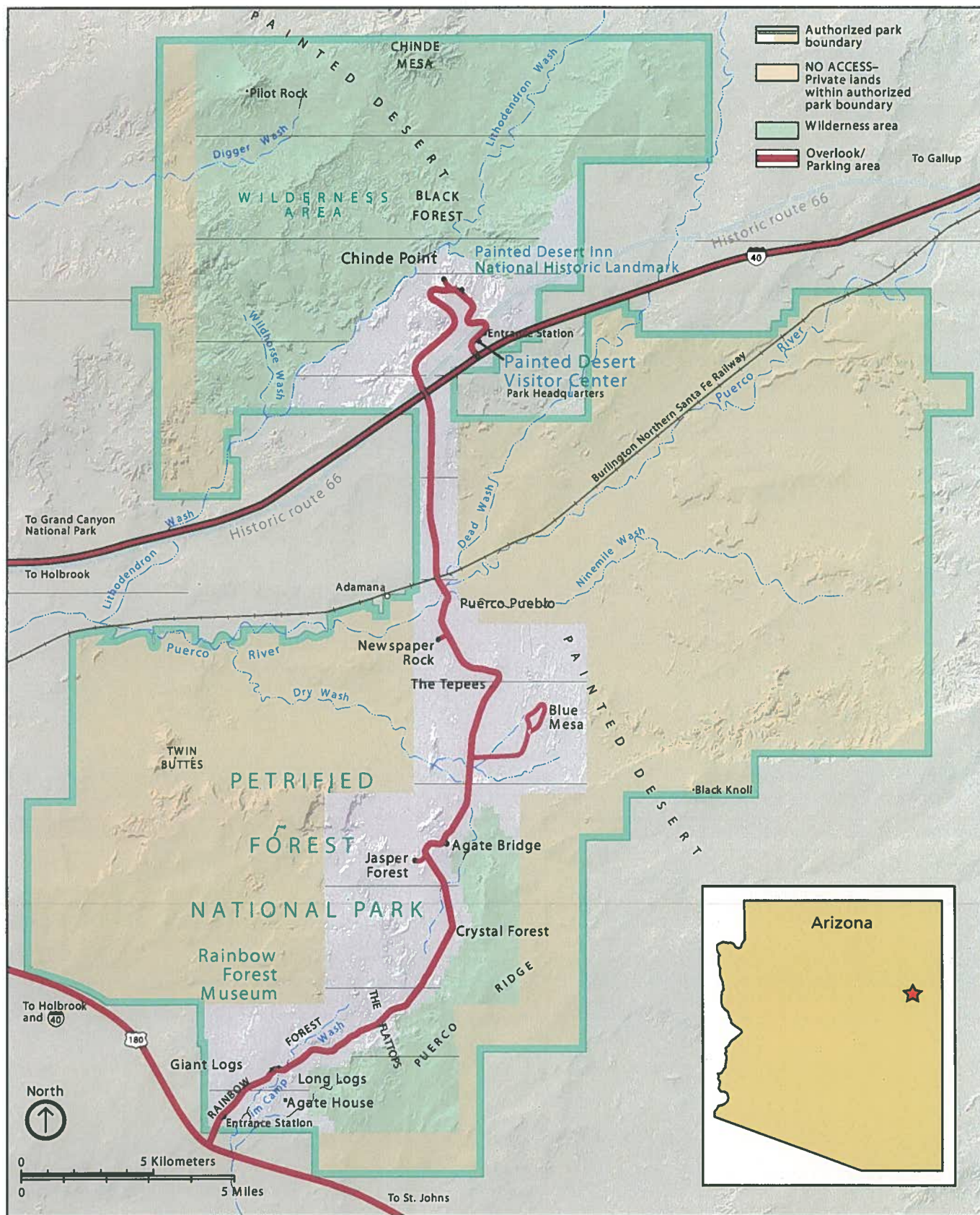
Sincerely,

A handwritten signature in black ink that reads "Bradley S. Traver". The signature is written in a cursive, flowing style.

Bradley S. Traver  
Superintendent

Enclosure





## PROJECT AREA MAP

### Petrified Forest National Park

United States Department of the Interior / National Park Service

**APPENDIX C**  
**MINIMUM REQUIREMENTS ANALYSIS**

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# MINIMUM REQUIREMENTS DECISION GUIDE

## WORKSHEETS

*“ . . . except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act...”*

– the Wilderness Act, 1964

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Please refer to the accompanying MRDG [Instructions](#) for filling out this guide.  
The spaces in the worksheets will expand as necessary as you enter your response.

The MRDG Instructions may be found at: <http://www.wilderness.net/mrdg/>

### Project Title: **Fire Management Plan Environmental Assessment / Assessment of Effect**

#### **Step 1: Determine if any administrative action is necessary.**

|                                                                            |
|----------------------------------------------------------------------------|
| <b>Description:</b> Briefly describe the situation that may prompt action. |
|----------------------------------------------------------------------------|

The National Park Service (NPS) is preparing a fire management plan environmental assessment / assessment of effect because the Secretary of the Interior, through NPS wildland fire policy directives and National Park Service Director's Order #18 (DO-18) Wildland Fire Management (NPS 2008b), requires parks with burnable vegetation to have a fire management plan. These plans are intended to be both strategic and operational, guiding the full range of fire program activities that support land and resource management objectives. In preparing a new fire management plan for Petrified Forest National Park, the National Park Service seeks to provide management direction by accommodating the latest national and NPS policies and scientific information.

More specifically, the purpose of the proposed fire management plan at Petrified Forest National Park is to:

- Ensure the health and safety of firefighters, NPS staff, and the public;
- Protect and maintain cultural and natural resources within the park;

- Reduce the potential for a catastrophic wildfire within the park;
- Protect properties adjacent to the park through cooperative efforts between the National Park Service and local agencies, and;
- Enhance public education and expand training for NPS staff regarding fire management and safety.

Management Policies 2006 (NPS 2006), requires analysis of potential effects to determine whether 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, adversely impacting park resources and values. However, the laws do give the National Park Service the management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given the National Park Service the management discretion to allow certain impacts within a park, that discretion is limited by the statutory requirement that the National Park Service must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise.

Fire management planning in the National Park Service has evolved over time as knowledge of fire behavior and effects has grown. Although a fire management plan for Petrified Forest National Park was prepared in 2005, the National Environmental Policy Act compliance used to evaluate the plan's effects was the Healthy Forest Initiative Hazardous Fuels Reduction Categorical Exclusion. In May 2008, the National Park Service determined that NPS units in the Supreme Court 9th Circuit Court of Appeals jurisdiction, such as Petrified Forest National Park, may no longer use the categorical exclusion. In April 2012, it was determined that the categorical exclusion was no longer suitable National Environmental Policy Act compliance for any NPS units. As a result, a new fire management plan and this environmental assessment are being prepared.

The fire management plan will incorporate the latest fire management science as well as meet evolving NPS policies and guidance. A fire management plan is an important planning tool for NPS staff and is consistent with the park's General Management Plan and other related park plans. The proposed new fire management plan includes measures to promote safety within the park and also contains provisions for the management of natural and cultural resources.

The activities outlined in the preferred alternative will maintain wilderness character while providing the necessary resources to achieve the following objectives:

- Provide protection of NPS staff and promote public safety, by continuing to work through cooperative efforts with NPS and local agencies.
- Protect property and resources by preserving the cultural landscape, maintaining the native plant community and natural resources, and reducing fuel loads.
- Identify and mitigate hazardous fuels in the wildland-urban interface.
- Provide education regarding fire management for the public and park staff.

To determine if administrative action is necessary, answer the questions listed in A - F on the following pages by answering Yes, No, or Not Applicable and providing an explanation.



### A. Describe Options Outside of Wilderness

Is action necessary within wilderness?

Yes: ☒ No: ☐

**Explain:** In order to meet the objectives of the fire management plan, some treatment within wilderness must occur. Fire and fuels management activities will be focused outside wilderness, to the greatest extent possible. However, the consequences of not conducting fuels management or suppression activities within wilderness would result in the need to aggressively suppress wilderness fires that threaten to cross the park boundary. Fire and fuels management actions and objectives could not be fully accomplished outside of the park's wilderness areas.

### B. Describe Valid Existing Rights or Special Provisions of Wilderness Legislation

Is action necessary to satisfy valid existing rights or a special provision in wilderness legislation (the Wilderness Act of 1964 or subsequent wilderness laws) that allows or requires consideration of the Section 4(c) prohibited uses? Cite law and section.

Yes: ☐ No: ☒ Not Applicable: ☐

**Explain:**

### C. Describe Requirements of Other Legislation

Is action necessary to meet the requirements of other laws?

Yes: ☒ No: ☐ Not Applicable: ☐

**Explain:** National Park Service Organic Act (1916), 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, adversely impacting park resources and values.

### D. Describe Other Guidance

Is action necessary to conform to direction contained in agency policy, unit and wilderness management plans, species recovery plans, or agreements with tribal, state and local governments or other federal agencies?

Yes: ☒ No: ☐ Not Applicable: ☐

**Explain:** Agency Policy: NPS Management Policies (2006), Chapter 4.5: Fire Management states that "Fire management or suppression activities conducted within wilderness, including the categories of designated, recommended, potential, proposed, and eligible areas, will be consistent with the "minimum requirement" concept identified in chapter 6 and Director's Order #41: Wilderness Preservation and Management." Director's Order #18: Wildland Fire Management requires parks with burnable vegetation to have a fire management plan.

## E. Wilderness Character

Is action necessary to preserve one or more of the qualities of wilderness character including: Untrammeled, Undeveloped, Natural, Outstanding opportunities for solitude or a primitive and unconfined type of recreation, or other unique components that reflect the character of this wilderness area?

**Untrammeled:**      **Yes:** ☐      **No:** ☒      **Not Applicable:** ☐

**Explain:** Fire is a natural ecological process that would be controlled and manipulated by park managers under the preferred alternative. The implementation of fuels management and suppression tactics would affect the untrammeled quality of the Petrified Forest National Park wilderness. Under the preferred alternative, the trammeling of wilderness due to fire management activity (including reducing nonnative vegetation and other vegetative fuel loads) would create opportunities to reduce the need for aggressive suppression actions during some naturally occurring wildfires in the Northern Painted Desert wilderness area (referred to in this document as the northern wilderness area). These actions would also allow for safe and effective suppression of other naturally occurring wildfires in both wilderness areas. In these instances, the short-term trammeling of wilderness due to fire management actions should be outweighed by enhancing the untrammeled quality of wilderness in the park as a whole over the long-term.

**Undeveloped:**      **Yes:** ☐      **No:** ☒      **Not Applicable:** ☐

**Explain:** Manual fuels treatment activity in strategic locations would impact the undeveloped quality of wilderness. However these activities would be conducted in such a way as to minimize the visual impact of the activity. The presence and associated noise of the hand-operated motorized equipment deemed necessary for fuels management activities (e.g. chainsaws, weed eaters) would temporarily affect the undeveloped quality of wilderness. However these impacts would be short-lived and last only as long as the equipment was present within wilderness. Under the preferred alternative, the impacts to the undeveloped quality of wilderness due to fire management activity (which serves to reduce hazardous fuel loadings in the park to protect values at risk) would create opportunities to safely and effectively manage naturally occurring wildfires without the need for aggressive suppression response. Within the northern wilderness area these actions could allow for a contain-and-confine management approach and eliminate the need for aggressive suppression. In these instances, the short-term impacts to the undeveloped quality of wilderness due to management actions in wilderness should be outweighed by enhancing the undeveloped quality of wilderness over the long-term.

**Natural:**      **Yes:** ☒      **No:** ☐      **Not Applicable:** ☐

**Explain:** Under the preferred alternative, fire management activities would enhance the natural quality of wilderness through the maintenance and management of the natural process of fire. The maintenance of natural communities and protection of flora and fauna at risk from unwanted fire impacts and from aggressive suppression response should enhance the natural quality of wilderness in the long-term.

Under the preferred alternative, the impacts to the natural quality of wilderness due to fire management activity (which serves to reduce hazardous fuel loadings in the park to protect values at risk) will create opportunities to safely and effectively manage naturally occurring wildfires without the need for aggressive suppression response. Within the northern wilderness area these actions could allow for a contain-and-confine suppression approach and eliminate the need for more aggressive suppression activities. In these instances, the short-term impacts to the natural quality of wilderness due to management actions in wilderness should be outweighed by enhancing the natural quality of wilderness over the long-term.

**Outstanding opportunities for solitude or a primitive and unconfined type of recreation:**

**Yes:** ☒ **No:** ☐ **Not Applicable:** ☐

**Explain:** Opportunities for solitude or primitive and unconfined type of recreation would be relatively unaffected, except on a short-term basis. During fuels management actions and wildfires, visitors may be excluded from certain areas for their safety. Additionally, fire suppression and fuel management activities may require the use of hand-operated motorized equipment which may disturb this wilderness quality in the short-term, but would only last while the equipment was present within wilderness.

**Other unique components that reflect the character of this wilderness:**

**Yes:** ☐ **No:** ☒ **Not Applicable:** ☐

**Explain:**

**F. Describe Effects to the Public Purposes of Wilderness**

Is action necessary to be consistent with one or more of the public purposes for wilderness (as stated in Section 4(b) of the Wilderness Act) of recreation, scenic, scientific, education, conservation, and historical use?

**Recreation:** **Yes:** ☒ **No:** ☐ **Not Applicable:** ☐

**Explain:** Fire and fuels management actions would reduce the accumulation of fuels and therefore reduce the risk and magnitude of wildland fire. These actions would increase visitor safety.

**Scenic:** **Yes:** ☐ **No:** ☐ **Not Applicable:** ☒

**Explain:**

**Scientific:** **Yes:** ☐ **No:** ☐ **Not Applicable:** ☒

**Explain:**

**Education:** **Yes:** ☒ **No:** ☐ **Not Applicable:** ☐

**Explain:** The potential for public outreach associated with fire and fuels management actions would provide an opportunity to educate both visitors and park staff on the role and effects of fire in the park's wilderness. Monitoring and the collection of data during fire and fuels management activities would allow management to evaluate the success of management actions.

**Conservation:** **Yes:** ☒ **No:** ☐ **Not Applicable:** ☐

**Explain:** Fire and fuels management, particularly the removal of nonnative vegetation, would help to restore and maintain the park's native ecosystem.

**Historical use:** **Yes:** ☐ **No:** ☐ **Not Applicable:** ☒

**Explain:**

**Step 1 Decision:** Is any administrative action necessary in wilderness?

Yes: ☒

No: ☐

More information needed: ☐

**Explain:** In order to meet the goals and objectives of the fire management plan, some fire management actions must occur within wilderness. To the greatest extent possible, fire and fuels management activities would be focused outside of the park's wilderness areas. However, if fuels management activities did not occur within the wilderness area, there would be greater potential for the need to aggressively suppress wildfires that were to occur. Additionally, due to the terrain and location, wildfires within the Rainbow Forest wilderness area (referred to in this document as the southern wilderness area) would need to be suppressed to ensure visitor safety, protect park resources, and to protect neighboring properties.

If action is necessary, proceed to Step 2 to determine the minimum activity.

## Step 2: Determine the minimum activity.

Please refer to the accompanying MRDG [Instructions](#) for information on identifying alternatives and an explanation of the effects criteria displayed below.

### Description of Alternatives

For each alternative, describe what methods and techniques will be used, when the activity will take place, where the activity will take place, what mitigation measures are necessary, and the general effects to the wilderness resource and character.

The alternatives described below correspond to the alternatives evaluated in the environmental assessment. The actions are described in detail in the “Alternatives” chapter of the environmental assessment and summarized below.

#### Alternative A, No Action

**Description:** Under the no action alternative, Petrified Forest National Park would conduct fire management activities without a formal fire management plan in place. In lieu of a plan, the National Park Service stipulates that all wildland fires must be treated using full fire suppression. This means all wildland fires would be extinguished as quickly as possible using all of the tools and resources available to the National Park Service.

On all wildland fire management actions, use of minimum impact suppression tactics is the policy of the National Park Service. Full suppression in wilderness would involve the use of hand crews or aircraft, as needed. Wildfires that occur within the northern wilderness area and do not threaten human safety, property, or park resources or values may be allowed to burn. This method would be contingent on establishment of a strategy to contain and confine the fire using natural and artificial barriers based on an assessment of risk. In the event that a fire would exceed the ability to contain and confine it, additional suppression tactics would be implemented.

The goal of an initial attack on a wildfire under alternative A would be to limit damage to resources and values to be protected and to prevent the escape of the fire. The use of a particular fire suppression tactic to combat a wildfire would be an incident command decision based on circumstances at the time.

A hand-crew is a team of trained personnel that use hand tools such as shovels, Pulaskis, McClouds, rakes, chainsaws, and flappers to extinguish the fire, and typically range from six to twenty people. Some hand tools can be used to suppress fire by removing fuel by digging a fireline, therefore removing vegetation down to mineral soil. Other hand tools, like flappers and backpack pumps, extinguish the fire along its edge. The use of aircraft to suppress wildfire involves the use of either a fixed-wing aircraft or a helicopter to transport water and/or retardant to the fire location. Water and/or retardant can be dropped on the fire to extinguish it, spread on areas in front of the fire to slow its progress, or dropped on fuels or structures to prevent the start of new ignition points. Aircraft would be used to protect developments and structures, increase defensible space, to soak roadsides as a means of broadening fire breaks, and to cool the edges of a fire line allowing hand crews to attack the fire.

#### Effects:

#### Wilderness Character

“**Untrammeled**” – Manual suppression utilizing hand tools and/or hand operated power tools could occur within both of the park’s wilderness areas under the no-action alternative. The use of aircraft to transport water and/or retardant to a fire location could also occur, depending on the severity of the fire and its location. However, the use of aircraft for fire suppression in the park has been extremely rare and has not occurred in the past 20 years. The use of mechanized tools and/or aircraft to suppress fire would be temporary, typically lasting for less than a day.

Implementation of these suppression methods, either by hand crew and/or aircraft would adversely affect the untrammeled quality of the wilderness. However, given the relative infrequency of fire within the park and the subsequent infrequency of suppression implementation, impacts to the untrammeled wilderness quality would be short-term and minor to moderate in intensity.

Fire itself is a naturally occurring process within the park and would therefore have negligible impacts to the untrammeled quality of wilderness. The use of the contain-and-confine method to suppress wildfire within the northern wilderness area would help reduce fuels and could minimize the frequency and intensity of future wildfires. This could limit the need for aggressive suppression and result in long-term beneficial effects to the untrammeled, undeveloped, and natural qualities of wilderness. Impacts to the untrammeled quality of the northern wilderness area from fire itself would be negligible.

**“Undeveloped”** – During wildfire suppression activities, the presence of hand tools and/or aircraft, and their associated noise would result in short-term, minor to moderate adverse impacts to the undeveloped quality of wilderness.

Fire itself is a naturally occurring process within the park and would therefore have negligible impacts to the undeveloped quality of wilderness.

**“Natural”** – Full fire suppression tactics under the no-action alternative would remove a naturally occurring process from the park’s landscape. Given the fact that the park is within a non-fire dependent ecosystem, the suppression of a natural process would result in long-term, minor, adverse impacts to the natural quality of wilderness. However, due to the historic suppression of all fires in the park, fuel loads may be larger than they would be naturally and therefore wildfires could burn hotter and more aggressive than they would otherwise. As a result, suppression of fire and protection of flora and fauna at risk from unwanted fire impacts could benefit the natural quality of wilderness in the short-term.

Fire itself is a naturally occurring process within the park and would therefore have negligible impacts to the natural quality of wilderness. However, due to the history of fire suppression within the park, fuel loads may be larger than they would be otherwise and wildfire could result in short-and long-term adverse impacts to the natural quality of wilderness depending on the location and severity.

**“Outstanding opportunities for solitude or a primitive and unconfined type of recreation”** – The health and safety of visitors is a high priority of the National Park Service. During the suppression of fires within wilderness, visitors may be excluded from certain areas for their safety. Temporary closures and the noise associated with the use of hand operated tools and/or aircraft suppression methods may temporarily impact opportunities for solitude or primitive and unconfined type of recreation within the wilderness. However, these impacts would only last as long as the equipment was present or the closure was in place. Due to both the infrequent visitor use of the wilderness areas within the park and the relative infrequency of fire within these areas, the impacts to this wilderness quality would be short-term and negligible to minor in intensity.

During a wildfire event, impacted areas of the park that were deemed unsafe for visitors would be temporarily closed. Temporary closures would impact opportunities for solitude or primitive and unconfined type of recreation within the closed area. As mentioned above, the temporary nature of these closures combined with low visitation to the park’s wilderness areas would result in short-term, negligible to minor adverse impacts to this wilderness quality.

**Other unique components that reflect the character of this wilderness** – Not applicable.

**Heritage and Cultural Resources** – Under the no action alternative, no fuels management activity would occur, therefore there would be no direct impact on cultural resources fire management operations within wilderness. However, increased fuel loads could increase the potential for wildfire and thereby increase the risk to cultural resources within wilderness from fire damages.

**Maintaining Traditional Skills** – Not applicable.

**Special Provisions** – None identified.

**Economics and Timing Constraints** – None identified.

**Additional Wilderness-specific Comparison Criteria** – None identified.

**Safety of Visitors, Personnel, and Contractors** – Under the no action alternative, no fuels management activity would occur. Large fuel loads could increase the potential for wildfire which would put life, property, park values, and surrounding community at risk.

## Alternative B – Multiple Fire Management Strategies

**Description:** This alternative, the NPS preferred alternative, consists of preparing and implementing a new fire management plan for Petrified Forest National Park. The new fire management plan would include options for suppressing wildfire events and options for the manual fuel reduction to lower the intensity and/or risk of wildland fires. Wildland fires requiring suppression would use minimum impact suppression tactics.

Wildfires within the non-wilderness portions of the park and the southern wilderness area would also be suppressed under alternative B. The fire suppression methods used to combat wildfire would be the same as those described for alternative A.

As described for alternative A, wildfires that occur within the northern wilderness area and do not threaten human safety, property, or park resources or values may be allowed to burn. This method would be contingent on establishment of a strategy to contain and confine the fire using natural and artificial barriers based on an assessment of risk. In the event that a fire would exceed the ability to contain and confine it, suppression tactics would be implemented.

Approved herbicides would be used per labeled directions to treat infestations of nonnative vegetation with a two-fold purpose; reducing fuel loads and the addressing nonnative plant proliferation. Application methods would target nonnative plant communities specifically using spot treatments rather than widespread broadcast methods.

Manual thinning of vegetation would be accomplished using hand-operated tools, including, but not limited to chain saws, hand saws, and line trimmers. The goal of vegetation thinning in wilderness would be to reduce the fuel load available to support an wildfire. Seasonal use restrictions would be considered as well as any restrictions related to weather, species sensitivity, or other concerns that may affect equipment use or operations. Both short- and long-term monitoring of fuel reductions would take place to determine the success of meeting objectives of the thinning projects as well as protecting resources.

### Effects:

#### Wilderness Character

Under alternative B, the impacts of wildfire and suppression tactics on wilderness character within the park would be the same as those described for alternative A.

**“Untrammeled”** – Implementation of hand tool and/or aircraft suppression methods and the use of hand operated motorized tools during manual thinning would be similar to those impacts described under alternative A and would be short-term, minor to moderate and adverse.

Use of approved herbicides on nonnative vegetation to reduce fuel loads and proliferation would consist of localized spot treatment application by park staff. The application of herbicide would result in short-term, minor, and adverse impacts to the untrammeled and undeveloped qualities of wilderness. The presence of motorized tools and their associated noise would have short-term, minor to moderate adverse impacts on the untrammeled and undeveloped wilderness qualities.

The use of the contain-and-confine method on wildfire within the northern wilderness area would help reduce fuels and could minimize the frequency and intensity of future wildfire. This could limit the need for aggressive suppression and result in long-term beneficial effects to the untrammeled, undeveloped, and natural qualities of wilderness. Impacts to the untrammeled quality of the northern wilderness area from fire itself would be similar to those described for wildfire and would be negligible.

**“Undeveloped”** – Implementation of hand tool and/or aircraft suppression methods and the use of hand operated motorized tools during manual thinning would be similar to those described under alternative A and would be short-term, minor to moderate, and adverse.

Use of approved herbicides on nonnative vegetation to reduce fuel loads and proliferation would consist of localized spot treatment application by park staff. The use of herbicide would result in short-term, minor, and adverse impacts to the untrammeled and undeveloped qualities of wilderness.



The presence of motorized tools and their associated noise during fuel reduction activities would have short-term, minor to moderate adverse impacts on the untrammeled and undeveloped wilderness qualities.

The use of the contain-and-confine method on wildfire within the northern wilderness area would help reduce fuels and could minimize the frequency and intensity of future wildfire. This could limit the need for aggressive suppression and result in long-term beneficial effects to the untrammeled, undeveloped, and natural qualities of wilderness. Impacts to the undeveloped quality of the northern wilderness area from fire itself would be similar to those described for wildfire and would be negligible.

**“Natural”** – Use of herbicides would reduce the amount of nonnative vegetation and help maintain natural flora and fauna communities. The treatment of nonnative vegetation would also reduce the fuel load and help to confine wildfires and lessen the potential for disruption or change of wilderness character associated with suppression actions. These actions would result in long-term benefits to the natural quality of wilderness.

The use of manual thinning to enhance the natural process of fire and to protect flora and fauna at risk from unwanted fire impacts and aggressive suppression response would result in long-term benefits to the natural quality of wilderness.

The use of the contain-and-confine method on wildfire within the northern wilderness area would help reduce fuels and could minimize the frequency and intensity of future wildfire. This could limit the need for aggressive suppression and result in long-term beneficial effects to the untrammeled, undeveloped, and natural qualities of wilderness. Impacts to the natural quality of the northern wilderness area from fire itself would be similar to those described for wildfire and would be negligible.

**“Outstanding opportunities for solitude or a primitive and unconfined type of recreation”** – During herbicide application, the areas being treated may be temporarily closed to park visitors. Due to the localized and short duration of these closures, the impact to opportunities for solitude or primitive and unconfined type of recreation would be negligible.

The noise produced from hand- tools being used for manual thinning and the potential for temporary closures would result in short-term, negligible to minor and adverse impacts to opportunities for solitude or primitive and unconfined type of recreation.

During a wildfire in the northern wilderness area that was treated with the contain-and-confine method, affected areas would be temporarily closed and park staff would ensure that visitors were not present in the area. Due to the temporary and limited extent of these closures and low visitation within the northern wilderness area, impacts to opportunities for solitude or primitive and unconfined type of recreation would be short-term and negligible to minor in intensity.

#### **Other unique components that reflect the character of this wilderness – NA**

**Heritage and Cultural Resources** – Under this alternative, cultural resource values would be protected to the extent possible during the suppression of wildfires. Where needed, fuel reduction activities would reduce the risks to cultural resources associated with wildfire. The use of motorized equipment to reduce fuel loads would mitigate ground disturbance associated with suppression activities that have the potential to damage cultural resources within wilderness.

**Maintaining Traditional Skills** – Not applicable.

**Special Provisions** – None identified.

**Economics and Timing Constraints** – This alternative may not necessarily be more cost effective than the no action alternative but it would allow fire management staff to accomplish fire and fuels treatment activities safely and in a timely manner.

**Additional Wilderness-specific Comparison Criteria** – None identified.

**Safety of Visitors, Personnel, and Contractors** – Fuels management within the park has the potential to reduce the intensity of an wildfire and reduce the need for aggressive suppression actions. These changes would result in increased safety for fire management personnel, visitors, and surrounding communities while maintaining wilderness character to the greatest extent possible.

## Step 2 Decision: What is the Minimum Activity?

Please refer to the accompanying MRDG [Instructions](#) before describing the selected alternative and describing the rationale for selection.

### Selected alternative:

Alternative B

### Rationale for selecting this alternative (including safety criterion, if appropriate):

Management of wilderness can be a delicate task that frequently requires the need for trade-offs between the four components of wilderness character. Fuels reduction activities conducted within the northern wilderness area are a manipulation of a natural process and affect the untrammelled and undeveloped quality of the wilderness. However, if these actions were to allow for increased flexibility in allowing future wildfires to burn under the contain-and-confine method, the natural wilderness quality would be improved over the long-term. The rationale for choosing alternative B is based on reducing the need for aggressive suppression and allowing for a more natural process, as safely as possible.

The use of motorized hand tools and/or aircraft affects wilderness character however, the effects would last only as long as the equipment is present within wilderness. The use of motorized hand tools and/or aircraft would allow fire management personnel to complete fuels treatments and/or suppression activities in less time when compared to the use of primitive hand tools. Although time is not a factor when considering the minimum activity in wilderness, it does become an issue when analyzing the length of human hazard exposure. Allowing the use of motorized hand tools would reduce fire management personnel's exposure to the hazards associated with fire management activities and would support the Petrified Forest National Park's fire management goal of providing for the safety of employees and the public.




**Monitoring and reporting requirements:** The following components would be monitored under alternative B.

1. Fuel Reduction Monitoring (Success)
  - a. Monitor for occurrences and establishment of invasive vegetation following fuels treatments and suppression activities.
  - b. Monitor fuels reduction areas to determine whether these actions are successful.
2. Contain-and-Confine within the Northern Wilderness Area
  - a. Park and fire fighting staff would monitor the fire to establish safe boundaries for firefighting crews, park staff, and public visitors. Stream staff gauges and ground water monitoring wells in plots to be measured

### Check any Wilderness Act Section 4(c) uses approved in this alternative:

- |                                                         |                                                                                    |
|---------------------------------------------------------|------------------------------------------------------------------------------------|
| <input type="checkbox"/> mechanical transport           | <input type="checkbox"/> landing of aircraft                                       |
| <input checked="" type="checkbox"/> motorized equipment | <input type="checkbox"/> temporary road                                            |
| <input type="checkbox"/> motor vehicles                 | <input type="checkbox"/> structure or installation (temporary browsing exclosures) |
| <input type="checkbox"/> motorboats                     |                                                                                    |

Record and report any authorizations of Wilderness Act Section 4(c) uses according to agency procedures.

| Approvals    | Signature                                                                         | Name              | Position                                | Date    |
|--------------|-----------------------------------------------------------------------------------|-------------------|-----------------------------------------|---------|
| Prepared by: |  | Alexa Miles       | Senior Environmental Scientist, Parsons | 6-11-13 |
| Recommended: |  | Patricia Thompson | Chief of Resource Management, PEFO      | 6-10-13 |
| Recommended: |                                                                                   |                   |                                         |         |
| Approved:    |  | Brad Traver       | Superintendent, PEFO                    | 6/19/13 |

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As the nation's principal conservation agency, the Department of the Interior has the responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

NPS June 2013