



National Park Service
U.S. Department of the Interior
Fort Davis National Historic Site
Texas

Fire Management Plan Environmental Assessment



Prepared for:
National Park Service
U.S. Department of the Interior
Fort Davis National Historic Site
Fort Davis, Texas

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Fort Davis National Historic Site Fire Management Plan Environmental Assessment

Summary

Fort Davis National Historic Site (hereafter FODA) is proposing a new Fire Management Plan (FMP) to include prescribed burning, use of manual and mechanical tools, and targeted herbicide application as tools for fuels management and vegetation restoration. A new FMP is needed to better protect and manage FODA natural and cultural resources, to address changes in the vegetation resulting from land use changes since the historic periods, including fire suppression and drought events, and to address updates in national fire policy terminology. In addition, the use of the Healthy Forest Initiative Categorical Exclusion, under which the current FMP was approved, will be discontinued by April 24, 2015. Due to updates in environmental regulations and proposed use of these fire/vegetative management tools, the National Park Service (NPS) has determined that it is necessary to complete a National Environmental Policy Act (NEPA) analysis for the new FMP.

This Environmental Assessment (EA) evaluates two alternatives—a No Action Alternative (1), and the Preferred Alternative (2). Under the No Action Alternative, the FODA fire management program would not have a valid FMP, and therefore fire management activities would be restricted to emergency wildfire suppression actions, allowed under the National Fire Policy. This would prevent vegetation restoration efforts to emulate the landscape found during the historic periods of cultural significance; continue to reduce resilience of FODA ecosystems to drought, pest outbreaks, wildfire, and climate change; and continue retention and increased loading of hazardous fuels and the associated risk both to humans, structures, and to natural and cultural resources. The Preferred Alternative would use prescribed burning, manual and mechanical tools and equipment for hazardous fuel reduction activities, assisted by targeted herbicide application. Wildfire suppression strategies would be the same as under Alternative 1. Use of these vegetation management tools would more effectively restore and protect FODA cultural and natural resource values and fire-dependent ecosystems, increase success in creating and/or maintaining defensible space and fuelbreaks by reducing hazardous fuels, and prevent encroachment of invasive and/or exotic plant species. Over time, these tools would alter the vegetation environment and lead to more effective wildfire suppression and better protection of adjacent property. Each alternative is described in more detail in the “Alternatives Considered” section of this document.

This EA has been prepared in compliance with NEPA to provide the decision-making framework that: 1) analyzes a reasonable range of alternatives to meet objectives of the proposed Fire Management Plan; 2) evaluates potential issues and impacts to the natural and cultural resources of FODA; and 3) identifies specific and required mitigation measures that are designed to lessen the degree or extent of these impacts. Resource topics determined to potentially be affected by the alternatives include: Air Quality, Soil Resources, Vegetation (including Invasive Weeds), Wildlife, Special Status Species, Archaeological sites and Historic Structures, Cultural Landscapes, Adjacent Landowners and Uses, and Human Health and Safety. All other resource topics were dismissed because it was determined the action alternative would result in negligible to less than minor effects. No major effects were identified as a result of this proposed project. No adverse effects on cultural resources under Section 106 of the National Historic Preservation Act would occur. Public scoping was conducted to assist with the development of this document and development of the alternatives; comments were received and considered in the impact analysis.

Public Comment

External scoping for the FMP EA was conducted through the distribution of an informative scoping letter dated February 19, 2013 to the Park's stakeholders via mail. In addition, a press release was sent to the local newspaper and flyers were posted in local communities; and the project was setup for review and comment in the Planning, Environment, and Public Comment (PEPC) website. One open house style meeting was conducted on March 5, 2013 at FODA auditorium to offer further opportunities for the public and various agencies to gather additional information about the proposed action and to solicit feedback for direction in the EA. During the meeting, NPS representatives were available to present an overview of the proposed action and answer questions; two people attended the public meeting. Two comment cards were generated from the meeting, and one person provided comments via email.

The FODA FMP Environmental Assessment will be available for public comments for 30 days; comments are due by April 23, 2014. Copies of the EA will be provided to interested individuals upon request. Reviewers should provide the NPS with their comments on the EA during the review period. This will allow NPS to analyze and respond to comments at one time, thus avoiding undue delay in the decision-making process. Reviewers are encouraged to structure their participation in the NEPA process so that it is meaningful and alerts the agency to the reviewer's position and contentions. Comments on the EA should be specific and should address the adequacy of the analysis and the merits of the alternatives discussed (40 CFR 1503.3). Following the close of the comment period, all public comments will be reviewed and analyzed prior to the release of a decision document. NPS will issue responses to substantive comments received during the public comment period, and will make appropriate changes to this EA as needed.

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/FODA>. 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.

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PARK DESCRIPTION, PURPOSE AND NEED

Introduction

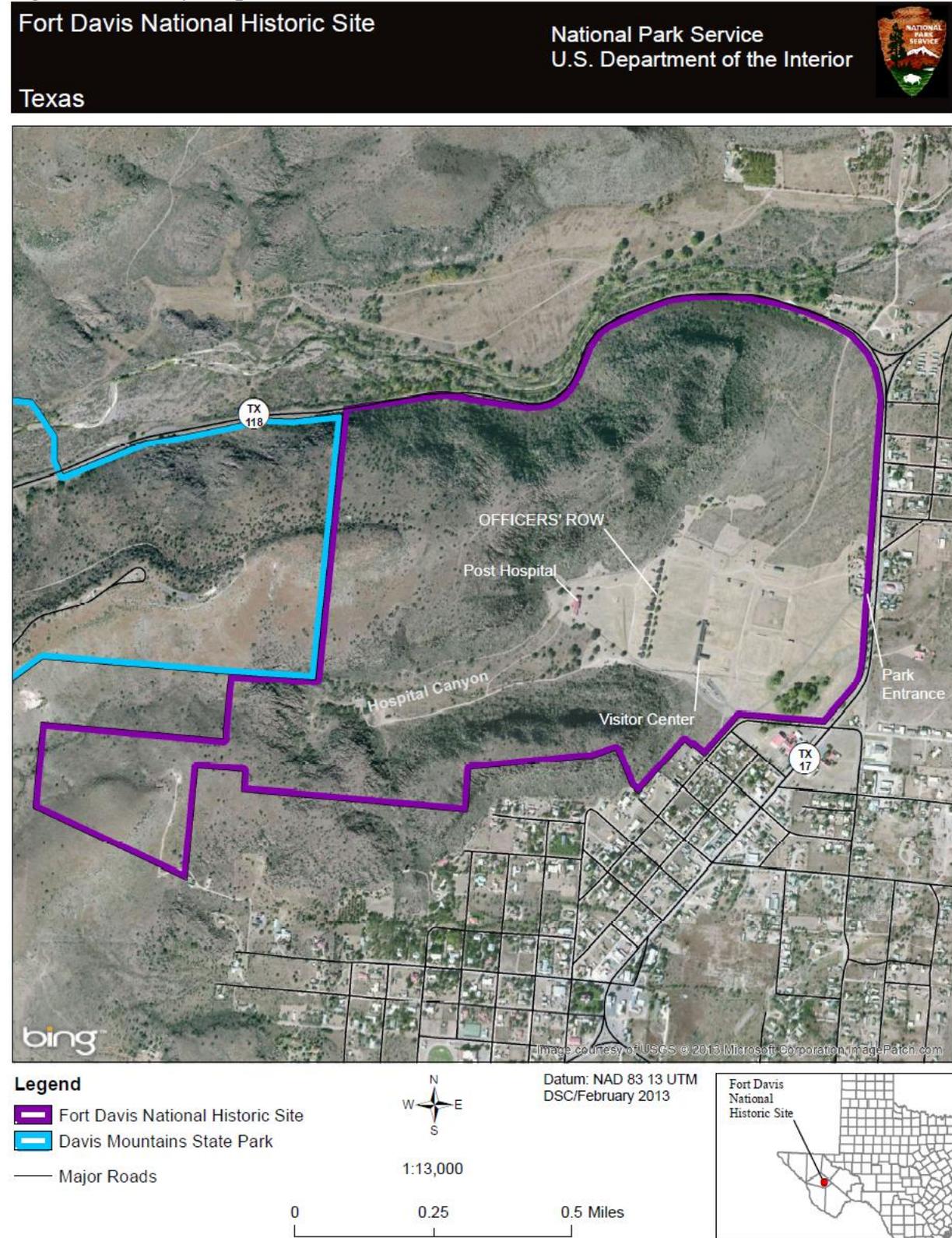
FODA encompasses the buildings, ruins, artifacts, foundations, and cultural landscape of two important frontier military posts active from 1854–1862 and 1867–1891, totaling approximately 523 acres (Figure 1). FODA is located in the Trans-Pecos region of west Texas on the northern edge of Fort Davis, Texas in Jeff Davis County. Private lands bound FODA to the north, south, and east, while the west side boundary is shared with the Davis Mountains State Park. FODA was set aside on September 8, 1961, by Congress (*PL 87–213*) to “commemorate the historic role played by such fort in the opening of the West.” FODA is significant because it is one of the best remaining examples in the Southwest of a post-Civil War frontier fort and provides an opportunity for understanding the role the military played in the settlement and development of the western frontier.

Historically, natural fire helped to shape the native vegetation and local ecosystems of the Southwest. Prior to European settlement, the fire history is thought to have been similar to areas with similar vegetation in the southwest. This included frequent (0 to 35 year return interval) low intensity surface wildfires to mixed intensity dominant overstory replacement fires (McPherson 1995, Swetnam and Baisan 1996, Rome et al. 2009). Ignitions from native peoples who utilized fire for multiple reasons (Pyne 2001) may have occurred in the FODA area. Semi-desert grassland and desert shrubland vegetation types of FODA and other fire-dependent ecosystems/vegetation communities require periodic fires to retain their ecological integrity. Grass and ground fuels were more prevalent before the advent of Euro-American grazing, and were the primary carrier of the frequent ground fires.

FODA is situated in the foothills of the Davis Mountains at the mouth of a small canyon with steep sidewalls and faces east to the open grasslands. In this strategically placed setting, white troops as well as African-American troops, popularly known today as “Buffalo Soldiers” were garrisoned while involved in struggles with Apache and Comanche Tribes. The troops stationed at Fort Davis protected emigrants, freighters, mail coaches, and travelers along the San Antonio-El Paso Road. This road was a transcontinental route going through west Texas to California and the surrounding frontier.

During these historic periods, the area was more open and less forested, which was a result of the intense human activities, such as intense livestock grazing and gathering of firewood. As human use of the land changed, grazing and tree cutting was halted, and fire protection and prevention occurred, the brush species and mesquite increased in density and height. Current conditions exhibit more vegetation than during historic periods with increased brush and mesquite (Figure 2 and Figure 3). Current fuel loads lend it to more intense wildfires that could threaten visitors, cultural and natural resources, park structures, and neighboring lands.

Figure 1. Vicinity Map of FODA



In accordance with *2006 NPS Management Policies*, the new FODA Fire Management Plan will be designed to protect the health and safety of the public and employees; minimize potential impacts associated with wildfire to properties adjacent to the park and to park facilities and infrastructure; and protect, preserve, and enhance cultural and natural resources. The preservation of cultural and natural resources within FODA is fundamental to its continued use and enjoyment by park visitors as a unit of the National Park System.

The new FMP would affirm firefighter and public safety as the highest priority of every fire management activity. In addition, the new FMP would incorporate updated terminology related to National Fire Policy.

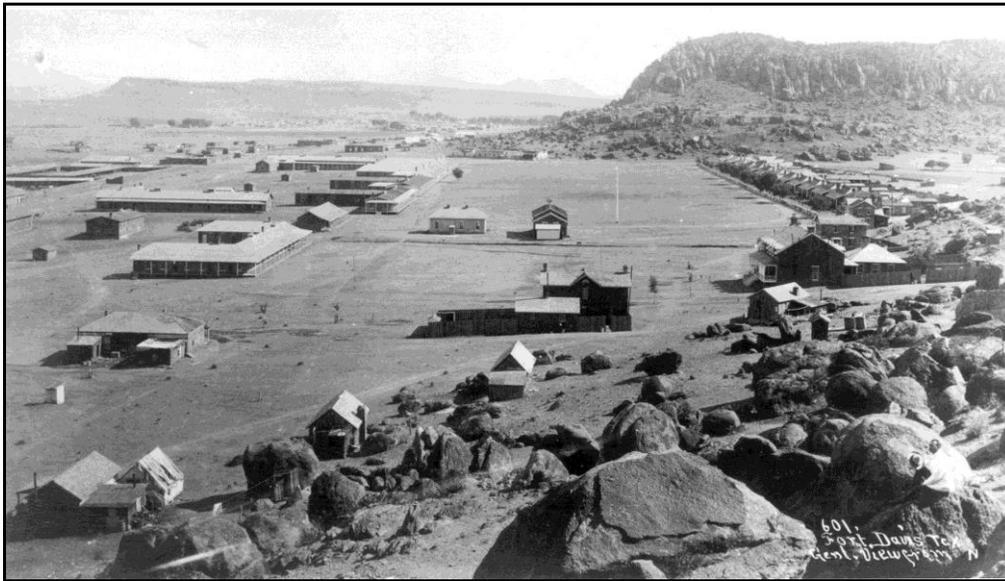


Figure 2. FODA Vegetation in the 1880s

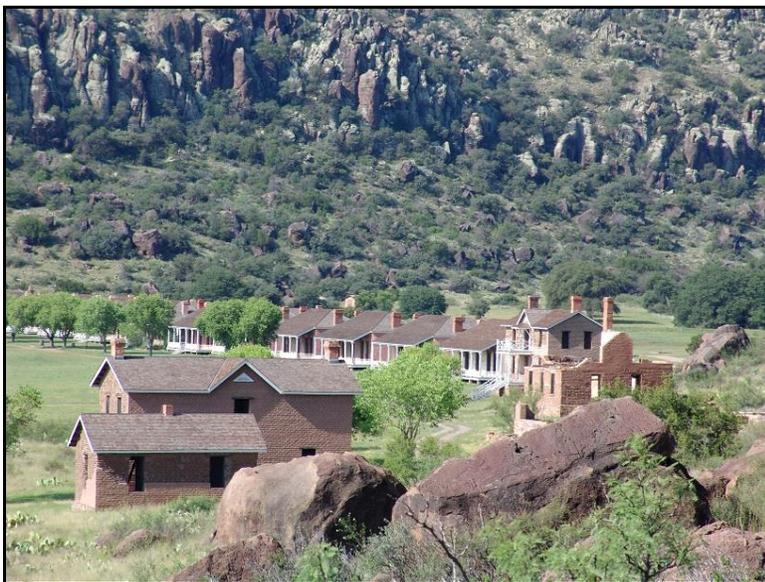


Figure 3. FODA Vegetation in 2011

Park Description

FODA was established by Congress in 1961 to “commemorate the historic role played by such fort in the opening of the West.” The purpose statements of FODA reflect the reasons for which it was created and provide the guiding foundation for its management and use. The purpose for FODA is to:

- Perpetuate and conserve the cultural and natural resources of FODA.
- Educate the public about the influence of Fort Davis on the development and settlement of the Southwest and about the impact of military operations on American Indians.

The significance of FODA:

1. One of the best remaining examples in the Southwest of a post-Civil War frontier fort.
2. Provides an excellent opportunity for understanding and appreciating the important role played by African-Americans in the western frontier army.
3. Historic integrity and character of the military post landscape.
4. The Trans-Pecos portion of the San Antonio-El Paso Road and the Chihuahua Trail.

Purpose and Need

Purpose

The purpose of the proposed project is to comply with DO-18, which states that “all parks with vegetation that can sustain fire must have a fire management plan”, and to replace the use of the Healthy Forest Initiative Categorical Exclusion (CE), per NPS direction to discontinue the use of that CE by April 24, 2015.

Need

FODA is proposing a new FMP to address changes in the vegetation resulting from land use changes since the historic periods, fire suppression, and drought events and to address updates in the national fire policy terminology.

Historically, the landscape was more open with fewer shrubs due to intense human activities in the area, such as grazing of domestic livestock. The grazing reduced the density and continuity of herbaceous fuels important to fire frequency and spread. These grazing practices reduced grasslands and favored increased shrub density and introduction of non-native invasive species (Grover and Musick 1990, Haynie 2000). Change in land use from intense grazing and human activities (e.g., firewood gathering), then suppression of wildfires, followed by cessation of grazing and tree cutting has resulted in more dense woody vegetation than historic periods and shrub encroachment. Hazardous fuel loads have increased with increasing brush densities, ladder fuels, and accumulation of dead and down woody debris. The current fuel loads increase the potential for more intense

wildfires and associated risk to visitors, employees, cultural and natural resources, NPS structures, and neighboring lands. The vegetation needs to be actively managed to reduce hazardous fuel loads and risk to life and property and to help perpetuate the vegetation conditions that developed during historic periods of cultural significance—frontier military posts active from 1854 to 1862 and 1867 to 1891—that NPS is mandated to interpret and protect.

Restoring vegetation communities in FODA would also help to restore some of the ecological integrity of fire-adapted vegetation communities and associated wildlife species. Periodic disturbances such as fire contribute to ecological diversity because moderate levels of disturbance provide opportunities for a larger number of species (Connell 1978). A new FMP would provide FODA with a means to continue to use prescribed fire and manual and mechanical vegetation treatments to manage hazardous fuel loads, protect sensitive sites, restore cultural landscapes, and control invasive plant species. FODA is also considering limited herbicide application as a follow up vegetation management tool to help prevent the encroachment of invasive and/or exotic plant species and to eliminate already present exotic species. Limited herbicide treatments would consist of spot treatments of individual plants or groups of individual plants. The use of prescribed fire, manual and mechanical treatments, and limited herbicide as fire management tools would provide a means to continue protecting life, property and resources from unwanted wildland fire in a safe and efficient manner.

In summary the following objectives of this proposed action are:

- To protect human life and safely conduct all wildland fire management activities.
- To conduct vegetation management activities including prescribed fire and manual methods of fuel reduction as a means to reduce hazardous fuels and restore cultural landscapes and natural resource processes.
- To consider targeted herbicide application as a limited vegetation management tool.
- To provide effective rehabilitation of wildfire areas—that is rehabilitation of fire suppression impacts and Burned Area Emergency Rehab (BAER).
- To continue and increase interagency cooperation and coordination, and public outreach about FODA fire management and restoration activities.
- To update fire policy and terminology language and discussions.
- To continue active research and monitoring of fire program field actions, by supporting sound resource management and research science, and utilize adaptive management to improve the program.

Relationship to Other Plans and Policies

The proposed action is consistent with the General Management Plan (GMP; NPS 2002a), FODA Resource Management Plan (NPS 1988), FODA Historic Scene Management Plan (NPS 1983), the *2006 NPS Management Policies* (NPS 2006), the NPS Director's Order 18, Guidance for Wildland Fire, and NPS Director's Order 28, Cultural Resources Management.

The proposed fire management activities are consistent with the GMP, which proposes to protect, restore, and maintain natural and cultural resources and associated values within their broader ecosystem and cultural context. The future desired conditions of the GMP also state to protect all

historic structures and ruins from adverse impacts; maintain the historic appearance; and manage the park to provide a safe environment for visitors, employees, and volunteers.

The Historic Scene Management Plan states that prescribed fire and mechanical means be used as a fuels reduction technique to maintain the historic scene from the 1880s—the period of fullest fort development and the period best documented by photographs, maps, documents, and specific botanical observations.

In accordance with the *2006 NPS Management Policies*, the wildland fire management program should be designed to protect natural and cultural resource objectives; address potential impacts on public and private land adjacent to the park; protect public health and safety; and provide for safety considerations for park visitors, employees, and developed facilities.

The authority for implementing prescribed fire is included in the National Park Service Organic Act of 1916. National Park Service managers are tasked with the mission to do their best to “preserve unimpaired the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of the current and future generations.”

Director’s Order 18 (DO-18) states that “every NPS unit with burnable vegetation must have an approved FMP.” DO-18 defines what an approved FMP must include, emphasizing that firefighter and public safety is the first priority and an interagency approach to managing fires on an ecosystem basis across agency boundaries. DO-18 also directs parks to identify, manage, and where appropriate, reduce hazardous fuels.

Director’s Order 28 (DO-28) requires the consideration of impacts on historic properties that are listed, or eligible to be listed, in the National Register of Historic Places (NRHP). DO-28 states that FMPs should address cultural resource concerns and protect archaeological sites, historic structures, and cultural landscape features.

Scoping

Scoping is a process to identify the affected environment that may be impacted by the proposed project, and to identify alternatives for achieving the Proposed Action, while minimizing the potential impacts. NPS conducted both internal scoping with NPS personnel, and external scoping with the general public and interested/affected groups and agencies.

Internal Scoping

Internal scoping was conducted on December 7, 2012 by an interdisciplinary team of professionals from FODA and the NPS Intermountain Regional Office including representatives from fire management, resource management, NEPA specialists, the Superintendent, and the private contractor working on the EA. The interdisciplinary team discussed the purpose and need for the project, discussed potential alternatives to address these needs, did preliminary determination of potential environmental impacts, and discussed past, present, and foreseeable projects that may have cumulative effects, and potential mitigation measures. The team members also conducted a site visit to view and evaluate the existing conditions of cultural and natural resources and hazardous fuels.

Public Scoping

Public scoping was initiated by distributing a scoping letter dated February 19, 2013 to various stakeholders describing the project and asking for comments (Appendix A). The letter was also made available on the PEPC website. In addition, a press release was sent to local and regional media, information was posted on the park website, and letters were made available at park visitor facilities. One open house style meeting was conducted to inform the public and various agencies about the proposed addition of prescribed burning, the use of manual and mechanical tools, and targeted herbicide application as FODA fire management tools, and to solicit feedback for direction in this EA. The public meeting was held on March 5, 2013, in Fort Davis, Texas at the FODA auditorium. During the meeting, NPS representatives were available to present an overview of the proposed action, discuss issues, and answer questions; attendees were able to submit oral and written comments or write in later, depending on their preference. Two comment cards were generated from the meeting, and one person provided comments via email.

Comment 1 consisted of support for invasive species control. Comment 1 also asked if FODA coordinates with fire management activities at Davis Mountains State Park or along common boundaries. FODA fire management staff collaborates with and maintains a written agreement with Davis Mountains State Park.

Comment 2 stated concerns about using herbicide application as there is not a boundary fence between his property and FODA. Comment 2 also stated that brush density has increased since the 1960s.

Comment 3 was from the White Mountain Apache Tribe (WMAT) and stated the Proposed Action would have no adverse impacts on the WMAT's historic properties and/or traditional cultural resources.

Internal and external scoping comments were considered in the choice of impact topics and were used in the development and evaluation of alternatives discussed in this EA. Scoping issues or impact topics that were considered, but not evaluated further, are discussed in "Impact Topics Dismissed from Further Analysis Section." The public, agencies, and Native American Indian groups traditionally associated with the lands of FODA will also have an opportunity to review and comment on this completed EA, and their views will be considered before a final decision is made.

Impact topics Retained for Further Analysis

Impact topics for this project have been identified on the basis of federal laws, regulations, and orders, including the *2006 NPS Management Policies*, and NPS knowledge of resources at FODA as well as the questions and comments brought forth during internal and external scoping.

Impact topics that are carried forward for further analysis in this EA are those where the proposed action may have a measurable effect. NPS defines "measurable" impacts as moderate or greater effects. It equates "no measurable effects" as minor or less effects. The use of "no measurable effects" in this EA pertains to whether the NPS dismisses an impact topic from further detailed evaluation in the EA. The reason NPS uses "no measurable effects" to determine whether impact

topics are dismissed from further evaluation is to concentrate on the issues that are truly significant to the action in question, rather than amassing needless detail in accordance with Council on Environmental Quality (CEQ) regulations at 1500.1(b).

There were nine impact topics retained for further analysis. The rationale for retaining each of these topics is briefly listed below with a description of the existing setting or baseline conditions (i.e. affected environment) within the project area. The impact topics along with the desired conditions and relevant laws, regulations, or policies are listed below in Table 1.

Table 1. Impact Topics Retained for Further Analysis and Relevant Laws, Regulations, and Policies.

Impact Topic	General Desired Conditions from NPS Management Documents	Relevant Laws, Regulations, and Policies
Air Quality	<p>Air quality related values should be protected from deterioration, especially on a permanent basis.</p> <p>Perpetuate predominant air quality to sustain human health, scenic vistas, visibility, and visitor enjoyment; and to conserve natural resources and systems and cultural resources.</p>	<p>NPS Organic Act of 1916, as amended; Clean Air Act, as amended; NPS Wildfire Management Reference Manual 18; NPS-77 Natural Resources Management Guidelines; NPS Management Policies; National Environmental Policy Act</p>
Soils	<p>Prevent human activities that cause soil compaction, soil loss or removal, and soil erosion.</p> <p>Prevent soil contamination from human sources.</p> <p>Where previously disturbed, re-establish contours and soil chemistry to support and sustain native vegetation communities.</p>	<p>NPS Management Policies 2006</p>
Vegetation (including invasives)	<p>Manage vegetation to achieve greatest diversity and health, foster the health and increase state and federal listed species, and allow for reintroduction of native species where absent.</p> <p>Ensure that allowed activities aid in the recovery or maintenance of natural vegetation communities especially special and unique habitats.</p> <p>Ensure processes continue that sustain support of functional physical processes, biological productivity, and biological organisms.</p> <p>Prevent establishment of non-native vegetation, and remove it when possible.</p>	<p>NPS Organic Act; NPS Management Policies 2006; Resource Management Guidelines (NPS-77); Executive Order (EO) 13112; Federal Noxious Weed Control Act; Executive Order (EO) 13112; Invasive Species (1999)</p>
Wildlife/Wildlife Habitat	<p>Minimize unnatural disturbances to native wildlife habitat.</p> <p>Prevent wildlife exposure to contaminants.</p> <p>Minimize human caused mortality to wildlife.</p>	<p>NPS-77; Migratory Bird Treaty Act, as amended; EO 13186; Lacey Act, as amended; NPS Management Policies 2006</p>

Impact Topic	General Desired Conditions from NPS Management Documents	Relevant Laws, Regulations, and Policies
	Ensure that allowed activities aid in the recovery or maintenance of wildlife habitat.	
Special Status Species	<p>Avoid and/or mitigate adverse impacts on state and federally listed threatened, endangered, sensitive, and candidate plant and animal species and their habitats.</p> <p>Manage for the existence or increase of state and federally listed threatened endangered, sensitive, and candidate plant and animal species and their habitats.</p> <p>Ensure that allowed activities aid in the recovery of state and federally listed threatened, endangered, sensitive, and candidate plant and animal species and their habitats.</p>	Endangered Species Act, as amended; NPS-77; Migratory Bird Treaty Act, as amended; EO 13186; Lacey Act, as amended; NPS Management Policies 2006; National Environmental Policy Act
Archaeological Sites and Historic Structures	<p>Protects archaeological and historic resources by preventing human caused, and in some cases naturally caused destruction, alteration, or impairment to all or part of the cultural resource.</p> <p>Prevents isolation from or alteration to cultural resources with its surrounding environment.</p> <p>The qualities that contribute to the eligibility for listing or listing of archaeological or historic properties on the NRHP are protected in accordance with the Secretary of the Interior’s Standards (unless it is determined through a formal process that disturbance or natural deterioration is unavoidable).</p>	National Historic Preservation Act; Executive Order 11593, Protection and Enhancement of the Cultural Environment; Archaeological and Historic Preservation Act; the Secretary of the Interior’s Standards and Guidelines for Archeology and Historic Preservation; Programmatic Memorandum of Agreement Among the NPS, Advisory Council on Historic Preservation, and the National Council of State Historic Preservation Officers (2008); NPS Management Policies 2006; National Environmental Policy Act; DO-28
Cultural Landscapes	<p>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.</p> <p>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 extant cultural landscapes: preservation, rehabilitation, and restoration.</p> <p>Cultural landscapes are listed in the National Register when their significant cultural values</p>	National Historic Preservation Act; Executive Order 11593; Archaeological and Historic Preservation Act; the Secretary of the Interior’s Standards and Guidelines for Archeology and Historic Preservation; Programmatic Memorandum of Agreement Among the NPS, Advisory Council on Historic Preservation, and the National Council of State Historic Preservation Officers (1995); NPS Management Policies 2006

Impact Topic	General Desired Conditions from NPS Management Documents	Relevant Laws, Regulations, and Policies
	<p>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.</p>	
Adjacent Landowners	<p>NPS values and goals are shared and understood by park stakeholders.</p> <p>FODA maintains a strong relationship with Davis Mountains State Park and local landowners.</p> <p>Public participation in planning and decision-making will ensure that the FODA fully understands and considers the public’s interests, which are part of their national heritage, cultural traditions, and community surroundings.</p> <p>NPS will actively seek out and consult with existing and potential visitors, neighbors, people with traditional cultural ties to park lands, scientists and scholars, concessioners, cooperating associations, gateway communities, other partners, and government agencies. The Service will work cooperatively with others to improve the condition of parks; to enhance public service; and to integrate parks into sustainable ecological, cultural, and socioeconomic systems.</p>	NPS Management Policies 2006
Human Health and Safety	<p>All reasonable and necessary measures would be taken to minimize human exposure to fire management related hazards. Besides exposure to fire and smoke, this includes related equipment activities, chemical exposure, exposure to heat and environmental hazards, and other work and recreational activities in a rustic, and natural setting.</p>	NPS Management Policies 2006; Director’s Orders 58; NPS Wildfire Management Reference Manual 18

Natural Resources

1) Air Quality

The Clean Air Act of 1963 (42 U.S.C. 7401 *et seq.*) established federal programs that provide special protection for air resources and air quality related values associated with NPS units. Specifically, Section 118 of the Clean Air Act requires a park unit to meet all federal, state, and local air pollution standards. FODA is designated as a Class II air quality area under the Clean Air Act, which means emissions of particulate matter and sulfur dioxide are allowed up to the maximum increase in concentrations of pollutants over baseline concentrations as specified in Section 163 of the Clean Air

Act. In addition, the Clean Air Act gives the federal land manager the responsibility to protect air quality related values (i.e., visibility, plants, animals, soils, water quality, cultural resources, and visitor health) from adverse pollution impacts. This was retained as an impact topic since smoke is a byproduct of prescribed burning.

2) Soil Resources

The *2006 NPS Management Policies* states the NPS will aim to understand and preserve the soil resources and to prevent unnatural erosion, removal, or contamination. The proposed action requires manual or mechanical treatments for construction of firelines, and prescribed burning and herbicide treatments, which have potential to have a measurable impact on soil resources; therefore, impacts to this topic will be analyzed further.

3) Vegetation Resources (including invasives)

The *2006 NPS Management Policies* states the NPS will preserve and maintain all plants native to the naturally evolving park unit ecosystems by preserving and restoring the diversity, dynamics, habitats, distributions, and natural processes of native plants. FODA promotes management practices to limit potential impacts to vegetation, to protect sensitive vegetation resources, and to prevent or limit invasive plant species. The construction of firelines, herbicide treatments, manual and mechanical treatments, and prescribed burning would remove or change areas of native vegetation for fuels reduction.

NPS has developed policies and guidance on management of exotic species. Section 4.4 of *2006 NPS Management Policies* addresses biological resource management, including management of native plants and animals. This policy states that NPS will maintain all native plants and animals as parts of the natural ecosystems of parks and “will manage—up to and including eradication—if control is prudent and feasible and the exotic species interferes with natural processes and the perpetuation of natural features, native species or natural habitats.” Associated ground disturbance activity from construction of firelines, herbicide treatments, manual and mechanical treatments, and prescribed burning could increase the potential for invasive plant species introduction and spread. The proposed action alternative would restore fire-adapted habitat and protect or restore other native vegetation habitats; thus, the topic of vegetation was retained for further analysis.

4) Wildlife

The *2006 NPS Management Policies* states the NPS will preserve and maintain animals native to the naturally evolving park unit ecosystems by preserving and restoring the abundances, diversity, dynamics, habitats, distributions, and natural processes of native animals. There are 15 mammal species, 125 bird species, 39 reptile species, and 10 amphibian species recorded for FODA (NPS 2013a). The Proposed Action would alter or disturb wildlife habitat and individual animals, but would be beneficial by restoring native vegetation and wildlife communities; thus, the topic of wildlife was retained for further analysis.

5) Special Status Species

The Endangered Species Act of 1973 requires an environmental assessment for projects on federally managed lands to determine potential effects to all federally listed endangered, threatened, and candidate species. Section 7 of the Endangered Species Act (ESA) requires all federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) to ensure that any action authorized, funded, or carried out by the agency does not jeopardize the continued existence of federally listed species or designated critical habitats. In addition, the *2006 NPS Management Policies* and Director's Order 77 *Natural Resources Management Guidelines* require the NPS to examine the impacts on federal candidate species, as well as state-listed endangered, threatened, candidate, rare, declining, and sensitive species. There are no known federally listed threatened, endangered, proposed or candidate species known or likely to inhabit FODA and no designated critical habitats lie within or near FODA. The Proposed Action could potentially disturb state-listed species or habitat, but may be beneficial in restoring native habitats that are critical in maintaining sensitive species populations. Therefore, the topic of special status species was retained for further analysis.

Cultural Resources

6) Archaeological Sites and Historic Structures

Section 106 of the National Historic Preservation Act (NHPA), as amended in 1992 (16 USC 470 *et. seq.*); the NPS's Director's Order 28 *Cultural Resource Management Guideline*; and *2006 NPS Management Policies* require the consideration of impacts on historic properties that are listed, or eligible to be listed, in the NRHP. The term "historic properties" is defined as any site, district, building, structure, or object eligible or listed in the NRHP, which is the nation's inventory of historic places and the national repository of documentation on property types and their significance. The above-mentioned policies and regulations require federal agencies to coordinate consultation with the State Historic Preservation Officer regarding the potential effects to properties listed on or eligible for the National Register of Historic Places.

The NPS, as steward of many of America's most important cultural resources, is charged to preserve historic properties for the enjoyment of present and future generations. Management decisions and activities throughout the National Park System must reflect awareness of the irreplaceable nature of these resources. The NPS will protect and manage cultural resources in its custody through effective research, planning, and stewardship in accordance with the policies and principles contained in the *2006 NPS Management Policies*, federal laws, and the appropriate Director's Orders.

To date 100 percent of FODA managed lands has been surveyed for the presence of cultural resources with both historic and prehistoric archaeological sites present. FODA is a National Registered historic district that contains both surface structures and subsurface archaeological remains, thus with any ground disturbing activity there is always the potential to impact subsurface materials or features. Previous investigations indicate that subsurface historical materials are known to exist throughout much of the Historic District (FODA).

The term "historic structures" refers to both historic and prehistoric (archaeological) structures, which are defined as constructions that shelter any form of human habitation or activity. FODA is a

National Historic Landmark with historic significance as a U.S. Army post from 1854 to 1891. The entire historic district includes over 250 structures and ruins, and 21 roofed buildings, of which six are restored and refurbished buildings. FODA also includes the remnants of the associated fort roads and earthworks. There is also a historic dike and ditch system used by the army for flood control. Fire management activities would be designed to avoid impacts to historic properties; however, both archaeological sites and historic structures are important in preserving cultural heritage in FODA. Therefore, archaeological sites and historic structure resources will be retained for analysis.

7) Cultural Landscapes

"In the broadest sense, 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 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 (DO-28)." (NPS's Director's Order 28 *Cultural Resource Management Guideline*). These inventories are a computerized, evaluated inventory of all Cultural Landscapes in which NPS has or plans to acquire any legal interest. Cultural Landscapes must be documented, then evaluated for significance and integrity, and then may be nominated for listing on the National Register.

FODA is considered one cultural landscape with the interpretation focused on the period that the site was used as a Fort for the U.S. military. FODA also contains evidence of pre-fort use by Native American people for temporary or seasonal camps, as well as post-fort use by members of the local community. Numerous community events were held at FODA, and many Fort Davis citizens maintain special ties to the landscape and its features, both natural and manmade, through their ancestors' recorded memoirs. The cultural landscape at FODA is significant for the period from 1854 to 1891 in that it contains one of the most intact surviving examples of a latter 19th century military complex in the U.S. southwest.

The landscape has been significantly altered by absence of grazing that was prevalent during the historic period, which has promoted increased vegetation growth. Prescribed fire would be used to help maintain a more open vegetation composition for the cultural landscape. The Proposed Action should have beneficial impacts to cultural landscapes; however, cultural landscapes are important in preserving cultural heritage in FODA. Therefore, cultural landscapes were retained for further analysis.

Human Resources

8) Adjacent Landowners

FODA is surrounded by the Davis Mountains State Park on the western boundary and the town of Fort Davis on the southern and eastern boundaries. Some of the private parcels adjacent to FODA are used as businesses and private residences. The Proposed Action should have beneficial long-term impacts to adjacent landowners and associated uses; thus, this resource topic was retained for further analysis.

9) Human Health and Safety

The *2006 NPS Management Policies* states park managers should strive to protect human life, by providing injury free visits and a safe and healthful environment for visitors and employees. Wildland fires pose a significant risk to the health and safety of firefighters, NPS employees, and the public. Other planned fire management activities may also pose some risk to staff and visitors. The Proposed Action would be beneficial by reducing hazardous brush areas, making wildfire control more successful. Because activities addressed under the Proposed Action have the potential to impact human health and safety near the fire management projects, this topic was retained for further analysis.

Impact topics Considered, but Dismissed from Further Analysis

1) Water Resources

NPS policies require protection of water quality consistent with the Clean Water Act. The purpose of the Clean Water Act is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." To enact this goal, the U.S. Army Corps of Engineers has been charged with evaluating federal actions that result in potential degradation of waters of the United States and issuing permits for actions consistent with the Clean Water Act. The U.S. Environmental Protection Agency also has responsibility for oversight and review of permits and actions that affect waters of the United States. There is no surface water present within FODA. The water resource associated with FODA is Limpia Creek, located outside the northern boundary of the historic site (Porter et al. 2009), thus no effects on the creek are anticipated. Therefore, the topic of water resources was dismissed from further analysis.

2) Wetlands

For regulatory purposes under the Clean Water Act, the term wetlands means "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas." Executive Order 11990 *Protection of Wetlands* requires federal agencies to avoid, where possible, adversely impacting wetlands. Further, Section 404 of the Clean Water Act authorizes the U.S. Army Corps of Engineers to prohibit or regulate, through a permitting process, discharge of dredged or fill material or excavation within waters of the United States. NPS policies for wetlands as stated in *2006 NPS Management Policies* and Director's Order 77-1 *Wetlands Protection*, strive to prevent the loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. In accordance with *DO 77-1 Wetlands Protection*, proposed actions that have the potential to adversely impact wetlands must be addressed in a Statement of Findings for wetlands.

There are no wetlands at FODA identified by the USFWS National Wetland Inventory in FODA (USFWS 2013a). Two drainages—North Ditch and South Channel dike system—constructed as interceptor ditches and dikes may function as created or intentional artificial wetlands as defined by the NPS in Director's Order 77-1 and Procedure Manual 77-1. However, there is minimal to no wetland habitat associated with them (NPS 2002a). No wetlands would be impacted by the Proposed

Action, therefore, a Statement of Findings for wetlands will not be prepared, and the topic of wetlands has been dismissed from further consideration.

3) Floodplains

Executive Order 11988 *Floodplain Management* requires all federal agencies to avoid construction within the 100-year floodplain unless no other practicable alternative exists. The NPS guided by the 2006 *NPS Management Policies* and Director's Order 77-2 *Floodplain Management* will strive to preserve floodplain values and minimize hazardous floodplain conditions. According to Director's Order 77-2 *Floodplain Management*, certain construction within a 100-year floodplain requires preparation of a Statement of Findings for floodplains.

FODA is located on an alluvial fan and is subject to runoff events during heavy precipitation. Historically, fire is thought to have included frequent (0 to 35 year return interval) low intensity surface wildfires to mixed intensity dominant overstory replacement fires (McPherson 1995, Swetnam and Baisan 1996, Rome et al. 2009). The Proposed Action would not involve the filling or alterations of floodplain areas and their values. Therefore, the topic of floodplains was dismissed from further analysis.

4) Ethnographic Resources

Director's Order 28 (DO-28), *Cultural Resource Management*, defines ethnographic resources as any site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of an associated traditional group. According to DO-28 and Executive Order 13007, *Indian Sacred Sites*, the NPS should preserve and protect ethnographic resources. The twelve affiliated Native American tribes were sent an informational letter on February 19, 2013 describing the Proposed Action and NPS's desire to hear their comments. One comment from the White Mountain Apache Tribe was received as of the date of this EA. The White Mountain Apache Tribe stated the Proposed Action will not have an adverse impact on their historic properties and/or traditional cultural resources and requested to be contacted immediately if Native American materials are discovered during fire management activities. This EA will also be sent to each tribe for their review and comment. If subsequent issues or concerns are identified, appropriate consultations would be undertaken. Because it is unlikely that ethnographic resources would be affected by the proposed project, and because appropriate steps would be taken to protect any ethnographic resources that are inadvertently discovered, ethnographic resources was dismissed from further analysis.

5) Paleontological Resources

The 2006 *NPS Management Policies* for the National Park Service (NPS) states the paleontological resources (fossils), including both organic and mineralized remains in body or trace form, will be protected, preserved, and managed for public education, interpretation, and scientific research. There are no known paleontological resources at FODA thus the topic was dismissed from further assessment.

6) Museum Collections

The Director's Order 24 *Museum Collections* states that NPS is required to consider the impacts on museum collections (historic artifacts, natural specimens, and archival and manuscript material), and provides further policy guidance, standards, and requirements for preserving, protecting, documenting, and providing access to, and use of, NPS museum collections. The FODA museum collection consists of approximately 80,000 artifacts ranging from antique furnishings, museum exhibit artifacts, extensive archaeological and field collection groups, and two herbariums. About 5,000 items are on public exhibit in the museum and six furnished NPS buildings. The remaining items are stored in three curatorial facilities. The Proposed Action would not disturb or damage the FODA museum collections or the buildings in which they are displayed and/or stored. In addition, FODA has employed modified fire wise standards and defensible space to protect facilities from wildland fires. Therefore, museum collections were dismissed from further analysis.

7) Soundscape Management

In accordance with the 2006 *NPS Management Policies* and Director's Order 47 *Sound Preservation and Noise Management*, an important component of the NPS's mission is the preservation of natural soundscapes associated with national park units (NPS 2006). Natural soundscapes exist in the absence of human-caused sound. The natural ambient soundscape is the combination of all the natural sounds that occur in park units, together with the physical capacity for transmitting natural sounds. The frequencies, magnitudes, and durations of human-caused sound considered acceptable varies among NPS units as well as potentially throughout each park, being generally greater in developed areas and less in undeveloped areas.

The predominant soundscape at FODA is comprised of mostly man-made sounds produced from vehicular traffic entering/leaving the park, people visiting or working at the park, and natural sounds such as birds and wind. Sounds from bugling and artillery demonstrations are added by park staff to contribute to the historic interpretation of FODA. Other sounds may include climate controls such as heating or air conditioning units and sounds outside FODA such as traffic noise from the town of Fort Davis.

Temporary, short-term impacts to the soundscape could occur from equipment (e.g., chainsaw, bush/brush hog) used for reduction of hazardous fuels or firelines. These impacts should be temporary and site-specific and should not exceed the typical levels of man-made noise present during regular operations. Therefore, soundscape management was dismissed as an impact topic for further analysis.

8) Lightscape Management

The 2006 *NPS Management Policies* states the NPS will strive to preserve natural ambient landscapes, which are natural resources and values that exist in the absence of human caused light (NPS 2006). FODA strives to limit the use of artificial outdoor lighting to the amount necessary for basic safety requirements. FODA also strives to ensure that all outdoor lighting is shielded to the maximum extent possible, to keep light on the intended subject and out of the night sky. The visitor center and the existing administration offices are the primary sources of light at FODA, but the

impact is minimal since the park is not open at night. No exterior lighting is proposed as part of the Proposed Action and no impacts to the FODA lightscape are expected; therefore, this topic has been dismissed from further consideration.

9) Prime and Unique Farmlands

The Farmland Protection Policy Act of 1981, as amended, requires federal agencies to consider adverse effects to prime and unique farmlands that would result in the conversion of these lands to non-agricultural uses. Prime or unique farmland is classified by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS). Prime farmland is defined as land that has the best combination of physical and chemical properties for producing food, forage, fiber, and oil seed, and for other uses (e.g., pasture land, forest land, and crop land). Unique farmland is defined as land other than prime farmland that can produce high value and fiber crops, such as fruits, vegetables, and nuts. There are no prime and unique farmlands designated in FODA (NRCS 2013); thus, this topic was dismissed from further analysis.

10) Indian Trust Resources

Secretarial Order 3175 mandates any anticipated impacts to Indian Trust resources from proposed project or action by the Department of Interior agencies be explicitly addressed in environmental documents. The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights, and it represents a duty to carry out the mandates of federal law with respect to American Indian and Alaska Native tribes. FODA does not have any lands considered Native American Trust resources. Therefore, Indian Trust Resources was dismissed as an impact topic for further analysis.

11) 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, policies, and activities on minorities and low-income populations and communities. The Proposed Action would not have disproportionate health or environmental effects on minorities or low-income populations or communities as defined by the US EPA Environmental Justice Guidance (US EPA 1998). Therefore, environmental justice was dismissed from further analysis.

12) Wilderness

The *2006 NPS Management Policies*, Section 6 states, "The National Park Service will evaluate all lands it administers for their suitability for inclusion within the national wilderness preservation system. For those lands that possess wilderness characteristics, no action that would diminish their wilderness suitability will be taken until after Congress and the President have taken final action. The superintendent of each park containing wilderness will develop and maintain a wilderness management plan to guide the preservation, management, and use of the park's wilderness area, and ensure that wilderness is unimpaired for future use and enjoyment as wilderness." There are no lands

designated as wilderness or proposed wilderness in or near FODA. Thus, wilderness was dismissed for further analysis.

13) Park Operations

Park operations include changes that may affect the current facilities or that may require a new level of maintenance or staffing. The Proposed Action would not require an increase in fire management staff manpower to implement the proposed fire management tools (i.e., prescribed fires, mechanical and manual vegetation treatments, and targeted chemical treatments); thus, park operations was dismissed from further analysis.

14) Visitor Use and Experience

The *2006 NPS Management Policies* states the fundamental purpose of all parks is for the enjoyment of park resources and values by the people of the United States. NPS is committed to providing appropriate, high-quality opportunities for visitors to enjoy the parks, and will provide opportunities specifically suited for the natural and cultural resources found within the park. Some temporary disturbance would be visible to visitors, but would be site-specific and would have little effect to visitor experience. It is estimated that impacts to visitor use and experience would be short-term and negligible; thus, this topic was dismissed from further analysis.

ALTERNATIVES CONSIDERED

Two alternatives were developed through internal and external scoping, and will be included in this analysis:

Alternative 1: No Action Alternative—Wildfire Suppression Only

This alternative represents what would occur if the FODA fire management program does not have a valid FMP and therefore is limited to wildfire suppression activities allowed under RM-18 and Interagency Standards for Fire and Fire Aviation Operations (NWCG 2013). The 2005 FMP and associated fuels/vegetation management activities was authorized under the Healthy Forest Initiative Categorical Exclusion, which would no longer be valid. FODA Fire Management activities would be restricted to suppression with no ability for planned fuels management activities, including hazardous fuel reduction. This alternative provides a baseline for comparing and evaluating the impacts to the environment by the action alternative.

Over time, wildfires would be expected to be larger, more intense, and more difficult to control without vegetation management to reduce fuels, establish fuel breaks, and restore lower vegetation densities. The buildup of fuels could pose high fire risk to visitors, adjacent private property structures, NPS infrastructure, and cultural and natural resources. There would be reduced resilience of FODA fire-adapted ecosystems/vegetation communities, and continued stress from drought and climate change, pest outbreaks, and wildfire.

Wildfires occurring within the boundaries of FODA would be aggressively suppressed at minimum cost, considering firefighter and public safety, benefits and all values to be protected consistent with

resource objectives. Suppression tactics that may be required to protect life and property include, but are not limited to, application of foam or retardant by ground equipment or aircraft, off-road use of wildland fire engines, hand crews establishing firelines, potential use of heavy equipment, such as bulldozers or masticators when approved by the Superintendent.

Indirect and direct attack methods would be used to suppress wildfires, dependent on conditions and resources available. Direct attack methods would include extinguishment of the fire edge with water from engines or pumps, dropping aerial retardant on the burning edge of the fire, and building hand lines or dozer line against the edge of the fire. Indirect attack methods would include masticating around buildings before the fire arrived to reduce fire intensity, intentional burning out vegetation along selected roads or other barriers in advance of the fire front, and applying foam or water to cultural or other park infrastructure sites to decrease fire behavior and intensity in advance of the fire's arrival.

Alternative 2: Action Alternative—Utilize vegetation management tools to modify fuels to protect and maintain park values

Under this alternative, the FODA fire management program would utilize certain fire management techniques or “tools” where and when appropriate. Manual and mechanical fuel reduction, prescribed fire, and targeted herbicide application would be vegetation management activities used to protect and preserve FODA values.

This alternative would allow prescribed burning in designated FODA areas for the purpose of fuel reduction, maintaining defensible space, restoring cultural landscapes, and controlling invasive plant species. It would also allow the utilization of hand tools during manual fuel reduction activities and hand-held mechanical equipment or wheeled or tracked equipment during mechanical fuel reduction activities to aid in achieving the same purposes listed above for prescribed burning. Mechanical fuel reduction would also use a wheeled tractor to mow the core historic site (67 acres) and to scrape the fuelbreak along sections of the fenced boundary. This would aid in maintaining the desired cultural landscape and defensible space. Specifically, manual fuel reduction would be activities that occur through the use of hand tools (e.g., ax, pulaski, cross-cut saw, pruners, shovel). Mechanical fuel reduction would be vegetation management activities that include using wheeled or tracked equipment (e.g., mowers, masticators, choppers, skidders, bulldozers) and/or handheld motorized equipment (e.g., weed eaters, chainsaws, hand-held brush cutters, leaf blowers).

Limited herbicide use would also be allowed as a follow up to some of the vegetation cutting treatments to slow vegetation regrowth. This would include spot spraying to limit brush encroachment or re-sprouting on fuelbreaks or other high-value areas that have been treated (e.g., historic sites). Herbicides could also be used for invasive and non-native plants that may be found after wildfires or in disturbed areas. Herbicide use would only use U.S. Environmental Protection Agency (US EPA) approved herbicides under their specified conditions, and after undergoing the rigorous NPS evaluation and approval process through the regional and national offices (the NPS herbicide evaluation and approval process is described in Scope and Details related to Herbicide Treatments section).

The techniques described above would be utilized under carefully prescribed conditions, plans, and objectives to restore, protect, and enhance FODA values. Management mitigation measures would be listed to prescribe how and when to use each of these tools. For example, fuel reduction activities would be scheduled during the week to limit disturbance to weekend visitor use during high visitation periods.

Adaptive management would allow updating these techniques and using improved methods, as long as they are within the scope of this analysis.

The priority for all FODA fire management activities is the protection of human life and safety, including firefighters, staff, visitors, and neighbors. Since funding for fuels treatments is limited, vegetation management activities would be prioritized by NPS staff on an annual basis. Secondary priorities, after human life is to protect unique, unusual and/or irreplaceable values that FODA was set aside to protect. Since FODA was set aside to commemorate the historical role played by Fort Davis in the opening of the West, the archaeological and historic sites, and cultural landscapes, are the highest protection priority. Additional values that would be prioritized per RM-18 include NPS infrastructure, threatened, endangered, or sensitive species' habitats, and immediately adjacent private or state property, not necessarily in that order.

Responses to wildfire under this alternative would be the same as described under the No Action alternative, but over time, wildfires would likely become less intense and easier to manage as hazardous fuels are reduced.

Scope and Details related to Herbicide Treatments

FODA is committed to its role as natural resource stewards, and dedicated to protecting the land, waters, wildlife, and people who live nearby, work there and visit. While utilizing NPS and EPA approval processes, FODA will use the best available science to examine proposed herbicide uses for risk versus benefit.

Herbicide application is only utilized by following NPS Management Policy 4.4.5 and 4.4.5.2, and Director's Order 77-7, which outlines the NPS approval process. To get approval, FODA's Integrated Pest Management Coordinator submits a pesticide use proposal into the NPS Pesticide Use Proposal System. Approval comes only after regional and national level staff consider numerous factors such as the target use, location where the application will occur, potential T&E species concerns, potential for getting into surface or ground water, persistence in the ecosystem, safety to employees and the public, and type of application (example, spot spraying). A product may be approved or not depending on the above factors and alternative treatment possibilities. An herbicide application map and record of treatment will be developed for each treatment area.

Approved herbicides must have undergone US EPA environmental and toxicological testing, and then must be US EPA approved and labeled, (as required under the Federal Insecticide, Fungicide and Rodenticide Act of 1972—the process to determine whether or not the product is safe for human health and environmental purposes). Application methods and rates will be followed by the NPS as identified on the product label. The FODA staff will utilize the NPS designated recordkeeping system for purchasing, storing, tracking and maintaining each approved product. FODA approved

applicators would be trained in spill response procedure, which would include actions to prevent leaks, spills, and accidental exposures.

This alternative includes the use of limited herbicide spraying as a management tool, but allows the flexibility to consider and use improved techniques, technology, and newly approved herbicides in the future if more environmentally acceptable alternatives are developed. Treatment methods would include low-volume spot treatments of individual plants/trees with a backpack sprayer or universal terrain vehicle (UTV) sprayer. All treatments would be done with US EPA approved herbicides and as specified on the label and precautions would be taken to avoid areas of standing water.

Treatment methods would include basal, cut stump, foliar applications, and hand-pulling. Basal application would paint an 18-inch wide band around the circumference of the tree trunk reaching the ground. Cut stump treatments involve cutting the stump at the base and applying herbicide to the stump. Foliar treatment would involve spraying herbicide directly onto leaves of trees and/or vegetation. The herbicide should be applied at a volume that wets the crown/leaves, but minimizes runoff and does not affect non-target species. Hand pulling involves the pulling of invasive seedlings out of the ground with the tap root. Pulled seedlings/saplings will be left hanging in such that the root will dry out and not re-sprout.

Use of targeted herbicide applications as a follow-up treatment to maintain fuelbreaks and/or defensible space work established by mechanical or manual vegetation cutting treatments would improve the longevity of the fuel reduction, and facilitate maintenance of these treatment areas. Being able to more successfully create and maintain fuelbreaks and/or defensible space removes a significant fuel hazard in prescribed burns or wildfires. This would make prescribed fire and wildfire control more effective, safer, and successful near historic structures and NPS facilities plus improves safe egress in the event of evacuation. This would also help to return fire-adapted vegetation communities to the range of natural variation where prescribed burning could be utilized as the primary natural change and maintenance agent. This would provide better protection than the “No Action Alternative” for visitors, residents, NPS infrastructure, NPS cultural and natural resources, and facilities.

The Chihuahuan Desert Network of the NPS has a small professional monitoring staff that measures and monitors vegetation manipulation activities and effects (i.e., prescribed fire, mechanical, herbicide, control areas). Systematic monitoring may occur before and after an area has been treated to determine vegetation mortality and progress toward meeting treatment objectives. Additional targeted herbicide treatments might occur after vegetation re-growth to suppress re-sprouts within the fuel break and/or defensible space.

Fire Management Actions and Components

Table 2 is included to clarify actions, components, and some expectations that might result from each alternative.

Table 2. Comparison of Alternatives and Fire Management Activities and Components

<i>Fire Management Activities and Components</i>	<i>Alternative 1 No Action Alternative</i>	<i>Alternative 2 Fire and Vegetation Mgmt. Tools</i>
Suppression actions would occur in response to wildland fire	X	X
-direct and indirect attack would be utilized, depending on safety concerns and economic considerations	X	X
-aerial retardant and foam could be utilized with Superintendent's approval	X	X
- mechanical equipment could be used to help stop wildfires with Superintendent's approval	X	X
- incident objectives and resource advisors would be utilized to protect FODA resources in significant emergency actions	X	X
-Burned Area Emergency Actions (BAER) could occur after wildfires	X	X
-Interagency and community cooperation and coordination would occur in all phases of the Fire Management Program		X
Prescribed Burning could be utilized to achieve identified objectives, and with approved burn plans		X
Hand-held mechanical equipment (chainsaws, brush cutters, leaf blowers) would be utilized during fuel reduction activities; fuel reduction activities would be designed to achieve identified objectives and approved plans.		X
Mowers would continue to be used to maintain defensible space		X
Expect larger wildfires, due to buildup of hazardous fuels. Estimate higher severity fires due to lack of fuel reduction activities.	X	
Spot herbicide application may be utilized to slow brush regrowth following fuel reduction projects		X
Spot herbicide application may be utilized to eradicate exotic or aggressive native vegetation (mesquite) that is invading areas		X
Ecological and cultural landscape restoration actions would utilize prescribed fire, manual fuel reduction, and herbicide application, to achieve objectives identified in project plans.		X

Alternatives Considered and Rejected

FODA has considered and dismissed elements of alternatives, rather than a wholly developed alternative.

Alternative Elements Considered and Dismissed

Two elements that could be considered in any alternative, but were dismissed during scoping.

The use of **wildland fire for resource objectives** element at FODA was considered. This means that natural (lightning) ignitions would be managed (allowed to burn) under carefully defined conditions to achieve resource related goals and objectives. Resource objectives include resource related goals such as special habitat renewal, reduction of hazardous fuels, wildlife values, and reintroducing fire into fire dependent ecosystems.

This element was dismissed because it is not practical to manage natural ignitions in a small acreage unit like FODA. Hazardous fuels are already built up in and adjacent to FODA values and developed areas. Managing fires with such volatile vegetative fuels in a small area with limited staff creates unacceptable risk to damage or destroy NPS infrastructure, NPS cultural and natural resources, and adjoining lands and structures. Due to this risk it is important to immediately initiate reasonable and appropriate suppression activities. There might be limited time or resources to suppress wildfires, and time is of the essence. Vegetation manipulation techniques, limited herbicide use, and prescribed fire are more practical, efficient and safe tools to use in these smaller acreage and developed areas for landscape maintenance and fuel reduction.

The use of **biological agents**, such as goats, to reduce hazardous vegetative fuels at FODA was dismissed during scoping. This element was dismissed because goats do not remove or kill woody vegetation such as mesquite, cat claw acacia, and whitethorn, which are invasive woody plants that can become hazardous fuels and are invading areas in FODA. In addition, using grazers such as goats may require significant additional economic costs such as fencing, constant monitoring, food supplements, installing water sources, and providing protection from predators. Trampling of archaeological sites by livestock would also be a concern. Selective grazing may further encourage the growth of woody plants, change native plant relationships, and introduce more exotic plant species. Vegetation manipulation techniques, limited herbicide use, and prescribed fire are more practical and efficient tools to use for hazardous fuel reduction.

Introducing insects was also briefly discussed, but no appropriate helpful species are known to the staff at this time. Any future proposal to introduce insects would need to have a separate environmental analysis at that time, when a specific proposal was developed and considered.

Mitigation Measures during the Proposed Action

The Big Bend NP Fire Management and FODA staff would work with resource specialists to ensure that cultural and natural resource specialists issues and concerns are considered on all planned projects at FODA. Resource specialists will also be consulted on all emergency incidents, such as wildfire suppression.

Resource Advisors (READ's) should be assigned to wildfires to prevent and reduce adverse impacts from fire suppression actions, and to advise in protecting cultural resources. Assigning READ's (or resource staff) may also be considered for prescribed fire and vegetation management activities.

The Superintendent has overall responsibility and oversight for all FODA activities and staff; he/she sets goals, approves FODA restrictions and closures, coordinates relations with neighbors and partner agencies, and approves the FMP and other major fire documents and plans.

The FODA Chief Ranger, Big Bend NP Fire Management Officer and Incident Commanders assigned by the Superintendent have direct responsibility for public, resident, and staff safety. They would coordinate evacuations and other actions with the appropriate ranger staff, FODA supervisors, and local emergency management agencies.

The following mitigation measures would help minimize the potential effects of FODA fire management activities on resources, staff, and the public. They would be incorporated into the new FMP and fire management work at the FODA, as appropriate, if the Preferred Alternative is adopted.

General Considerations

- All prescribed burns would have a written and approved prescribed fire burn plan, as required by NPS *Reference Manual-18* and the *Interagency Prescribed Fire Planning and Implementation Procedures Guide*.
- Firefighters would utilize Minimum Impact Suppression Tactics (MIST) to minimize impacts of fire response operations, when possible.
- Constructed firelines would be built to the minimum depth and width needed for safe control operations.
- Constructed firelines would be rehabilitated as soon as possible after fires are out to prevent erosion, negative visual effects, and opportunities for invasive plant establishment.
- Natural, manmade features and/or vegetation change barriers would be utilized for firelines whenever possible to minimize the need for fireline construction. This helps minimize disturbance (e.g., soils, habitat, vegetation) by mechanical or hand line construction. Indirect/confine type strategies would often be the preferred strategy for most wildfires.
- Existing roads would be utilized by vehicles and equipment for travel as much as possible. Utilize UTV's, if possible, when off road travel is required. Less sensitive travel routes would be utilized for firefighters, vehicles, and equipment whenever possible.
- After wildfires, Burned Area Emergency Rehabilitation (BAER) would be considered in consultation with regional office and resource specialists.
- Equipment operators would be trained or advised on how to minimize soil and vegetation disturbance, compaction, and displacement, which helps protect cultural resources and prevent establishment of invasive plants. Untrained or new operators would be accompanied by READ's to recommend low-impact operations and techniques.
- Equipment with fluid leaks would not be utilized. Refueling or filling or mixing of gas and other fluids would be avoided in the field when possible; when necessary, appropriate precautions would be taken to prevent spills. These actions would be taken away from streams and watercourses.
- Reasonable procedures would be followed to prevent unintended spills of foam and fire retardant chemicals.
- Herbicide would only be utilized after undergoing the NPS national and regional approval process and considering impacts to natural and cultural resources, and public health and

safety. Herbicide would not be used during high winds. EPA instructions would be the primary direction that would be followed when applying herbicide.

- An herbicide application map and a record of treatment would be developed for each treatment area.
- Herbicide and application devices would be worked on, filled and mixed only utilizing approved leak prevention, and catchment systems. These sites should be away from streams or standing water.
- No visible leakage of chemicals would be allowed from equipment used for transporting, storing, mixing, or applying chemicals.
- Staff utilizing herbicide would be trained in approved procedures related to proper handling, storage, transportation, mixing, spill prevention, and application procedures.
- Prescribed fire would not occur sooner than 2 weeks after herbicide has been applied. Longer delays may be planned to allow target vegetation time to dry and burn better during prescribed burning. This delay time would also allow the herbicide to be absorbed into the target plant tissue and naturally decompose before burning.

Air Quality

- Fire/park staff would perform agency, public, and neighbor notification procedures for all FODA prescribed burns, focusing on residents and activities that might be impacted by smoke from the burns.
- Coordination with adjacent agencies would occur regarding the total number of prescribed burns simultaneously occurring in the area, to limit cumulative smoke impacts.
- FODA would follow any smoke regulations applicable by the State of Texas related to prescribed burns.
- Coordination with the Superintendent would occur in advance of prescribed fires to fully consider the effects of prescribed fire smoke on visitation during holidays or periods of heavy public use.
- When possible, prescribed burns would be conducted when fuel moistures are relatively low to provide better combustion, more transport and lofting of the smoke column, and less residual burning.
- Smoke transport winds would be assessed by prescribed fire managers to determine smoke impacts to sensitive receptors and populated areas.
- Timing and methods of ignition on prescribed burns would be constantly assessed and reviewed by fire managers to minimize smoke impacts.
- The Prescribed Fire Burn Boss would be trained in smoke reduction techniques.
- During FODA prescribed burns, smoke monitoring would occur throughout ignition and immediately after; data would be saved as part of the prescribed fire project records.
- On wildfires and prescribed burns, FODA assigned incident commanders/burn bosses would work with fire or public information officers to regularly update local residents on expected smoke impacts.

Soils

- Vegetation would be removed, cut or manipulated along firelines to the minimum width necessary for fire control and/or to protect human, natural or cultural values.

- Water diversion devices and/or brush and duff covering (after fire is out) would be considered on all sloping and bare soil firelines to prevent erosion.
- Berms would be removed, and natural ground contours restored during fireline rehabilitation.
- Firefighters would utilize Minimum Impact Suppression Tactics (MIST) to minimize soil related impacts of fire response operations whenever possible.
- Utilize water, pumps, and hose lays when available for wetlines or to back-up smaller firelines to minimize the amount of fireline construction and soil disturbance.
- Prescribed fire prescriptions would be utilized that minimize widespread intense and long duration surface burning on soil surfaces to prevent soil sterilization.
- Equipment operators would be trained to minimize soil and vegetation disturbance, compaction, and displacement.
- Dozer and/or heavy equipment would seldom be used at FODA; consider only with consultation of resource specialists and specific permission of Superintendent. Ensure qualified READ's are available to accompany heavy equipment.
- Equipment operation would be avoided on steep slopes, fragile or highly erosive soils.
- When possible, mowing or mastication would be considered for firelines to avoid exposing mineral soils.
- Mop-up on fires would be done utilizing methods to minimize widespread soil disturbance.
- If herbicides are utilized, use only NPS-approved types that do not maintain long-term active residue in soils.

Vegetation

- Vegetation would be removed, cut or manipulated along firelines to the minimum amount necessary for fire control or to protect human, natural or cultural values. Avoid extensive falling and bucking of trees where they are present.
- Leftover vegetative fuels cut from firelines would be lopped and scattered, or, in structure areas, piled for later removal, or saved for replacement on firelines to prevent erosion and promote new growth.
- Water, pumps, and hose lays, when available, would be utilized to create wetlines or to back-up smaller firelines to minimize the amount of fireline construction and vegetation disturbance.
- Stream, arroyo, or water crossings by firelines should be avoided when possible to minimize riparian vegetation disturbance. If necessary, they should be carefully constructed to minimize disturbance to the banks and watercourse area. Crossings should promptly be restored and rehabilitated in consultation with resource specialists.
- Mastication should generally be avoided if project is located in a unique habitat area where cutting of some vegetation may be undesirable. Treatment/vegetation cutting plan may be more closely analyzed and modified in consultation with resource specialists to meet additional requirements.
- When possible, mowing or mastication would be utilized for firelines to avoid exposing mineral soils. When scraping is needed, it would be to the minimum depth and extent necessary for safe fire control operations. Minimizing soil exposure provides fewer opportunities for establishment of new invasive plant species, and easier survival of native plants.

- Slash disposal areas, if needed, would be identified that have no sensitive natural or cultural resources, or sensitive vegetation habitats.
- Prescribed burning prescriptions would be developed that meet specific vegetation management objectives for each prescribed burn unit. These prescriptions would consider variables such as live and dead fuel loading and moisture, wind parameters, temperature, seasonal timing of burn, firing methods, and relative humidity. Excessive residual burning would be avoided for maximum survival of native plants.
- Rehabilitate constructed firelines after fires are out to prevent erosion and promote the re-establishment of native plants.
- Fire and resource specialists would discuss and design systematic monitoring systems related to specific FODA needs to measure the effects of fire related vegetation management activities such as mastication, herbicide use, and prescribed burning.
- Areas disturbed by suppression activities on wildfires or firelines for prescribed fires should be monitored for establishment of invasive plants.
- When possible, incoming vehicles, engines, and equipment from outside the immediate area would be cleaned (including the undercarriage) before use in FODA to remove invasive weed seeds. They would also be cleaned immediately before/upon leaving the park before going to another assignment, or returning to home unit.

Wildlife/Wildlife Habitat

- Upon wildfire notification, resource specialists would examine maps and information resources to assess wildlife effects. READ(s) may be assigned to the incident management organization, depending on potential effects on wildlife, especially if sensitive species are involved.
- Utilize water, pumps, and hose lays when available for wetlines or to back-up smaller firelines to minimize the amount of fireline construction and habitat disturbance by firefighters.
- Stream, arroyo, or water crossings should be avoided when possible by firelines or equipment. Crossings should promptly be restored and rehabilitated in consultation with resource specialists.
- Utilize existing roads, and direct fire related travel onto travel routes that are less sensitive to wildlife disturbance, whenever possible for firefighters, vehicles, and equipment.
- Identify vegetation slash disposal areas, if needed, that have no sensitive wildlife effects.
- Mastication and brush cutting equipment use will be curtailed during prime avian nesting season, or other sensitive wildlife activity periods.
- When planning and before initiating non-emergency field fire/fuels management activities, NPS resource specialists would be consulted to determine presence or effects on sensitive species. If present, mitigation actions would be developed to minimize impacts on species of concern.
- Wildlife effects would be fully considered when developing prescribed fire plans and prescriptions through consultation with resource/wildlife specialists.
- Chemical retardant, foam, and gasoline refueling would not occur within 200 feet of standing water or streams to protect aquatic species.

- Retardant or foam would not be dropped or applied within 300 feet of standing water to protect aquatic species.
- Helicopter bucket filling would only be allowed from approved water sources to help prevent wildlife disturbance.
- Helicopter use would be minimized when possible, and flight levels kept high in raptor and birding areas, to prevent collisions with aircraft.

Special Status Species

- Generally, the same mitigations for special status species would occur as listed above under “Wildlife/Wildlife Habitat”.
- When sensitive species locations, seasons, unique habitat, nesting areas, or other parameters are involved with a fire management project or wildfire, additional consultation with resource specialists and/or specific wildlife experts would occur. Written directions specifying appropriate and reasonable actions and/or mitigations would then be utilized by the fire management staff to minimize disturbance effects or maximize benefits to those sensitive species.
- After or during the wildfire or other activity, resource specialists would direct formal or informal consultation with the US Fish and Wildlife Service and/or State of Texas depending on the status of the species, its recovery plan (if any), and previous agreements between the NPS and the agencies.

Archaeological Sites and Historic Structures

- FODA will follow the nationwide programmatic agreement (PA) guidelines for all fire management related activities before implementing any fuel reduction projects to ensure compliance with section 106 of the National Historic Preservation Act.
- Identify cultural sites in advance of wildfire, prescribed fire, or fuels treatment activities in order to consider potential affects, and develop a plan to avoid adverse effects to historic properties..
- If a wildfire or prescribed fire is likely to get into an area where historic structures such as buildings need to be protected, then fire management will consult with incident management, resource specialists, and guidelines from the FODA structural fire plan.
- Utilize water, pumps, and hose lays when available for wetlines or to back-up smaller firelines to minimize the amount of fireline construction and ground disturbance.
- Educate assigned fire personnel about the significance of cultural sites, how to identify and avoid those sites, and appropriate actions and notifications to be made if new sites are encountered.
- Remind assigned firefighters to never pick up or disturb artifacts or cultural resources.
- Avoid building firelines and doing any ground disturbance in dense cultural site areas.
- Utilize defensive, protection tactics and indirect attack tactics, and collaborate with cultural specialists, to prevent damage to historic, cultural, archaeological, ethnographic, or landscape sites.
- Collaborate and coordinate with FODA affiliated tribes to prevent damage to ethnographic resources, even if unrecorded, before planned projects or during wildfires.

- When possible, mowing or mastication would be utilized for firelines to avoid exposing mineral soils and buried cultural materials.
- Flush cut stumps in cultural sites rather than remove them. Avoid ground disturbance as much as possible in and around cultural sites.
- Identify slash disposal areas, if needed that have no cultural resources.
- During wildfires, fire managers would regularly update FODA cultural specialists on initial and extended attack response strategies, ground disturbance, and actual and predicted extent of fire area. This will help facilitate the focus on involved cultural resources.
- FODA cultural and historic site base maps would be immediately available to fire managers and incident commanders to allow them to avoid impacts to cultural sites.
- If heavy equipment is approved by the Superintendent for use, accompaniment by line qualified archeologists would occur to ensure avoidance of damage to archaeological or cultural sites.
- Special flagging would be utilized to identify archaeological and historic sites; flagging must be monitored as fire threat passes and may need early removal to prevent undue attention to cultural sites.
- After wildfires, Burned Area Emergency Rehabilitation (BAER) activities would be considered in consultation with regional office and resource specialists; cultural resource specialist(s) will need included on the BAER team.
- Mow grass around the fort grounds regularly enough to prevent the grass from carrying surface fire during dry periods.

Cultural Landscapes

- Many of the same mitigations outlined above in “Archaeological and Historic Resources” would be utilized to protect cultural landscapes, or elements of cultural landscapes.
- If fire or fire management activities are to occur in a National Register Cultural Landscape, it is critical to consult immediately with the cultural specialist with knowledge of that landscape to ensure that actions are compatible with the broader purpose of that specific landscape.
- Fire management staff will have access to maps showing FODA cultural landscapes, so that they know when and where to initiate cultural landscape consultation.
- With cultural landscapes, a wider perspective of any fire management ground or vegetation disturbing actions would be taken, with the goal of enhancing the cultural landscape for the long-term.
- After wildfires, Burned Area Emergency Rehabilitation (BAER) activities would be considered in consultation with regional office and resource specialists, and a cultural landscape specialist would likely need included on the BAER team.

Adjacent Landowners

- Continually emphasize the safety of fire staff, neighbors, and the public as the highest priority in all fire management activities.
- All fire management activities, including wildfires, would fully consider risk and effects to private property at and adjacent to FODA. This consideration would occur on an ongoing basis for the duration of the activity or incident.

- Herbicide would only be used after visitors were out of the immediate area, or informed in advance, and appropriate informational signing was placed at human entries to the spray area.
- FODA neighbors and visitors would be notified of all fire management activities that have the potential to impact them. FODA superintendent would assure that appropriate level/intensity of public information officers are present and informed to ensure a responsive level of public information occurs.
- Fire staff/superintendent would ensure adequate public notification procedures occur for all FODA prescribed burns.
- For wildfires, regular media releases would inform locals and visitors about the expected impacts of the fire, especially related to smoke, and closures or restrictions. Signs or notices may be posted at appropriate places to inform incoming visitors of the fire situation. Announcements would also occur during visitor center orientations.
- The superintendent may authorize temporary closure/restrictions in some areas to protect public, neighbors, and visitors.
- To prevent accidental exposure to hazards, neighbors and visitors would be kept out of the immediate vicinity of fire management activities such as mastication, tree falling, low level aviation operations, prescribed fire, and equipment use.
- FODA would monitor fuel, weather, and fire condition parameters and may limit public access and activities to FODA when extreme conditions develop, as designated in Preparedness Level planning, included in the FMP.
- Initial attack staff would determine the proximity of a new fire to visitors, adjacent landowners, and communities. They would coordinate with rangers and local agencies to inform them of the potential hazards and evacuate as necessary.
- As burned areas are opened to visitors after a fire, signs would be posted informing the public of potential hazards in the burned areas, (e.g., snags, stump holes).

Human Health and Safety

- Continually emphasize the safety of fire staff, neighbors, and the public as the highest priority in all fire management activities.
- The superintendent would establish appropriate and reasonable closure orders that would be managed by park rangers.
- Initial attack staff would determine the proximity of fires to visitors, adjacent landowners, and communities. They would coordinate with FODA Rangers and local agencies to inform them of the potential hazard and evacuate as necessary.
- FODA neighbors, visitors, and local residents would be notified/informed on all fire management activities that have the potential to impact them.
- FODA would monitor fuel, weather, and fire condition parameters and may limit public access and activities in FODA when extreme conditions develop, as delegated in Preparedness Level planning.
- Defensible space planning and hazardous fuel reduction would be an ongoing and continuous activity for FODA buildings and infrastructure.
- An herbicide application map and record of treatment would be developed for each treatment area and would be posted or distributed as necessary and helpful.

- Herbicide would only be used after visitors were out of the treatment area and appropriate informational signing was placed at human entries to the application area.
- Staff would perform other agency and public notification procedures for all FODA prescribed burns.
- Prescribed fire burn boss would work with local residents in close proximity to prescribed burns to ensure their safety, both in planning and during implementation.
- The fire management staff would work with ranger staff and local agencies on posting smoke hazard signs if necessary
- For longer duration fires, regular media releases would inform locals and visitors about the expected impacts of the fire, especially related to smoke and closures or restrictions. Signs or notices may be posted at appropriate places to inform incoming visitors of the fire situation. Announcements during visitor orientations at the visitor center would also occur.
- To prevent accidents, visitors would be kept out of the immediate vicinity when fire management activities such as mastication, tree falling, low-level aviation operations, prescribed fires, and equipment use occur.
- As burned areas are opened to visitors after a fire, signs would be posted informing the public of potential hazards in the burned areas.

Environmentally Preferred Alternative

According to the CEQ regulations implementing NEPA (43 CFR 46.30), the environmentally preferred alternative is the alternative “that causes the least damage to the biological and physical environment and best protects, preserves, and enhances historical, cultural, and natural resources. The environmentally preferred 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. In some situations, such as when different alternatives impact different resources to different degrees, there may be more than one environmentally preferred alternative.”

Alternative 2 is the NPS Preferred Alternative, utilizing prescribed burning, manual and mechanical vegetation treatments, and targeted herbicide as fire management tools. This is the environmentally Preferred Alternative for several reasons: 1) it would increase successful restoration and protection of FODA natural and cultural values; 2) it would increase the resilience of fire dependent ecosystems to future natural disturbances such as wildfire, drought, insect outbreaks, and wind events; 3) it would restore fire-adapted and unique ecosystems and associated wildlife; 4) reduce a significant fuel hazard posed by dense brush ground cover, making prescribed burning safer for employees, provide better defensible space for nearby residents, and make control of wildfire more successful; and 5) it would maintain and preserve the historic scene, in accordance with the Historic Scene Management Plan. For these reasons, the preferred alternative causes the least damage to the biological and physical environment and best protects, preserves, and enhances historical, cultural, and natural resources, thereby making it the environmentally preferable alternative.

Under the No Action Alternative, the fire management program would continue to use the current nationally approved fire management tools related to fire suppression, however, 1) it would increase the risk of future high, severity wildfires; 2) reduce the amount, extent, and effectiveness of successful historic landscape and ecological restoration; 3) continue to reduce resilience of FODA’s

ecosystem to drought, pest outbreaks, and wildfire; and 4) increase health and safety risks for visitors, adjacent landowners and residents, and NPS infrastructure due to increased wildfire risks.

Under Alternative 1, FODA would not be entirely consistent with the NPS Wildland Fire Management directives. This directive states a goal of restoring and maintaining fire-adapted ecosystems using appropriate tools and techniques in a manner that will provide sustainable, environmental and social benefits (RM-18).

Therefore, Alternative 2, developing a new FMP that would include the use of prescribed burning, manual and mechanical tools for vegetation management, and targeted herbicide application, as well as continued responses to unplanned wildfire ignitions, is the NPS’ Preferred Alternative.

Table 3 compares the ability of these alternatives to meet the project objectives (the objectives for this project are identified in the Purpose and Need chapter). As shown in the following table, the Preferred Alternative meets each of the objectives identified for this project, while the No Action Alternative does not address all of the objectives.

Table 3. Summary of the Proposed Action Objectives and Alternatives

Objectives	Alternative 1 No Action Alternative	Alternative 2 Preferred Alternative
To protect human life and safely conduct all wildland fire management activities.	No, continued retention and buildup of hazardous fuels would increase risk of larger and/or intense wildfires; the lack of efficient fuelbreaks would reduce ability of fire fighters to control wildfires. Minimal defensible space could lead to increased threat to structures, humans, and adjacent private lands. All this could contribute to less effective suppression that could expose fire fighters and the public to elevated risk.	Yes, ability to use additional fire management tools as described above would decrease hazardous fuels, increase number and quality of effective fuelbreaks, and decrease probability of large and intense wildfires over time. This would increase ability of fire fighters to control wildfires and prescribed burns safely and decrease health and safety risks for visitors, private residents, and NPS employees.
To conduct vegetation management activities including prescribed fire and manual methods of fuel reduction as a means to reduce hazardous fuels and restore cultural landscapes and natural resource processes.	No, FODA limited to full wildfire suppression and management options allowed under National Fire Policy. Natural vegetation management would not occur.	Yes, this alternative plans and implements all active vegetation management activities listed in the objective.
To consider targeted herbicide application as a limited vegetation management tool.	No, limited to full wildfire suppression and management options allowed under National Fire Policy.	Yes, this alternative considers targeted herbicide application as a limited vegetation management tool, which would aide in defensible space and fuelbreak work.
To provide effective rehabilitation of	Yes, this alternative would allow for rehabilitation activities after	Same as Alternative 1, except that over time fire size and severity may decrease leading to less

Objectives	Alternative 1 No Action Alternative	Alternative 2 Preferred Alternative
wildfire areas (rehabilitation of fire suppression impacts and BAER).	wildfires. It is likely that wildfires would be larger and more severe, leading to increased rehabilitation activities, decreased effectiveness, and higher associated costs.	rehabilitation activities, increased effectiveness, and lower financial costs.
To continue and increase interagency cooperation and coordination, and public outreach about FODA fire management and restoration activities.	No, interagency cooperation and coordination and public outreach would be conducted on as needed basis for wildfire suppression efforts.	Yes, this alternative would allow for continued and increased interagency cooperation and coordination, and public outreach about FODA fire management activities with more emphasis on restoration, hazardous fuel reduction, and defensible space activities, as they would be a leading component of the program.
To update fire policy and terminology language and discussions.	No, this alternative would allow the current FMP to expire with no new FMP.	Yes, this alternative would allow for updating terminology and policy in the new FMP to conform to current interagency standards. This would also allow for consistent interagency communications to the public, staff, and cooperators allowing for more efficient communications.
To continue active research and monitoring of fire program field actions, by supporting sound resource management and research science, and utilize adaptive management to improve the program.	No, this alternative would limit the fire program to emergency wildfire suppression tactics, so it would not support current scientific understanding of fire-adapted ecosystems, protection of cultural resources, or adaptive management.	Yes, implementing the proposed fire management tools and methodologies would support research, improve scientific understanding of fire-adapted ecosystems and protection of cultural resources, and allow adaptive management to make fire program improvements over time..
Does the alternative meet project objectives	No	Yes

Table 4. Comparison of Alternatives

Components	Alternative 1 No Action	Alternative 2 Proposed Action
Fire Suppression Tactics	All wildfires within FODA boundaries would be suppressed using the appropriate response, utilizing both direct and indirect tactics, depending on the specifics of each fire. Tactical alternatives that require suppression actions on private lands would be coordinated with local fire agencies and landowners. Fire control actions in many areas would be more challenging due to less reduction of brush and ground cover (hazardous fuels).	Same as Alternative 1, except that fire control actions may be easier over time with allowed reduction of vegetation due to utilization of more active vegetation management tools (e.g., prescribed fire, thinning).
Prescribed Burning	Prescribed fires would not be used as a fire management tool. Hazardous fuels would continue to be retained	Prescribed fires would be used to manage hazardous fuel loads, protect sensitive sites, maintain cultural

	and build up in density, increasing the potential intensity and difficulty to control/suppress future wildfires. FODA’s cultural landscape integrity and ecosystems resilience to drought, pest outbreaks, and wildfire would continue to decrease.	landscape, and restore the natural resource processes. Prescribed burning would become safer and more effective as dense brush is reduced. Fuelbreaks and defensible space are initially developed by mechanical treatments, followed by targeted herbicide application, decreasing the risk of prescribed fires, and present safer control options for wildfires.
Mechanical and Manual (Mechanical includes chainsaws hand-held powered weed cutters, blowers, hand mowers, and hand motorized equipment operated by an individual walking with the equipment and wheeled or tracked equipment such as mowers, masticators, choppers, skidders, bulldozers) (Manual includes ax, pulaski, cross-cut saw, pruners, shovel)	Mechanical and manual tools would not be used to reduce hazardous fuels, to prep units for prescribed burning (including defensible space and fuelbreaks), or to assist on ecological restoration goals. Hazardous fuels would continue to be retained and to build up in density, increasing the potential intensity and difficulty to control/suppress future wildfires.	Mechanical and manual treatments would be used to reduce hazardous fuels, prep units for prescribed burning, to maintain and/create defensible space, or to accelerate ecological restoration goals within FODA. Focused treatment may occur near structures, cultural and natural resource sites. Internal NPS and programmatic processes would be utilized to plan in advance and ensure protection of natural and cultural resources.
Chemical	Chemical treatments would not be used as a fire management tool, so fuel reduction acreage associated with fuelbreaks would not occur. Reduction of encroaching invasive and/or exotic plant species by fire management would not occur.	Targeted herbicide treatments would be used as a follow-up treatment to brush reduction and defensible space treatments and to reduce invasive and/or exotic plant species following NPS approval processes. This would help to help maintain fuelbreaks and defensible space by decreasing woody vegetation resprouts.

Summary of Environmental Consequences of the Alternatives

Table 5 summarizes the anticipated environmental impacts for alternatives 1 and 2. Only those impact topics that have been carried forward for further analysis are included in this table. The *Environmental Consequences* chapter provides a more detailed explanation of these impacts.

Table 5. Environmental Impacts Summary by Alternative.

Resource Topic	Alternative 1 No Action	Alternative 2 Preferred Alternative
Air Quality	The No Action Alternative would have adverse, minor to moderate, localized, short-term impacts on air quality from increased potential for locally severe wildfire effects.	The Preferred Alternative would have adverse, short-term, localized, and negligible to minor impacts on air quality from prescribed burning. As well as indirect, moderate, long-term, and beneficial effects to air quality over time from a decrease in hazardous fuels

Resource Topic	Alternative 1 No Action	Alternative 2 Preferred Alternative
		following implementation of vegetation management actions—prescribed burning, manual and mechanical fuel reduction, and targeted herbicide application.
Soil Resources	The No Action Alternative would have direct, short-term negligible to minor, adverse, and localized impacts on soil resources from wildfire suppression tactics. Indirect impacts would be adverse, moderate, localized, and long-term for the overall soil impacts.	The Preferred Alternative would result in short-term, localized, minor, and adverse impacts from prescribed burns and associated activities to soils. Beneficial long-term impacts to soils would result from the increased nutrients from prescribed burns, increased stability of the soil strata, increased ground cover to more grassy and small shrub conditions, and the reduced threat of severe, higher intensity wildfire.
Vegetation Resources	<p>The No Action Alternative could result in adverse, minor to moderate, long-term, localized impacts to vegetation resources from physical alteration of vegetation structure, composition, and function and increased susceptibility to spread of invasive plants. The intensity of impacts would depend on the intensity, duration, and location of the wildfire(s), and the mitigation efforts that could be implemented.</p> <p>Indirect effects to climate change would be adverse, minor to moderate, short- to long-term, and localized due to increased hazardous fuels and potential for larger and more intense fire behavior.</p>	<p>Overall, the Preferred Alternative would have direct, minor to moderate, beneficial, long-term, localized impacts by restoring the native vegetation structure, composition, diversity, and function of fire-adapted and fire-maintained plant communities (e.g., semi-desert grasslands, juniper savannas). Adverse impacts to vegetation resources would be short-term, localized, and minor from potential loss of individuals and communities of plants from prescribed fires. Adverse impacts from mechanical and manual fuel reduction and limited herbicide use would be negligible due to mitigation measures implemented.</p> <p>Indirect effects to climate change would be beneficial, long-term, and localized due to reduced hazardous fuels and fire behavior potential in treated areas.</p>
Wildlife	The No Action Alternative would have indirect, adverse, minor to moderate, localized, long-term impacts to wildlife habitat and individuals from increased potential for severe wildfires and potential reduced habitat quality.	The Preferred Alternative would have minor to moderate, beneficial, long-term, localized impacts to native wildlife resources from restoring the variety and diversity of native and fire-adapted vegetation communities and wildlife habitat present at FODA and reducing the potential for future larger and severe wildfires. Adverse impacts would be short-term and localized due to stress and disturbance for less mobile species and temporary displacement within and near treatment units for more mobile wildlife species.
Special Status Species	There would be no effect to the black bear, black-capped vireo, least tern, Northern aplomado falcon, yellow-billed	The Preferred Alternative would have no effect to the black bear, black-capped vireo, least tern, Northern aplomado

Resource Topic	Alternative 1 No Action	Alternative 2 Preferred Alternative
	<p>cuckoo, Southwestern willow flycatcher, Mexican spotted owl, Comanche Springs pupfish, Pecos gambusia, diminutive amphipod, Phantom Lake cave snail, Phantom Spring snail, or little aguja pondweed because no federally listed species or their habitat occurs within FODA.</p> <p>Overall, The No Action alternative would have adverse, minor to moderate, long-term, and localized impacts to the Trans-Pecos black-headed snake and Texas horned lizard from severe wildfire impacts to individuals, reduced prey availability, and habitat degradation or removal.</p>	<p>falcon, yellow-billed cuckoo, Southwestern willow flycatcher, Mexican spotted owl, Comanche Springs pupfish, Pecos gambusia, diminutive amphipod, Phantom Lake cave snail, Phantom Spring snail, or little aguja pondweed because no populations or habitat occurs within FODA.</p> <p>The Preferred Alternative would result in beneficial, minor to moderate, long-term, localized impacts to state listed species—Trans-Pecos black-headed snake and Texas horned lizard—from prescribed fires and associated fuel reduction activities (manual and mechanical, targeted herbicide). Adverse impacts would be short-term and site-specific to state listed species due to temporary displacement within and near burn units from noise, smoke, and manual and mechanical fuel reduction associated with prescribed fires.</p>
Archaeological Sites and Historic Structures	<p>The No Action Alternative would have long-term, minor, adverse, and localized impacts to archaeological sites and historic structures due to potential hazardous fuel build up and the increased risk for severe wildfires.</p>	<p>The Preferred Alternative would result in adverse, minor, long-term impacts to archaeological sites and/or historic structures with some beneficial, minor to moderate, long-term, and localized impacts due to reducing the potential for severe wildfires as hazardous fuels decrease and defensible space and fuelbreaks are maintained/created.</p>
Cultural Landscapes	<p>The No Action Alternative would have indirect, long-term, minor, adverse, localized impacts to the cultural landscape due to increased potential for larger, severe wildfires from continued retention and likely increase of hazardous fuels within the cultural landscape.</p>	<p>Impacts to the cultural landscape would be beneficial, minor to moderate, long-term, and localized due to reducing the potential for future severe wildfires as hazardous fuels decrease and defensible space and fuelbreaks are maintained/created, and a more open cultural landscape representative of the historic period is maintained. Adverse, long-term, minor, and localized impacts to cultural landscapes could occur from inadvertent damage to contributing elements (archaeological sites and historic structures) or from trimming or vegetation removal (shrubs).</p>
Adjacent Landowners and Uses	<p>The No Action alternative would result in adverse, short- to long-term, minor to moderate, localized impacts due to continued hazardous fuel build up and the increased risk for severe wildfires.</p>	<p>Impacts to adjacent landowners and uses would be beneficial, minor to moderate, long-term, localized impacts by reducing the potential for future severe wildfires, as the quantity of acres restored/maintained to reflect the FODA historic scene of the</p>

Resource Topic	Alternative 1 No Action	Alternative 2 Preferred Alternative
		1880s increases and hazardous fuels decrease. Temporary, adverse impacts could result from prescribed fire activities due to reduced visibility from smoke and road closures to adjacent landowners and surrounding communities.
Human Health and Safety	Overall, the effects for the No Action Alternative would be direct, short- to long-term, minor to moderate, adverse, localized due to potential hazardous fuel build up and the increased risk for larger, severe wildfires.	The Preferred Alternative would have both short- and long-term impacts to human health and safety that would be beneficial and minor to moderate from reducing the potential for future severe wildfires as the amount of acres restored successfully increases and acres of hazardous fuels (dense trees, shrubs, and brush and ground cover) decreases. Adverse impacts to health and safety would be short-term, negligible to minor, localized with minimal human health and safety concerns for fire fighters and the public due to implementation of vegetation management actions.

ENVIRONMENTAL CONSEQUENCES

Methodology

The effects of each alternative are assessed for direct, indirect, and cumulative effects for each resource topic selected. Actions are first analyzed for their direct and indirect effects. Direct effects are impacts that are caused by the alternatives at the same time and in the same place as the action. Indirect effects are impacts caused by the alternatives that occur later in time or are farther in distance than the action. Potential impacts are described in terms of type, context, duration, and intensity. Specific impact thresholds are given for each resource at the beginning of each resource section. General definitions for potential impacts are described as follows:

Type: Describes the impact as either beneficial or adverse, direct or indirect:

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

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

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

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

Context: Describes the location or area where the impacts will occur.

Site-specific: Impacts would occur within the location of the Proposed Action.

Local: Impacts would affect areas within the location of the Proposed Action and land adjacent to the Proposed Action.

Regional: Impacts would affect areas within the location of the Proposed Action, land adjacent to the Proposed Action, and land in surrounding communities.

Duration: Unless otherwise specified in this document, the following terms are used to define duration.

Short-term: impacts that generally last for the duration of the project. Some impact topics will have different short-term duration measures and these will be listed with the resource.

Long-term: Impacts that generally last beyond the duration of the project. Some impact topics will have different long-term duration measures and these will be listed with the resource.

Intensity: Describes the degree, level, or strength of an impact. The impacts can be *negligible, minor, moderate, or major*. Definitions of intensity can vary by resource topic and are provided separately for each impact topic analyzed.

Cumulative Impacts

The Council on Environmental Quality (CEQ) regulations, which guide the implementation of the National Environmental Policy Act of 1969 (42 USC 4321 et seq.), require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as "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" (40 CFR 1508.7). Cumulative impacts are considered for all Alternatives.

Cumulative impacts were determined by combining the impacts of the alternative with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other ongoing or reasonably foreseeable future projects in FODA and, if applicable, the surrounding region. The temporal scope includes projects within a range of approximately 10 years. Past, current, and foreseeable actions that could potentially contribute to cumulative effects include:

- Wildland fires originating from adjacent lands (other agency prescribed fires and wildfires, private property debris burning)
- Continued maintenance activities and construction within FODA
- Fire management activities planned by other agencies

Natural Resources

Air Quality

Affected Environment

The Clean Air Act of 1963 (42 U.S.C. 7401 *et seq.*) established federal programs that provide special protection for air resources and air quality related values associated with NPS units. Specifically, Section 118 of the Clean Air Act requires a park unit to meet all federal, state, and local air pollution standards. FODA is designated as a Class II air quality area under the Clean Air Act, which means emissions of particulate matter and sulfur dioxide are allowed up to the maximum increase in concentrations of pollutants over baseline concentrations as specified in Section 163 of the Clean Air Act. In addition, the Clean Air Act gives the federal land manager the responsibility to protect air quality related values (i.e., visibility, plants, animals, soils, water quality, cultural resources, and visitor health) from adverse pollution impacts.

Ambient monitoring for SO₂, NO_x, O₃, and PM has not been routinely conducted for FODA, but modeling efforts and estimates generated by NPS and based on regional air quality sites indicate that FODA is in compliance with the NAAQS (NPS 2013b). Prior to any prescribed fire, FODA would acquire the necessary state and local air quality clearance and permits. FODA would also follow state and local requirements for reporting on smoke emissions from wildfires. In addition, prescribed burn managers avoid burning when winds have the potential to carry significant amounts of smoke that could affect local communities and visitor safety.

Methodology and Intensity Threshold

Air quality impacts were qualitatively assessed using literature reviews and professional judgment based on consideration of fuel levels and types, size of area that could burn, and knowledge of air chemistry. The thresholds of change for the intensity and duration of an impact are defined as follows:

Negligible: The effects of the actions would have no changes or changes in air quality would be below or at the level of detection, and if detected would have effects that would be considered slight and short-term.

Minor: The effects of the actions would be measurable small, short-term, localized changes in air quality. Alteration to air quality would be temporary and limited smoke exposure to sensitive resources. No mitigation measures would be necessary.

Moderate: The effects of the actions would be measurable, localized changes in air quality that would have consequences, but air quality standards would still be met. Alteration to air quality resources would be short-term smoke exposure to sensitive resources. Mitigation measures would be necessary and would likely be successful.

Major: The effects of the actions would be measurable, regional changes in air quality that would have substantial consequences, and would violate state and federal air quality standards and Class II

air quality standards. Alteration to air quality resources would be long-term smoke exposure to sensitive resources. Extensive mitigation measures would be needed to offset any adverse effects and their success could not be guaranteed.

Duration:

Short-term: Recovers in 7 days or less.

Long-term: Takes more than 7 days to recover.

Analysis of Alternatives and Impacts on Air Quality

Impacts of Alternative 1—No Action Alternative

Hazardous fuel loadings would be retained and likely continue to accumulate, leading to increased potential for more intense and larger wildfires that could be difficult to control/suppress. Wildfires in areas where little to no fuel hazard reduction has occurred could burn larger acreages and more intensely compared to a prescribed fire scenario.

Wildfires are not planned around favorable weather events or meteorological conditions that would allow for dispersion and transport away from sensitive receptors (i.e., local communities, private residents). These large, difficult to control wildfire incidents could produce more smoke in volume than wildfires where the vegetation has been managed for fuel reduction and is likely to produce two to four times greater particulate matter emissions than would be generated by prescribed fire (Quigley and Arbelbide 1997). The No Action Alternative would result in adverse, minor to moderate, localized, short-term impacts due to increased potential for locally severe wildfire effects on air quality. The severity and duration of impacts would largely depend on the timing, location, severity, and extent of wildfires.

Cumulative Impacts

Cumulative impacts to air quality would occur from No Action Alternative plus other activities including wildland fires (other agency prescribed fires and wildfires, private property debris burning) originating from adjacent lands, traffic within and outside FODA, routine maintenance of park roads, and potential for private development near the park. The No Action alternative in combination with the past, present, and foreseeable future actions would result in minor to moderate, short-term, adverse, localized cumulative impacts to air quality. Contribution to cumulative air quality impacts resulting from the No Action alternative would be negligible, as most air quality impacts are from other sources.

Conclusion

The No Action Alternative would result in adverse, minor to moderate, localized, short-term impacts to air quality from increased potential for larger and severe wildfires. Cumulative impacts to air quality would be adverse, minor to moderate, short-term, and localized.

Impacts to Alternative 2—Preferred Alternative

Management responses to wildfire would be the same as Alternative 1, but effects would be different due to the effects (beneficial and adverse) from the proposed vegetation management actions. Impacts to air quality from particulate matter and smoke produced from prescribed fires would be direct, adverse, minor, short-term, and localized. Negligible amounts of fugitive dust generated from suppression activities and increased vehicle traffic associated with fire crews would temporarily affect air quality, and would be site-specific where suppression activities were occurring. During and immediately following a prescribed burn, smoke, particulate matter, and dust emissions would impact visibility in FODA and the surrounding area. There may be an intermittent and short-term exceedance of air quality standards (especially particulates) resulting in short-term, localized, and negligible to minor adverse impacts to air quality and visibility. Mitigation measures would include burning during appropriate weather and fuel moisture conditions where fuels are dry and will burn out quickly; utilizing wind conditions that disperse smoke away from residents; removing larger fuels (e.g., tree boles) from the area prior to burning to minimize vegetative fuels available; and accelerated mop-up to minimize smoldering. Burning under appropriate conditions can take advantage of favorable air column lift and transport conditions, dispersing smoke more quickly.

Each prescribed burn plan will identify smoke-sensitive areas. Fire weather forecasts will be used to correlate ignitions with periods of optimal combustion and smoke dispersal. Mitigation measures would be defined in the plan and arrangements made prior to ignition to ensure that designated resources are available if needed to implement the mitigation measures. Prescribed fires will not be implemented when atmospheric conditions exist that could permit degradation of air quality to a degree that negatively affects public health (federal and state air quality standards will be the basis for this decision). Smoke situation that arises and threatens smoke-sensitive areas may trigger suppression and/or mitigation measures that terminate the prescribed burn.

Air pollutants and dust would be generated by use of gasoline-powered equipment in mechanical and manual fuel reduction projects. The direct adverse effect of these pollutants on air quality, given the small size of the projects and infrequency of activity, would be localized, short-term, and negligible to minor. The indirect and longer-term adverse impacts would be negligible.

Targeted herbicide application, such as utilizing backpack sprayers for foliar application, could result in herbicide temporarily in the air in the immediate vicinity of the work due to spray drift and volatilization (evaporation of liquid to gas). However, mitigation measures (mitigation measures section), and targeted herbicide application would reduce the potential for drift into non-target areas, and the amount of herbicide released into the air through volatilization. Airborne herbicide risks have been shown to be insignificant, even when prescribed fires are applied immediately after herbicide application (McMahon and Bush 1991). The indirect and long-term adverse impacts would be negligible.

The Preferred Alternative could potentially produce slightly lower smoke emissions over time by effectively reducing the small tree and dense ground cover, changing the main fuel load to grass and forbs in some areas, a faster-lighter burning fuel, which creates less smoke. Overall, Alternative 2 would likely lead to lower and less intense wildfire emissions, which would have a beneficial local effect.

Cumulative Impacts

Cumulative impacts to air quality would occur from the Preferred Alternative plus other activities including wildland fires (other agency prescribed fires and wildfires, private property debris burning) originating from adjacent lands, traffic within and outside FODA, routine maintenance of park roads, and potential for private development near the park. The Preferred Alternative in combination with the past, present, and foreseeable future actions would result in minor, short-term, adverse, localized cumulative impacts to air quality; and long-term, moderate, beneficial, cumulative effects due to the reduction in fuels and reduced risk of a catastrophic wildland fire. Contribution to cumulative air quality impacts resulting from the Preferred Alternative would be negligible, as most air quality impacts are from other sources.

Conclusion

The Preferred Alternative would result in short-term, localized, and negligible to minor adverse impacts to air quality from prescribed burning. As well as indirect, moderate, long-term, and beneficial effects to air quality over time from a decrease in fuel loading following implementation of prescribed burning, manual and mechanical fuel reduction, and targeted herbicide use. Overall, cumulative effects under this alternative would be negligible, short-term, adverse, and localized.

Soil Resources

Affected Environment

The park is located in the Chihuahuan Desert Grasslands of the Chihuahuan Desert, which includes areas of fine-textured soils with a higher water retention capacity (Griffeth et al. 2004). FODA is located along the southern edge of the Davis Mountains, which are part of the eastern belt of the Tertiary Trans-Pecos volcanic field (Henry et al. 1994). The geology primarily includes the Sleeping Lion Formation—low-silica rhyolite lava—and colluvium and fan deposits. The distinctive cliffs and boulders that surround the fort are from the exposed columnar jointing of the silica rhyolite lava flow. Frazier Canton Formation—rhyolitic tuff—is exposed along the base of the cliffs primarily along the eastern edge of the ridges. The Barrel Springs Formation is located in the western portions of FODA and is a rhyolitic rheomorphic ash flow (Henry et al. 1994). These geologic formations provide distinctive features to the soils present at FODA.

There are eight soil-mapping units within FODA as reported by the Natural Resource Conservation Service (NRCS 2013). The predominant soils within FODA are rock outcrop with Brewster association soils (approximately 40%) along higher canyon walls and hilltops. Rock outcrops with Mainstay-Brewster association soils (approximately 20%) are along the western and southwestern edges of FODA. These areas are known as igneous mountain range sites. The soils range from very shallow to deep and are gravelly to cobblely in texture (NRCS 2013).

The majority of the fort is located on the Musquiz association, which can be characterized as moderately deep to very deep, nearly level, and clay loams with low erosion hazard and high water availability (NRCS 2013). At the foot of the canyon walls surrounding the fort is a narrow band of

gravelly loam on gentle slopes—Santo Tomas-Medley association. Fine material is washed out of these soils into the flats below.

Hospital canyon is mostly located on the Bigetty association, which is characterized as non-calcareous loams. Along the northern boundary is a narrow strip of silty loam soils on flat terrain (0–1% slopes)—Rockhouse-Bigetty association (NRCS 2013). All soils within FODA are classified as well-drained (NRCS 2013).

Methodology and Intensity Threshold

To analyze the impacts on geologic and soil resources, all available information on geological and soil resources in FODA was compiled, and developed in consultation with NPS staff and other sources. The thresholds of change for the intensity and duration of an impact are defined as follows:

Negligible: The effects of the actions would not be discernible alteration to soils. Alteration to soil resources would be so slight that their ability to sustain biota, water quality, and hydrology would not be affected, and rehabilitation would not be necessary.

Minor: The effects of the actions would be localized or limited alteration to soils. Alteration to soils would affect their ability to sustain biota, water quality, and hydrology, such that rehabilitation would be achievable within 2 years. Mitigation measures, if needed to offset adverse effects, would be simple and successful.

Moderate: Alteration to soil resources would affect their ability to sustain biota, water quality, and hydrology, such that rehabilitation would be achievable within 3 to 5 years. Mitigation measures, if needed to offset adverse effects, could be extensive but would likely be successful.

Major: Alteration to soil resources would have a lasting effect on the ability of the geology and soil to sustain biota, water quality, and hydrology, such that rehabilitation could not successfully be achieved. Extensive mitigation measures would be needed to offset any adverse effects and their success could not be guaranteed.

Duration:

Short-term: Recovers in less than 3 years.

Long-term: Recovers in more than 3 years.

Analysis of Alternatives and Impacts on Geologic and Soils Resources

Impacts of Alternative 1—No Action Alternative

Under the No Action Alternative, hazardous fuel loadings would be retained and continue to accumulate, leading to increased potential for more intense and larger wildfires that could be difficult to control/suppress. The resulting wildfire could be of high enough intensity to remove most soil organic matter (duff/litter) from the soil surface as well as most standing vegetation. The potential for damage to nutrient, physical, and biotic soil characteristics by fire is low to moderate primarily due to the soil texture and the amount of rock fragment present (NRCS 2012). Moderate,

as defined by NRCS, is that “fire damage can occur because one or more soil properties are less than desirable. Fair performance can be expected, and some maintenance is needed.” The potential for high intensity wildfires could cause soil sterilization, lower soil pH and nitrogen content, killing rhizomes and mycorrhiza, and/or cause soil to repel water. Removal of ground cover and/or duff/litter layer exposes the soil surface to precipitation events and would increase the potential for erosion, loss of topsoil, and/or long-term soil changes to occur. Restoration and regrowth of ground cover would depend on the location, severity, and size of intensely burned areas in the fire. If any slopes or steep areas were burned intensely, they would be prone to washing and erosion before vegetation recovers. The indirect impacts due to increased potential for locally severe fire effects on soil, including physical alteration of soil structure and development of hydrophobic layers, would be adverse, moderate, localized, and long-term. Overall soil impacts would depend on the timing, location, intensity, and extent of the wildfire.

Wildfire suppression strategies could impact soils, if mitigation/restoration of firelines did not occur immediately, which would lead to increased erosion. NPS directed wildfire suppression strategies use minimum impact suppression tactics (e.g., select procedures, tools, and equipment that least impacts the environment, use waterbars on firelines to reduce erosion risk, re-contour area) to reduce impacts; however, these suppression strategies only impact a small area compared to the total area burned, which would be the primary source of soil erosion. Fire suppression impact (fireline) rehabilitation efforts following any suppression effort would further limit the extent of long-term impacts to soils.

Cumulative Impacts

Cumulative impacts to soil resources would occur from No Action Alternative plus other activities including past grazing, maintenance activities and construction within FODA, and wildland fires originating from other adjacent lands. The No Action alternative in combination with the past, present, and foreseeable future actions would result in short- to long-term, minor to moderate, adverse cumulative impacts on soil productivity and stability, which would be reduced over time with rehabilitation efforts of burned areas.

Conclusion

The No Action Alternative would result in short-term, negligible to minor, adverse, and localized from wildfire suppression tactics. Indirect impacts to soils would be adverse, moderate, localized, and long-term with the overall soil impacts depending on the timing, location, intensity, and extent of the wildfire. Contribution to cumulative soil impacts under this alternative would be adverse, short- to long-term, and minor to moderate.

Impacts to Alternative 2—Preferred Alternative

Management responses to wildfire would be the same as Alternative 1, but effects to soil resources would be different due to the effects (beneficial and adverse) from the proposed vegetation management actions. Over time, wildfires would likely be less intense and smaller with soil fire effects more likely to be within the range of naturally occurring wildfires. The use of active vegetation management tools—prescribed fires, manual and mechanical treatments, and targeted

herbicide use—to reduce hazardous fuels would decrease the potential intensity and size of future wildfires in the long term, resulting in fewer suppression and wildfire impacts to soils.

Prescribed fires would impact soils by partially removing protective surface vegetation and litter, and organic matter in the soil, thereby temporarily exposing the soils to a higher potential for both water and wind erosion. The potential for damage to occur to soils within FODA is low to moderate—rating is based on prescribed fire that is intense enough to remove the duff layer and consume the organic matter in the surface layer (NRCS 2013). The potential for moderate fire damage occurs on the Rockhouse-Bigetty association along the northern boundary and the Mainstay-Brewster association soils along the western and southwestern boundaries. The NRCS defines moderate damage as, “fair performance can be expected, but some maintenance will be needed.” Following a prescribed fire, wind erosion may temporarily increase due to the removal of standing vegetation. However, prescribed fires would be designed to not completely consume live and dead vegetation, so the exposure of soils would be less than in high intensity wildfires. Properly executed prescribed fires could be beneficial to soil resources by providing a temporary influx of nutrients from burned vegetative material (Rau et al. 2008), which stimulates seed production without sterilizing the soil, and helps to perpetuate the fire-adapted vegetation associations and allied wildlife. In addition to some recycling of nutrients back into the soils, raising pH, and increasing minerals and salt concentrations in the soil, the ash, charcoal, and vegetation residue resulting from incomplete combustion aids in soil buildup and soil enrichment by new and partially burned organic matter being added to the soil profile. The added material works in combination with living and dead and dying root systems to make the soil more porous, better able to retain water, and less compact while increasing needed sites and surface areas for essential microorganisms, mycorrhizae, and roots (Vogl 1979, Wright and Bailey 1982).

Mechanical and manual equipment used during hazardous fuel reduction treatments (e.g., defensible space, fuelbreaks) could compact soils in localized areas due to increased erosion from removing vegetation. Mechanical and manual fuel reduction treatments would avoid steep slopes and arroyos and soil impacts would be analyzed as part of the treatment plan to avoid physical changes to soils. Implementing mitigation measures such as not allowing mechanical equipment in areas with highly erodible soils (Mitigation Measures Section) would minimize soil disturbance and changes.

Targeted herbicide application—low volume application applied to specific basal or foliar plant areas—could result in herbicide migration into the soil. However, the NPS would use herbicides that do not have short- or long-term residual implications to soils, water, wildlife, or humans. In addition to the mitigation measures, limited use as a follow-up treatment to selected fuelbreaks and defensible space treatments would minimize potential herbicide impacts to the soil. Spot treatments to existing invasive (non-native) plants that may be found after wildfires or in disturbed areas would also be a relatively minor use and help to minimize chances for overspray and migration into the soil. Therefore, the indirect and long-term impacts to soils would be adverse and negligible.

Cumulative Impacts

Cumulative impacts to soil resources would occur from the Preferred Alternative plus other activities including past grazing, maintenance activities and construction within FODA, and wildland fires originating from other adjacent lands. The Preferred Alternative in combination with the past,

present, and foreseeable future actions would be adverse, short-term, minor, and localized as soil impacts would be distributed throughout FODA rather than being concentrated to one large area or conducted all at one time. Cumulative beneficial impacts to soils would be minor and long-term over time due to increased nutrients and increased soil fertility (nutrient recycling, nitrogen availability) for fire-adapted vegetation.

Conclusion

The Preferred Alternative would result in adverse, short-term, minor, and localized impacts from prescribed fires and associated vegetation activities to soils. Beneficial, long-term, localized impacts to soils would occur from increased nutrients following prescribed fires, increased stability of soil strata and altering ground cover to more grassy and small shrub conditions. A benefit to soils over time would be the reduced threat of more intense, larger wildfires. Cumulative impacts would be adverse, minor, short-term, and localized due to prescribed fireline rehabilitation efforts and natural revegetation of burned areas, but beneficial over the long-term.

Vegetation

Affected Environment

More than 200 vascular plants have been documented within FODA (Haynie 2000). FODA vegetation reflects its history as an active garrison in two periods between 1854 and 1891. Evergreen oak-dominated woodlands occur on north-facing ridges and in canyons. Semi-desert grasslands dominated by grama grasses (*Bouteloua* spp.) are found on southern-facing slopes intermixed with desert shrublands. The eastern foreground area and along the bottom of Hospital Canyon are also dominated by grama grasslands with weedy herbaceous cover or encroached by honey mesquite (*Prosopis glandulosa*). The core historic site has actively manicured, cultural vegetation that includes mowed grasslands and a historic cottonwood grove once used as a vegetable garden by soldiers.

Eight vegetation groups with thirty-three plant associations were identified in FODA with woodlands and shrublands as the dominant vegetation communities (Muldavin et al. 2012). Shrublands cover approximately 28%, woodlands cover about 24%, and semi-desert grasslands cover about 18% in FODA. Woodland vegetation communities at FODA include the Madrean Encinal, Madrean Juniper Savanna and Woodland, and the Sonoran-Chihuahuan Lowland Riparian Forest Groups. Shrublands at FODA primarily include the Chihuahuan Creosotebush Mixed Desert Scrub Group with the Apacherian-Chihuahuan Mesquite Upland Scrub Group occurring in the foreground. Semi-desert grasslands at FODA include the Apacherian-Chihuahuan Semi-Desert Grassland & Shrub-steppe Group. Descriptions of the dominant vegetation groups described below are from the botanical surveys conducted between 2007 and 2011 (Muldavin et al. 2012).

Madrean Encinal Group

There are four oak-dominated woodland associations that are dominated by Emory oak (*Quercus emoryi*) or gray oak (*Q. grisea*). These oak-dominated woodlands form open to closed stands on the north-facing slopes and summits along Sleeping Lion and North Ridges. These associations have

diverse understories dominated by grasses intermixed with shrubs. The recent 2011 fire burned some mature trees, but most are resprouting (Muldavin et al. 2012).

Madrean Juniper Savanna and Woodland Group

This association is intermixed with the oak woodlands along the northern slopes of the ridges and on the summits. Tree canopies are open and are dominated by Pinchot's juniper (*Juniperus pinchotti*). This association is described as an open-canopied grassland savannas with a grass dominated understory and scattered shrubs.

Sonoran-Chihuahuan Lowland Riparian Forest Group

Populus deltoids/ruderal disturbance woodland association is represented by the remnant cottonwood grove located in a swale in the southeast portion of the Foreground Resource Opportunity Area (ROA). This grove was used by soldiers (Greene 1986). A dry-riparian association, Netleaf Hackberry/Bluebunch Wheatgrass Woodland, is also part of this group. This association lacks the oak component, but is species rich and includes 30 shrubs and herbs with grasses being the most abundant.

Chihuahuan Creosotebush Mixed Desert Scrub Group

These shrublands are dominated by catclaw mimosa (*Mimosa aculeaticarpa* var. *biuncifera*), whitebrush (*Aloysia gratissima*), Wright's beebrush (*Aloysia wrightii*), and Texas mountain laurel (*Sophora secundiflora*; Muldavin et al. 2012). The understory is a diverse grassy component characterized by grammas, plains lovegrass (*Eragrostis intermedia*), and tanglehead (*Heteropogon contortus*). Some stands are dominated by whitethorn (*Acacia constricta*) with cacti and other succulents in the understory.

Apacherian-Chihuahuan Mesquite Upland Scrub Group

This shrubland association is dominated by honey mesquite and is prevalent in the Foreground ROA. Honey mesquite typically forms open canopies with a grassy understory. Stands are most prevalent on soils derived from alluvial; fan deposits on the east side of FODA that historically supported grasslands (Muldavin et al. 2012). Mesquite invaded with the disturbance from the fort settlement (Dick-Peddie 1993).

Apacherian-Chihuahuan Semi- Desert Grassland & Shrub-steppe Group

Grasslands are interspersed among shrublands and woodlands on Sleeping Lion and North Ridges, and dominate the new extension area landscape (Muldavin et al. 2012). There were 26 grass species recorded with interspersed shrubs such as green sotol (*Dasyilirion leiophyllum*), Texas sacahuista (*Nolina texana*), and Torrey's yucca (*Yucca torreyi*).

Fire Ecology

Fire historically played a role in shaping the structure and composition of the juniper savanna woodlands with high-frequency, low-intensity surface fires (Romme et al. 2009). It is not known whether the woodland fire regime has been significantly altered from pre-settlement conditions (Muldavin et al. 2012). The 2011 wildfire killed some junipers and created more open woodlands and grasslands. Given the intensive human-influenced history at FODA, woodland stand structures have likely been altered extensively by people from wood harvest and intensive livestock grazing. After grazing was initiated, the natural fire frequency was reduced because less grass was available

to sustain fire spread. Suppression policies also excluded fire. Tree density and canopy cover have increased with shrub species invading grasslands and juniper and oak woodlands encroaching and replacing grassland communities.

Fires naturally occurred in the semi-desert grasslands between 10- and 30-year intervals depending on fuel accumulation (McPherson 1995). As previously stated, there was likely intensive livestock grazing since the 19th century until FODA was established. These practices likely led to shrub encroachment of grasslands, which are currently called shrublands. The invasive shrubs include honey mesquite, catclaw mimosa, and whitethorn. Shrubs killed by the 2011 wildfire have resprouted even with persisting drought conditions.

Invasive, Non-native Species

There are 23 nonnative plant species known to occur in FODA (Reiser et al. 2012, Rice and Hanna 2012, Horsley and Caven 2012) with one, field bindweed (*Convolvulus arvensis*), being classified as “noxious weed in Texas (Texas Department of Agriculture 2013). The Entrance Road, Old El Paso-San Antonio Road, and Rock House Fire areas had a significant number of survey blocks with nonnative plant species (Reiser et al. 2012, Rice and Hanna 2012, Horsley and Caven 2012). Until more replicated sampling across years is conducted, no detailed trends or other analysis can be described.

Methodology and Intensity Threshold

The methodology used for assessing vegetation impacts included using available spatial data and literature to identify the plant communities present and identifying the potential effects to plant populations (e.g., composition, diversity, abundance) by the Proposed Action. The thresholds of change for the intensity of an impact are defined as follows:

Negligible: The action alternatives would not affect native vegetation or some individual native plants would be affected, but there would be no effect on native plant species' populations (e.g., composition, diversity, abundance). The effects would be on a small scale.

Minor: The effects of the actions would affect some individual plants and a relatively limited portion of that species' population would also be affected. Mitigation measures, if needed to offset adverse effects, would be simple and successful. Rehabilitation is readily achievable through natural successional processes.

Moderate: The effects of the actions would affect some individual native plants and a sizeable segment of the species' population would also be affected over a relatively wide area. Mitigation measures, if needed to offset adverse effects, could be extensive, but would likely be successful. Rehabilitation is achievable but likely requires additional resources to accomplish goals.

Major: The effects of the actions would cause substantial alteration to individual native plants and affect a sizeable segment of the species' populations over a relatively wide area. Extensive mitigation measures would be needed to offset any adverse effects, and their success would not be guaranteed. Rehabilitation may not be attainable even with substantial efforts.

Duration:

Short: Recovers in 3 years or less.

Long: Recovers in more than 3 years.

Analysis of Alternatives and Impacts on Vegetation**Impacts of Alternative 1—No Action Alternative**

Under the No Action Alternative, hazardous fuel loadings would be retained and likely continue to accumulate, leading to increased potential for intense and larger wildfires that could be difficult to control/suppress. The resulting wildfire could be of high enough intensity to remove most standing vegetation and most soil organic matter (duff/litter) from the soil surface. In addition fire-adapted ecosystems would not be maintained and/or restored and could cause a decline in health and vigor of vegetation communities with a decrease in plant diversity and herbaceous understory. The resilience of FODA ecosystems would be reduced from the continued stress of pest outbreaks, drought, and wildfire. Indirect impacts could be adverse, minor to moderate, localized, and long-term due to physical alteration of vegetation structure, composition, and function. High intensity and/or stand replacing wildfires could create bare and burned soil areas leading to increased opportunities for invasive plant establishment in burn areas and a potential increase of noxious weeds.

Potential spread of invasive plants could also occur from equipment used by fire crews on wildfire suppression efforts (i.e., carried in on equipment from outside the area, fireline construction equipment) or naturally distributed by wind or animals. Soil disturbance and bare soil areas from fireline construction could lead to increased opportunities for invasive plant establishment and a potential increase of noxious weeds. Following fire management suppression activities, areas would be monitored for invasive vegetation. Impacts from the spread of invasive weed species would be long-term and adverse if viable seeds become established. However, due to mitigation measures that would be used (i.e., cleaning of equipment before and after use, firelines re-contoured and covered with cut vegetation debris after suppression activities), impacts would be negligible.

Climate Change

Recent analysis on fire extent and climate during the past 35 years revealed an increase in frequency of large, high severe fires since the mid-1980's with longer wildfire duration and longer wildfire seasons (Westerling et al. 2006). At FODA vegetation types that have experienced fuel accumulations and increased vegetation density are more likely sensitive to climatic variability (i.e., less resilient to fires during drought and warmer years). However based on the current information available for climate change and associated vegetation changes and the fact that interactions between climate change, fire, and vegetation are complex and uncertain, it is unknown whether the same or different vegetation would grow back following a large, severe fire. However, if repetitive fires occur following a large, severe wildfire, it is considered unlikely that historic vegetation associations would develop as they did in the past.

In addition, there are potential future changes in plant communities from predicted climate change, as individual plant species respond to large and small-scale changes in temperature and precipitation, fertilizing effect of increased carbon dioxide, and changing patterns of inter-specific competition (Shafer et al. 2001). The spread of non-native plant species could be accelerated in response to future

climate changes, particularly in those areas where native plant species are unable to adapt to the climate changes. Annual climate variations are driven by interannual variations from the intensity of the summer monsoon precipitation and by variations in El Niño Southern Oscillation cycles (NPS 2007). Annual average temperature and precipitation patterns have shown large fluctuations over the past century with no discernible trend (NPS 2007). However, temperatures have generally become warmer in the past 2–3 decades (NPS 2007). Many future scenarios have been developed and modeled in an attempt to quantify future climate change (Solomon et al. 2007, USFS 2013). Annual temperatures for Jeff Davis County are predicted to increase between 1.1 to 2.1 degrees Celsius by 2050 compared to the year 2000 (USFS 2013). Small changes in average temperatures can have profound effects on species survival and distribution. Precipitation is predicted for driest models to decrease by 5.6 millimeters per month and to decrease by 2.0 millimeters per month in the wettest projections by 2050 compared to the year 2000 (USFS 2013). However, at this time, the models are not sufficiently precise to address increases in temperature and water stress over the short duration of the planning period and the small scale of FODA. Many national and international studies indicate temperature rise is inevitable. Due to increased hazardous fuels and potential for larger and more intense wildfire behavior, indirect effects of Alternative 1 would be adverse, minor to moderate, short- to long-term, and localized.

Cumulative Impacts

Cumulative impacts to vegetation resources would occur from the No Action Alternative plus other activities including past grazing, maintenance activities and construction within FODA, fire management activities planned by other agencies, and wildland fires originating from other adjacent lands. The No Action Alternative in combination with the past, present, foreseeable future actions would have adverse, minor to moderate, long-term, localized impacts from increased potential for stand replacing wildfires.

Conclusion

The No Action Alternative would have adverse, minor to moderate, localized, and long-term due to physical alteration of vegetation structure, composition, and function. Climate change would have adverse, minor to moderate, short- to long-term, localized impacts. Cumulative impacts would be adverse, minor to moderate, long-term, localized.

Impacts to Alternative 2—Preferred Alternative

Management responses to wildfire would be the same as Alternative 1, but effects to vegetation would be different due to the effects (beneficial and adverse) from the proposed vegetation management actions. Prescribed fires would benefit native plant communities over the long term by rejuvenating the soils with nutrients; reducing shrub density and encroachment; and restoring semi-desert grasslands, and reducing competition from invasive plants. Prescribed fire could also increase flower production and/or seed germination of fire-adapted plant species and restore native vegetation structure, composition, and function of historically fire-maintained plant communities. Over the long term, utilizing prescribed fire would be expected to reduce hazardous fuel accumulations and decrease the potential size and intensity of wildfires, as it would make them easier to control by

suppression resources. Experiencing more traditional fire behavior and effects would lead to increased vigor of fire-adapted vegetation found at FODA.

Prescribed fire could result in the loss of individuals and communities of plants in the short-term, especially those that are not fire adapted. However, prescribed fires are designed to be lower in intensity than wildfires, promoting survival of diverse species and seedbeds. Thus, overall impacts would be direct, minor to moderate, beneficial, long-term, and localized by restoring the native vegetation structure, composition, diversity, and function of historically fire-maintained vegetation associations.

Mechanical and manual treatment impacts would include removal of vegetation near buildings and structures (e.g., cultural sites) to create/maintain defensible space. Mechanical and manual treatments would also include development of fuelbreaks and reducing/eliminating invasive and/or exotic plants. Vegetation of historic periods of cultural significance—frontier military posts active from 1854–1862 and 1867–1891—would be maintained, which is an important component of interpreting the cultural period and scenes found at FODA.

Potential spread of invasive plants could occur from equipment used by crews for fuel treatments (i.e., carried in on equipment from outside the area for prescribed fires, mechanical fuel reduction treatment equipment, fireline construction equipment). Following fire management activities (e.g., prescribed fires, hazardous fuels reduction), areas that were treated would be monitored and invasive vegetation may be removed by manual, mechanical, or targeted herbicide treatments. Impacts from the spread of invasive weed species would be long-term and adverse if viable seeds are transported and become established. However, due to mitigation measures that would be used (i.e., cleaning of equipment before and after use, avoid burning when possible in areas at high risk for weed establishment or spread), impacts would be negligible.

Targeted herbicide application impacts could be spraying non-target plants and herbicide drift. Potential for impacts to non-target plants would be minimized by following mitigation measures plus application would be limited to small areas, conducted with certified applicators in accordance with the product label instructions, and hand application of herbicides via backpack sprayers and UTV sprayers to specific basal or foliar plant areas, or directly to cut stumps or tree trunks. Thus, indirect, adverse impacts would be negligible.

Climate Change

Considered over a broad scale, areas treated with prescribed fire could remove additional environmental stressors and competition on remaining species and allow them to better adapt to climate change. Burn plan prescriptions and real-time fire modeling rely on current meteorological conditions and fuel characteristics, which reflect the uneven progression of longer-term changes. These planning and decision-making processes are an example of short-term adaptive management followed by the fire program under guidance in RM-18, Wildland Fire Management. As additional scientific information becomes available at a useful temporal, spatial, and/or ecological scale, it would also contribute to the longer-term adaptive management process through annual program reviews and revisions to the FMP. Due to reduced fuels and fire behavior potential in treated areas indirect effects would be beneficial, long-term, and localized.

Cumulative Impacts

Cumulative impacts to vegetation resources would occur from the Preferred Alternative plus other activities including past grazing, maintenance activities and construction within FODA, fire management activities planned by other agencies, and wildland fires originating from other adjacent lands. The Preferred Alternative in combination with the past, present, foreseeable future actions would have moderate, long-term, beneficial, and localized impacts. This would be due to the decreasing shrub density, brush cover, and ground cover over time, thus improving ecological restoration with the return of a natural fire regime and an increased trend of resilience to future climate warming or droughts.

Conclusion

Overall, the Preferred Alternative would have an indirect, beneficial, minor to moderate, long-term impacts to vegetation by restoring native vegetation structure, composition, diversity, and function of fire-adapted and fire-maintained plant communities (e.g., semi-desert grasslands, juniper savannas). Adverse impacts to vegetation resources would be short-term, minor, and localized from potential loss of individuals and communities of plants from prescribed fires. Adverse impacts from mechanical, manual, and herbicide use would be negligible due to mitigation measures implemented. Cumulative impacts to vegetation would be moderate, long-term, beneficial, and localized.

Wildlife

Affected Environment

The predominant habitat types in FODA are oak-dominated woodlands, desert shrublands, and semi-desert grasslands. The Davis Mountains and Davis Mountains State Park, which is the western boundary of FODA supports a large variety of wildlife, so there is potential for a large variety of wildlife to move through FODA. There are about 15 species of mammals, 125 bird species, 39 reptile species, and 10 amphibian species recorded for FODA (NPS 2013a).

Common large mammals known to occur in and around FODA include mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), collard peccary (*Pecari tajacu*), coyote (*Canis latrans*), bobcat (*Felis rufus*), gray fox (*Urocyon cinereoargenteus*), and pronghorn (*Antilocarpa Americana*). Small mammals documented in FODA include desert cottontail (*Sylvilagus audubonii*), black-tailed jackrabbit (*Lepus californicus*), rock squirrel (*Spermophilus variegatus*), ringtail (*Bassariscus astutus*), and common skunk (*Mephitis mephitis*). Black bear (*Ursus americanus*) historically occurred in the area and have been observed in the Davis Mountains as a rare occurrence. There are also two invasive mammal species known to occur at FODA, Barbary sheep (*Ammotragus lervia*) and feral hogs (*Sus scrofa*). Barbary sheep (aoudad), an African wild sheep, was imported to ranches in west Texas as game animals and present distribution includes the Davis Mountains and FODA. Hogs were introduced by early Spanish explorers and as colonization increased the number of hogs increased. Many of these hogs escaped contributing to the feral population, which are distributed throughout most of Texas today including FODA.

The 2012 bird surveys recorded over 600 birds and 53 species at FODA (NPS 2013c). Common bird species observed include red-tailed hawk (*Buteo jamaicensis*), barn swallow (*Hirundo rustica*), Bewick's wren (*Thryomanes bewickii*), rock wren (*Salinctes obsoletus*), black-throated sparrow (*Amphispiza bilineata*), Say's phoebe (*Sayornis saya*), Lark Sparrow (*Chondestes grammacus*), and turkey vulture (*Cathartes aura*; NPS 2013c).

FODA provides habitat for birds protected under the Migratory Bird Treaty Act (MBTA). The MBTA makes it unlawful to pursue, hunt, kill, capture, possess, buy, sell, purchase, or barter any migratory bird, including the feathers or other parts, nests, eggs, or migratory bird products. In addition, this act serves to protect environmental conditions for migratory birds from pollution or other ecosystem degradations. Potential impacts to migratory birds will be avoided by keeping fire management activities to small scale and minimizing any adverse impacts when possible.

As previously mentioned, 10 amphibian species and 39 reptile species have been recorded or have suitable habitat at FODA. Amphibians observed in FODA include the red-spotted toad (*Bufo punctatus*), Great Plains Narrow-mouthed Toad (*Gastrophryne olivacea*), and Couch's Spadefoot (*Scaphiopus couchii*; NPS 2013a). Reptiles observed in FODA include Western Coachwhip (*Masticophis flagellum*), Sonoran Gophersnake (*Pituophis catenifer*), Texas Horned Lizard (*Phrynosoma cornutum*), Great Plains Skink (*Eumeces obsoletus*), Chihuahuan Spotted Whiptail (*Aspidoscelis exsanguis*), and Ornate Box Turtle (*Terrapene ornate*; NPS 2013a).

Methodology and Intensity Threshold

The methodology used for assessing wildlife impacts included using available literature to identify the wildlife species and habitat communities present and identifying the potential effects to wildlife populations (e.g., composition, diversity, abundance) by the action alternatives. The thresholds of change for the intensity of an impact are defined as follows:

Negligible: No wildlife species would be affected or some individuals could be affected as a result of the alternative, but there would be no effect on wildlife species' populations. Impacts would be well within natural fluctuations.

Minor: Some wildlife species would be affected and a limited part of the species' population would be affected as a result of the alternative. Mitigation measures, if needed, would be simple and successful.

Moderate: Some wildlife species would be affected and a sizeable part of the species' population would be affected as a result of the alternative over a relatively large area within FODA. Mitigation measures, if needed, would be extensive and successful.

Major: A considerable effect on wildlife individuals and on a sizeable segment of the species' population as a result of the alternative over a relatively large area in and outside FODA. Extensive mitigation measures would be needed to offset any adverse effects and may not be successful.

Duration:

Short: If individual species or habitat recovers in ≤ 3 years.

Long: If individual species or habitat recovers in >3 years.

Analysis of Alternatives and Impacts on Wildlife

Impacts of Alternative 1—No Action Alternative

Existing wildlife habitat conditions would persist with continued retention and increase of hazardous fuels—shrub density, brush and ground cover, and encroaching woody vegetation. The continued encroachment of shrubs could change species composition and structure of native grasslands, leading to a more homogenous shrubland state that is less diverse and fire-adapted. Increased hazardous fuels could also reduce wildlife habitat quality and increase the potential for more intense, larger wildfires. Fire dependent vegetation communities may decrease in prevalence and vigor, leading to negative impacts on wildlife species long adapted to those vegetation types. Impacts to wildlife habitat and individuals would be indirect, adverse, minor to moderate, long-term, and localized due to increased potential for locally or widespread severe fire effects.

Wildfire suppression tactics would temporarily increase noise disturbance from human presence and equipment, smoke, fire, and soil disturbance. Additional disturbances to wildlife could result from the use of helicopters for transport of personnel and firefighting control actions. Low level fixed wing aircraft flights and retardant drops could be used in firefighting suppression actions, also disturbing wildlife. In addition, reproduction and survival for individuals could be affected due to increased stress and loss of foraging opportunities after habitat burns in high intensity wildfires. Temporary loss of habitat and displacement may occur for individuals within the burn area. Mortality to wildlife species that are smaller and less mobile such as, small mammals, lizards, and snakes, may also occur from wildfires, while larger animals may not be able to move out of the fire path in time, becoming disoriented by the wildfire.

Cumulative Impacts

Cumulative impacts to wildlife resources from other activities include loss of habitat from development in surrounding Fort Davis community, fire management activities planned by other agencies, wildfires originating from adjacent lands, and noise-related impacts from vehicles and State Highways 118 and 17. The No Action Alternative would result in adverse, minor to moderate, short- to long-term, localized cumulative impacts due to displacement and habitat alteration from wildfires and the likelihood of more intense and larger wildfires over time.

Conclusion

The No Action Alternative would have indirect, adverse, minor to moderate, long-term, and localized impacts to wildlife habitat and individuals due to increased potential for locally or widespread severe fire effects and reduced habitat quality and displacement. Cumulative impacts to wildlife would be adverse, minor to moderate, short- to long-term, localized to wildlife and/or their habitat.

Impacts to Alternative 2—Preferred Alternative

Management responses to wildfire would be the same as Alternative 1, but effects to wildlife would be different due to the effects (beneficial and adverse) from the proposed vegetation management actions. The likelihood of intense or larger wildfires would decrease with time as prescribed burns and mechanical and manual vegetation management actions were completed. These actions would likely decrease the potential for larger, intense wildfires over time.

The use of vegetation management tools would increase the success rate of restoring fire as an ecological process, thus increasing the prevalence and vigor of fire dependent vegetation and befitting associated native wildlife species present at FODA. In addition, the ability to reduce more dense shrub and brush areas would potentially increase wildlife habitat quality and ground forage available. The potential for wildfires to be lower intensity ground fires, which are easier to manage/suppress and have less impact on wildlife and their habitat would increase under the Preferred Alternative. Thus, the Preferred Alternative would have beneficial, minor to moderate, long-term, localized impacts by restoring the abundance and diversity of fire-adapted vegetation communities and wildlife habitat present and reducing the potential for future severe wildfires.

Prescribed fire could benefit individual wildlife species and their habitat by emulating the natural fire regime and creating a more historic and natural vegetation pattern across FODA. Prescribed fire could create localized, but not widespread areas of early succession vegetation and enhance the variety and diversity of vegetation communities and wildlife habitat present. Prescribed burns would increase the amount of nutrients available to the soils in the short-term, which could increase new plant growth and improve the amount of ground and grass species available, and the nutritional quality of the forage for wildlife species. The burned areas generally green up earlier than non-burned areas, thus providing earlier grazing (Redmon and Bidwell 2003).

Prescribed fires could directly impact nesting resident and migratory birds if conducted during breeding/nesting season (generally between April 15–September 15) through mortality of fledglings that are unable to flee or avoid the burn units. Implementing prescribed fires when possible outside the breeding season and/or avoiding known nesting areas should mitigate these potential impacts.

Impacts on wildlife species that are less mobile from mechanical and manual treatments used for hazardous fuel reduction would be short-term, adverse, and localized due to stress and disturbance. Potential mitigations include avoiding seasons when ground and shrub/tree nesting birds are actively nesting. Short-term impacts on more mobile wildlife species (e.g., deer, mountain lions) would be temporary displacement from the treatment areas.

Targeted herbicide application applied by hand, such as spot application to specific basal or foliar plant areas, would minimize chances for overspray and applying to non-target plants in wildlife habitat. Thus, mitigation measures (mitigation measures section), limited use, low volume application of herbicide, and conducted by a certified applicator following all label instructions would minimize chances for overspray and impacts to non-target plants. In addition, herbicides commonly used for vegetation management by the NPS (e.g., Garlon 4, glyphosate, imazapyr, sulfometuron, metsulfuron methyl, hexazinone) have been designed to target biochemical processes unique to plants, thus have low levels of direct toxicity or risk to wildlife when used in accordance

with label specifications (Tatum 2004). Herbicides commonly used for vegetation management also degrade quickly upon entering the environment and thus are neither persistent nor do they bioaccumulate (Tatum 2004). Using targeted herbicide as a follow-up treatment to reduce and/or maintain brush regrowth of selected defensible space and fuelbreaks and to reduce/eliminate invasive/noxious weeds would cause a temporary disturbance to wildlife in the treatment areas.

Cumulative Impacts

Cumulative impacts to wildlife resources from other activities include loss of habitat by the development in surrounding Fort Davis community, fire management activities planned by other agencies, wildfires originating from adjacent lands, and noise-related impacts from vehicles and State Highways 118 and 17. The Preferred Alternative would result in adverse, minor, short-term, localized impacts due to increased noise and disturbance to wildlife as well as beneficial, minor, long-term, and localized due to habitat improvement from return of a natural fire regime and improved habitat quality.

Conclusion

Impacts to native wildlife resources would be minor to moderate, beneficial, long-term, and localized from restoring the variety and diversity of native and fire-adapted vegetation communities and wildlife habitat present at FODA. The potential for future large and severe wildfires would also decrease, as would wildfire suppression efforts. Adverse impacts would be short-term and localized due to stress and disturbance for less mobile species and temporary displacement within and near treatment units for mobile wildlife species. Overall, cumulative impacts to wildlife resources would be beneficial, minor, long-term, and localized due to increased habitat quality with an increased mosaic of habitat types and a decrease in the potential for severe and intense wildfires.

Special Status Species

Affected Environment

Under the Endangered Species Act of 1973 (ESA), the NPS has the responsibility to address impacts to federally listed, candidate, and proposed species. The terms “threatened” and “endangered” describe the official federal status and certain species in FODA as defined by the ESA. The term “candidate” is used officially by the U.S. Fish and Wildlife Service (USFWS) to describe species, which sufficient information exists on biological vulnerability and threats to support a “proposed rule to list,” but issuance of the proposed rule has not been completed. NPS policies dictate that federal candidate species, proposed species, and state species of concern are to be managed to the greatest extent possible as federal-listed endangered and threatened species (NPS 2006). For the purposes of this analysis, a list of federally listed species that may occur in or near FODA (Jeff Davis County) was obtained from the USFWS website (http://www.fws.gov/southwest/es/ES_ListSpecies.cfm) on September 26, 2013. A list of state listed species that may occur in or near FODA was obtained from the Texas Parks and Wildlife (TPWD) website (<http://www.tpwd.state.tx.us/gis/ris/es>) and the Texas Natural Diversity Database.

All federal and state listed species known to occur in Jeff Davis County, Texas are listed in Table 6. Currently, there are no federally listed threatened, endangered, candidate species, or species of special concern species known or likely to inhabit FODA and no designated critical habitats within or near FODA.

There are 23 Texas state-listed species with potential to occur in Jeff Davis County (Table 6). Twelve of these species are federally protected under the ESA. Of the 23 species, two state listed sensitive species and/or their habitat may be impacted by fire management activities in FODA— Texas horned lizard (*Phrynosoma cornutum*) and Trans-Pecos black-headed snake (*Tanilla cucullata*). The remaining state listed species that are known to occur within Jeff Davis County do not occur at FODA based on their known habitat preferences and/or they have not been documented in FODA (NPS 2013a).

Table 6. Federal and State Listed Threatened, Endangered, or Candidate Species Known to Occur within Jeff Davis County, Texas.

Species	Status		Habitat	Potential to Occur
	USFWS	State		
Black bear <i>Ursus americanus</i>	T	T	Desert scrub or woodland habitats within scattered mountain ranges, predominantly the Chisos and Guadalupe Mountains.	Habitat not present at FODA. Solitary individuals could pass through that inhabit the Davis Mountains.
BIRDS				
Black-capped vireo <i>Vireo atricapilla</i>	E	—	Preferred habitat is rangelands with scattered clumps of shrubs separated by open grassland. In Texas, occurs in the Edwards Plateau and eastern Trans-Pecos regions. This bird is recorded as an accidental occurrence in riparian and pinyon-juniper habitats in Davis Mountains State Park.	Habitat not present at FODA.
Common Black-Hawk <i>Buteogallus anthracinus anthracinus</i>	—	T	An obligate riparian nester that prefers remote, mature gallery forest corridors associated with perennial streams; nests in cottonwood galleries. In Texas, remnant population found in Jeff Davis County.	Nesting habitat not present; observed in the mesquite grasslands (NPS 2011a); likely foraging or as a transient.

Species	Status		Habitat	Potential to Occur
	USFWS	State		
Least Tern <i>Sterna antillarum athalassos</i>	E	E	Nests are bare or sparsely vegetated sand, shell, and gravel beaches, sandbars, islands, and salt flats associated with rivers and reservoirs.	Habitat not present
Mexican Spotted Owl <i>Strix occidentalis lucida</i>	T	T	Nesting and roosting habitat is composed of mature, old-growth forests of white pine, Douglas fir, and ponderosa pine. In Texas, occurs in the he Davis and Guadalupe Mountains.	Habitat not present
Northern Aplomado Falcon <i>Falco femoralis septentrionalis</i>	E, Experimental, Non-essential	E	Inhabits open grassland or savannah habitat with scattered trees or shrubs. In Texas, occur in South Texas and Trans-Pecos regions.	Large tracts of open grasslands or savannah habitats are not present in FODA.
Peregrine Falcon <i>Falco peregrinus anatum</i>	Delisted	T	Nests on large cliff walls in wooded/forested habitats, with large "gulfs" of air nearby where they can forage. In Texas, is a resident of the Trans-Pecos region, including the Chisos, Davis, and Guadalupe mountain ranges.	No large cliff wall habitat present within FODA for nesting. This species has not been documented in FODA; and is unlikely to occur (NPS 2013a).
Southwestern Willow Flycatcher <i>Empidonax traillii extimus</i>	E	E	Breeds in dense riparian habitats along rivers, streams, or other wetlands. The vegetation can be dominated by dense growths of willows (<i>Salix</i> sp.) or other shrubs and medium-sized trees. One of the most important characteristics of the habitat appears to be the presence of dense vegetation, usually throughout all vegetation layers present.	Habitat not present

Species	Status		Habitat	Potential to Occur
	USFWS	State		
Yellow-billed Cuckoo <i>Coccyzus americanus</i>	C	—	An obligate riparian nester—prefers streamside forests, especially those dominated by willow and cottonwood stands. In Texas, also occurs in open woodlands with dense undergrowth, overgrown orchards and pastures.	Habitat not present
Zone-tailed hawk <i>Buteo albonotatus</i>	—	T	Primarily a bird of high elevation, near streams, either in riparian trees or on cliffs but often hunting over higher-elevation coniferous forest or desert lowlands. In west Texas, rock outcrops frequently present near nest sites where lizards are available.	Nesting habitat not present; observed in mesquite grasslands (NPS 2011a); likely foraging or a transient.
FISH				
Comanche Springs Pupfish <i>Cyprinodon elegans</i>	E	E	Currently, restricted to San Solomon and Phantom Cave and associated springs, and downstream irrigation canals. In Texas, found only in spring-fed waters near Balmorhea, Texas.	Habitat not present
Pecos gambusia <i>Gambusia nobilis</i>	E	E	Preferred habitat is spring-fed pools and marshes with constant temperature. In Texas, occurs in the Pecos River basin, near Balmorhea, and Leon Creek and Diamond-Y Spring outflow near Fort Stockton.	Habitat not present
Rio Grande Chub <i>Gila pandora</i>	—	T	This fish inhabits flowing pools of headwaters, creeks, and small rivers, often near inflow of riffles and in association with cover such as undercut banks, aquatic vegetation, and plant debris. In Texas, isolated populations	Habitat not present

Species	Status		Habitat	Potential to Occur
	USFWS	State		
			occur in Davis Mountains.	
REPTILES				
Chihuahuan Desert lyre snake <i>Trimorphodon vilkinsonii</i>	—	T	Typically inhabits dry, rocky terrain of mountains, canyons, hills, rock outcrops, fissured bluffs, and arroyos, in areas with desert plants (e.g., catclaw mimosa, white thorn) or riparian vegetation.	Habitat not present
Mountain short-horned lizard <i>Phrynosoma hernandesi</i>	—	T	Typically inhabits open shrubby or woodland habitats with sparse vegetation.	Open shrubby or woodland habitat not present and has not been recorded in FODA (NPS 2011b, NPS 2013a).
Texas horned lizard <i>Phrynosoma cornutum</i>	—	T	Inhabit arid and semiarid habitats in open areas with sparse plant cover.	Habitat present and has been recorded in FODA (NPS 2011b, NPS 2013a)
Trans-Pecos black-headed Snake <i>Tantilla cucullata</i>	—	T	Inhabits limestone hills of the Chihuahuan Desert, where the snake is thought to seek refuge in cracks and crevices. Endemic to Texas found only in the Big Bend and the eastern portion of the Trans-Pecos near Del Rio.	Habitat most likely present in the flats and thought to occur in FODA (NPS 2011b, NPS 2013a).
CRUSTACEANS				
Diminutive amphipod <i>Gammarus hyalelloides</i>	C	—	Endemic aquatic amphipod that occurs in springs issued from a cave. Known only from Phantom Lake Spring.	Habitat not present
INVERTEBRATES				
Phantom Lake Cave Snail <i>Cochliopa texana</i>	Proposed E	—	Endemic aquatic snail occurring in only three spring systems and associated outflows (Phantom Lake, San Solomon, and East Sandia springs) in the Toyah Basin of Jeff Davis County and Reeves County, Texas.	Habitat not present
Phantom Spring snail <i>Tryonia cheatumi</i>	E	—	Endemic aquatic snail occurring in only three spring systems and	Habitat not present

Species	Status		Habitat	Potential to Occur
	USFWS	State		
			associated outflows (Phantom Lake, San Solomon, and East Sandia springs) in the Toyah Basin of Jeff Davis County and Reeves County, Texas.	
PLANTS				
Little Aguja pondweed <i>Potamogeton clystocarpus</i>	E	E	Texas endemic that inhabits still or slowly flowing water of pools in intermittent, spring-fed creeks with sand and gravel derived from igneous rock. This plant is known from one population in Jeff Davis on private property.	Habitat not present

Sources: USFWS, last updated September 19, 2013; and TPWD, last updated September 5, 2013.

Trans-Pecos black-headed Snake

The Trans-Pecos black-headed snake is endemic to western Texas, specifically Big Bend and the eastern portion of the Trans-Pecos near the Del Rio area (LaDuc and Cannatella 2013). The preferred habitat is steep-sided rock canyons that provide cracks and crevices as protection (Dixon and Werler 2005). The dominant vegetation was pinyon pine, juniper, and oak dominated. This snake has also been documented in hilly grasslands with lava soils that supported scattered stands of juniper and cholla (Dixon and Werler 2005). The natural history of this snake is not well known. The Trans-Pecos black-headed snake has not been documented in FODA (NPS 2011b, NPS 2013a), but is thought to likely occur along the rocky areas surrounding and north of the fort ruins (NPS 2011b).

Texas Horned Lizard

Texas horned lizards are found in deserts, temperate grasslands, prairies, and scrubland, occurring in sandy, open areas with little vegetation. Defense mechanisms include inflating itself to appear larger and squirting blood from its eyes. The lizard hibernates during the late fall and winter months, coming out of hibernation in late April or May, depending on soil temperatures. The lizard digs for hibernation, nesting, and insulation purposes, and it often inhabits abandoned animal burrows or covers itself with loose sand. Mating occurs soon after emergence from hibernation, and continues into July. The lizard is often found near harvester ant mounds, which are its main source of prey, but it also forages on grasshoppers, beetles, and isopods. Texas horned lizards have been documented in FODA (NPS 2011b, NPS 2013a).

Methodology and Intensity Threshold

The methodology used for assessing special status impacts included using available GIS data and literature to identify the special status species and habitat communities present and identifying the potential effects to special status populations (e.g., composition, diversity, abundance) by the action alternatives. The thresholds of change for the intensity of an impact are defined as follows:

Negligible: No individuals of a special-status species would be affected but a very localized area of their habitats could be affected as a result of the alternative.

Minor: A few individuals of special status species or localized areas of their respective habitats would be affected, but the species' population would not be affected as a result of the alternative. Mitigation measures, if needed, would be simple and successful.

Moderate: A number of individuals of special status species populations or a limited portion of their respective habitats would be affected as a result of the alternative. The impacts would be difficult to detect using typical population monitoring techniques. Mitigation measures, if needed, would be extensive and successful. Moderate effect would equate with a "may affect, likely to adversely affect" or "not likely to adversely affect" determination in U.S. Fish and Wildlife Service terms and would require formal consultation.

Major: A measureable portion of a special-status population or a large portion of their respective habitats would be affected as a result of the alternative over a relatively large area within the park. The impacts would be readily detectable using typical population monitoring techniques. Extensive mitigation measures would be needed to offset any adverse effects and may not be successful.

Duration:

Short-term: If individual species or habitat recovers in ≤ 1 year; population recovers in ≤ 3 years.

Long-term: If individual species or habitat recovers in ≥ 1 year; population recovers in > 3 years.

Analysis of Alternatives and Impacts on Special Status Species

Impacts of Alternative 1—No Action Alternative

There would be no direct impacts to any special status species. Existing habitat conditions would persist with continued retention and increase of hazardous fuels—shrub and tree density, ground cover. The continued encroachment of woody species and increase of ground cover could change species composition and the structure of native vegetation and habitats. This would likely lead to a more homogenous habitat state and reduce habitat quality and key habitat requirements for native species, which is needed to maintain viable populations of special status species. The fuel buildup would likely lead to increased potential for uncharacteristic wildfires (e.g., high intensity, stand replacing wildfire) that are difficult to suppress/manage. These stand replacing fires could cause alterations in native habitat that could persist for decades, or longer. As discussed in the wildlife section, increased human presence and noise related to fire suppression tactics during wildfires could temporarily disturb species within or near the wildfire areas.

Trans-Pecos black-headed snake

The continued retention and increase of hazardous fuels—shrub and tree density—could lead to intense and larger wildfires and/or could change the species composition and structure of the native vegetation. Severe wildfires could remove large tracts of vegetation that surround den sites, burn portions or an entire den site, and/or temporarily decrease prey availability (centipedes, insects). Trans-Pecos black-headed snakes have not been observed in FODA, but is thought to be present in the rocky hills and canyons. Fire is often channeled up canyons via a “chimney” effect during wildfires, (i.e., dependent on slope, winds aspect), and may burn with more intensity in those areas, thus increasing the chance of habitat alteration under this alternative. The indirect effects would be adverse, minor to moderate, localized, long-term impacts due to increased potential for locally severe fire effects on Trans-Pecos black-headed snake habitat, and individuals if present in FODA, and reduced prey availability.

Texas horned lizard

Existing hazardous fuels would continue to increase, which could lead to intense and larger wildfires that are difficult to suppress/manage. These severe wildfires could lead to sterilization of the soils, removal of plant communities, baking and destruction of ant mound colonies, and overheating of Texas horned lizards on the surface or buried in the soil. This could lead to severe habitat loss, mortality of individual Texas horned lizards, and/or removal of prey species (e.g., harvester ants, grasshoppers). Texas horned lizards are known to occur in FODA (NPS 2011b, NPS 2013a). Indirect effects would be adverse, minor to moderate, localized, long-term impacts due to increased potential for locally severe fire effects on individual Texas horned lizards and their habitat.

Cumulative Impacts

Cumulative impacts to special status species resources from other activities include loss of habitat from development in surrounding Fort Davis community, fire management activities planned by other agencies, wildfires originating from adjacent lands, and noise-related impacts from vehicles and State Highways 118 and 17. The No Action Alternative would result in adverse, minor to moderate, long-term, and localized due to increased potential for more severe wildfires from continued retention and buildup of hazardous fuels.

Conclusion

There would be no effect to the black bear, black-capped vireo, least tern, Northern aplomado falcon, yellow-billed cuckoo, Southwestern willow flycatcher, Mexican spotted owl, Comanche Springs pupfish, Pecos gambusia, diminutive amphipod, Phantom Lake cave snail, Phantom Spring snail, or little aguja pondweed because no federally listed species or their habitat occurs within FODA. The No Action alternative would result in indirect, adverse, minor to moderate, short- to long-term and localized impacts to Trans-Pecos black-headed snake and Texas horned lizard. Adverse impacts are due to increased potential for locally severe fire effects on individuals, reduced prey availability, and habitat degradation or removal. Cumulative effects under this alternative would be adverse, minor to moderate, long-term, and localized impacts to the Trans-Pecos black-headed snake and Texas horned lizard.

Impacts of Alternative 2—Preferred Alternative

Management responses to wildfire would be the same as Alternative 1, but effects to special status species would be different due to the effects (beneficial and adverse) from the proposed vegetation management actions. The likelihood of intense or larger wildfires would decrease with time because prescribed burns and vegetation management actions would target areas for hazardous fuels reduction, leading to less potential and smaller areas of high intensity wildfires over time. The use of vegetation management actions would increase the success rate of restoring fire as a natural ecological process, thus increasing native fire-dependent vegetation in prevalence and vigor, having a positive impact on special status wildlife species adapted to those vegetation types (e.g., semi-desert grasslands, juniper savannas). Habitat quality for special status species would be enhanced over time by promoting a more open vegetation structure with healthy herbaceous ground cover, reducing shrub density and brush cover, and promoting healthy, less dense oak and juniper stands. In addition, wildfires would have an increased potential to be lower intensity ground fires that are easier to manage/suppress and more beneficial for habitat of special status species. Thus, Alternative 2 would enhance the native fire-adapted vegetation and the native wildlife/habitat over time.

Prescribed fire would aid in maintaining and/or restoring native vegetation by rejuvenating soils with nutrients, creating openings, introducing fire under milder conditions with lower intensity burning, decreasing shrub density, and aiding in re-establishing more diverse native groundcover. Unlike wildfire, prescribed burns would be limited in size, so annual impacts to vegetation would be localized rather than widespread. This could result in more diverse habitat types and better native habitat for Trans-Pecos black-headed snake and Texas horned lizards by creating more open, sparsely vegetated patches. Open patches may facilitate increased mobility; may increase forage efficiency by allowing lizards/snakes to sit and wait for their prey; and may also increase the number of areas exposed to direct sunlight for thermoregulation. Previous studies have also shown prescribed fires may increase insect abundance, the primary prey species of Texas horned lizards and Trans-Pecos black-headed snake (Burrow et al 2002, Swengel 2001).

Noise, smoke, and manual and mechanical fuel reduction associated with prescribed fires could temporarily displace special status species within and near burn units. Texas horned lizards may be able to survive prescribed fires by burrowing into the soil and Trans-Pecos black-headed snakes may leave the area or seek refuge in deeper rock cracks and crevices. In areas with unnaturally heavy fuel loads, however, the risks associated with mortality may be higher. These species have evolved with frequent (0 to 35 year return interval) low intensity surface wildfires to mixed intensity dominant overstory replacement fires (McPherson 1995, Swetnam and Baisan 1996, Rome et al. 2009). Prescribed fires would also be relatively small in size and localized, so while temporarily changing habitat in one area, other FODA areas would remain initially unchanged allowing temporary refugium to continue for both species. These unburned areas would be adjacent to burned areas and, if needed, allow quicker recolonization of the recovering habitat. Burn plans would include mitigation measures to minimize potential impacts to special status species and their habitats. Overall, prescribed fire would have beneficial, long-term, localized impacts to special status species' habitat and associated prey habitat.

All proposed actions would be of short duration, timed to preserve identified species, sensitive habitats, and resources. By following mitigation measures impacts to state listed species should be

beneficial, minor to moderate, long-term, localized impacts from prescribed burns and associated fuel reduction activities.

Targeted herbicide application—spot treatments—to specific basal or foliar plant areas, would minimize chances for overspray and applying to non-target plants. Thus, mitigation measures (mitigation measures section), limited use, low volume application of herbicide, and conducted by a certified applicator following all label instructions would minimize chances for overspray and impacts to non-target plants. In addition, herbicides commonly used for vegetation management by the NPS (e.g., Garlon 4, glyphosate, imazapyr, sulfometuron, metsulfuron methyl, hexazinone) have been designed to target biochemical processes unique to plants, thus have low levels of direct toxicity or risk to wildlife when used in accordance with label specifications (Tatum 2004). Herbicides commonly used for vegetation management also degrade quickly upon entering the environment and thus are neither persistent nor do they bioaccumulate (Tatum 2004). Thus, impacts from targeted herbicide application should be negligible to special status species.

Neither direct nor indirect short-term or long-term effects of prescribed burns, manual and mechanical fuel reduction, or targeted herbicide treatments would be expected to impact the twelve federally listed species for Jeff Davis County because FODA does not support any known populations or contain designated critical habitat. Thus, the Preferred Alternative would have no effect to the black bear, black-capped vireo, least tern, Northern aplomado falcon, yellow-billed cuckoo, Southwestern willow flycatcher, Mexican spotted owl, Comanche Springs pupfish, Pecos gambusia, diminutive amphipod, Phantom Lake cave snail, Phantom Spring snail, or little aguja pondweed because no populations or habitat occurs within FODA.

Cumulative Impacts

Cumulative impacts to special status species resources from other activities include loss of habitat from development in surrounding Fort Davis community, fire management activities planned by other agencies, wildfires originating from adjacent lands, and noise-related impacts from vehicles and State Highways 118 and 17. The Preferred Alternative would result in minor to moderate, long-term, beneficial, localized cumulative impacts to special status species and their habitats through improved and restored habitat from simulating the return of a natural fire regime, and reduced potential for uncharacteristic wildfires.

Conclusion

The Preferred Alternative would have no effect to the black bear, black-capped vireo, least tern, Northern aplomado falcon, yellow-billed cuckoo, Southwestern willow flycatcher, Mexican spotted owl, Comanche Springs pupfish, Pecos gambusia, diminutive amphipod, Phantom Lake cave snail, Phantom Spring snail, or little aguja pondweed because no populations or habitat occurs within FODA.

Overall, the Preferred Alternative would have beneficial, minor to moderate, long-term, localized impacts to the Trans-Pecos black-headed snake and Texas horned lizard from prescribed fires and associated fuel reduction activities. Adverse impacts to the Trans-Pecos black-headed snake and Texas horned lizard would be short-term and site specific due to temporary displacemtn within and

near burn units from noise, smoke, and manual and mechanical fuel reduction associated with prescribed fires. Cumulative impacts would be minor to moderate, long-term, beneficial, and localized.

Cultural Resources

Archaeological Sites and Historic Structures

Affected Environment

Archaeological Sites

In addition to the natural biological diversity, FODA preserves a rich, unique cultural record of prehistoric and historic sites. To date 100 percent of FODA managed land has been surveyed for the presence/absence of cultural resources and both historic and prehistoric archaeological sites have been documented. FODA is a national registered historic district that contains both surface structures and subsurface archaeological remains, thus with any ground disturbing activity there is always the potential to impact subsurface materials or features. Previous investigations indicate that subsurface historical materials are known to exist throughout much of FODA. Prehistoric sites include structures, tools, and materials used by pre-historic people that likely temporarily or seasonally inhabited the area to forage for edible plants and to hunt for available animals (NPS 2002b). Historical sites are primarily associated with the occupancy of the fort from 1854 to 1891 and consist of foundations and buildings from the first and second forts, remnants of the original San Antonio-El Paso Road, and the post cemetery. More than 13 archaeological sites have been recorded within the park boundaries.

Historic Structures

Fort Davis National Historic Site is a National Historic Landmark (NPS 2014), and is listed on the National Register of Historic Properties as a National Historic District. FODA contains the remains of over 250 structures and ruins, of which 25 have been restored and 6 are refurnished to the time period of the 1880s. FODA also includes remnants of the associated fort roads and earthworks and a historic dike and ditch system used by the army for flood control. About 60 structures made up the first Fort Davis with only foundations remaining today. FODA is listed on the NRHP as an excellent example of a latter 19th century military complex in the southwestern United States. Currently 110 first and second fort structures are on the NPS list of classified structures (NPS 2002a).

FODA anticipates utilizing the streamlined review process described in the Programmatic Agreement among the National Park Service (U.S. Department of the Interior), the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers for Compliance with Section 106 of the National Historic Preservation Act (NPS 2008). Planned actions not eligible for this streamlined process will be subject to the standard review process described in this Programmatic Agreement. Emergencies, such as response to unplanned wildland fire, are subject to the emergency actions process described in this Programmatic Agreement.

Methodology and Intensity Threshold

The methodology used for assessing archaeological resource impacts included using available GIS data and literature to identify the archaeological resources present and identifying the potential effects to archaeological resources by the Proposed Action. The thresholds of change for the intensity of an impact are defined as follows:

Negligible: Impact is at the lowest levels of detection, barely measurable, with no perceptible consequences, either adverse or beneficial. For the purposes of Section 106, the determination of effect would be no adverse effect to archaeological or historic structure resources.

Minor: Disturbance of an archaeological site(s) or historic structure(s) is confined to a small area with little, if any, loss of important information potential. For purposes of Section 106, the determination of effect would be no adverse effect.

Moderate: Disturbance of an archaeological site(s) or historic structure(s) would not result in the loss of integrity. For purposes of Section 106, the determination of effect would be adverse effect.

Major: Disturbance of an archaeological site(s) or historic structure(s) is substantial and results in the loss of most or all of the site and its integrity. For purposes of Section 106, the determination of effect would be adverse effect.

Duration:

Short-term: Any disturbance to archaeological site(s) or historic structure(s) would be permanent, and are considered long-term.

Long-term: Any disturbance to archaeological site(s) or historic structure(s) would be permanent, and are considered long-term.

Analysis of Alternatives and Impacts on Archaeological Sites Historic Structures

Impacts of Alternative 1—No Action Alternative

Hazardous fuel loads on FODA lands would continue to increase within and adjacent to archaeological sites and historic structures. This could lead to increased potential for larger, intense wildfires. Larger, intense wildfires and associated suppression activities could have extensive impacts on archaeological sites and/or historic structures. More intense wildfires could cause discoloration of surface artifacts, burning perishable materials, checkering or cracking of glass and ceramic artifacts, spalling of stone, and melting of metals (Ryan et al. 2012). Archeomagnetic dates and pollen counts could also be altered from a severe, high intensity wildfire. Depending on the severity of the fire, historic structures could be degraded by charring of wooden structures, spalling of masonry plaster or cement based structures, distortion from expansion of materials, adobe integrity weakened, or calcination of gypsum-based plasters (Ryan et al. 2012). Overall impacts would depend on the timing, location, intensity, and extent of the wildfire and the mitigation efforts that could be implemented.

Emergency response actions and tactics to wildfire will consider type and location of archaeological sites/historic structures. Most emergency management actions for wildfires will allow for protection of these historic properties (archaeological sites, historic structures). Some values at risk are higher priority than historic properties, such as human safety. There is potential for emergency management responses for wildfires to adversely impact historic properties. The Texas Historical Commission will be notified of management responses to upland wildland fires, as described in the Programmatic Agreement among the National Park Service (U.S. Department of the Interior), the Advisory Council on Historic Preservation and the National Conference of State Historic Preservation Officers for Compliance with Section 106 of the National Historic Preservation Act (NPS 2008). Indirect adverse impacts could include exposure of artifacts to erosion. Mitigation measures (see mitigation measures section) could reduce or eliminate most impacts from wildfire suppression actions, but the need and use of suppression control actions would increase with increased potential for larger wildfires. FODA area wildfires can happen and move extremely quickly, straining the ability of park and fire management officials to implement mitigations actions effectively in a large, quickly moving incident.

Cumulative Impacts

Cumulative impacts to archaeological sites and historic structures could occur from the No Action Alternative and other activities including past development, park management activities, past grazing, natural erosion, fire management activities planned by other agencies, and wildfires originating from adjacent lands. The No Action Alternative in combination with the past, present, foreseeable future actions would result in adverse, long-term, minor, localized impacts. Impacts would be due to continued increase of shrub density and ground fuels leading to increased potential for future severe wildfires, and lack of creation/maintenance of defensible space.

Conclusion

The No Action Alternative could have adverse, long-term, minor, and localized impacts to archaeological sites and historic structures due to continued hazardous fuels buildup and increased potential for larger, severe wildfires that are harder to control and/or suppress. Cumulative impacts would be adverse, long-term, minor, and localized.

Impacts to Alternative 2—Preferred Alternative

Planned projects will be designed and implemented to result in “no adverse effects” to archaeological sites/historic structures in FODA. These planned projects using prescribed fire, mechanical and manual fuel reduction, and/or targeted herbicide will comply with the streamlined review process or standard review process described in the Programmatic Agreement among the National Park Service (U.S. Department of the Interior), the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers for Compliance with Section 106 of the National Historic Preservation Act (2008)..

Emergency response actions and tactics to wildfire will consider type and location of archaeological sites/historic structures. Most emergency management actions for wildfires will allow for protection of these historic properties (archaeological sites, historic structures). Some values at risk are higher

priority than historic properties, such as human safety. There is potential for emergency management responses for wildfires to adversely impact historic properties. The Texas Historic Commission will be notified of management responses to unplanned wildland fires, as described in the Programmatic Agreement among the National Park Service (U.S. Department of the Interior), the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers for Compliance with Section 106 of the National Historic Preservation Act (NPS 2008).

Management responses to wildfire would be the same as Alternative 1, but effects to archaeological sites and historic structures would be different due to the impact (beneficial and adverse) from the proposed vegetation management actions. Using vegetation management tools—prescribed fire, mechanical and manual fuel reduction, and targeted herbicide—would increase the ability and efficiency to reduce hazardous fuels (shrub density, woody encroachment of grasslands, ground fuels), to maintain/create defensible space and fuelbreaks, and to remove existing noxious weeds. This would increase the potential over time for wildfires to be of lower intensity and shorter flame lengths with lower rates of spread, which makes wildfires easier to suppress/manage; this contributes to reducing the risk of damage to archaeological sites and/or historic structures. Impacts to archaeological sites and historic structures under the Preferred Alternative would be both beneficial and adverse. Minor to moderate, long-term, and localized beneficial impacts would be realized by reducing the potential for future severe wildfires, as hazardous fuels decrease and defensible space is created or maintained. Minor, long-term, adverse impacts could occur from inadvertent damage to resources while implementing planned fuel reduction projects, or from emergency management response to unplanned wildland fire.

Prescribed fire would allow for pre-planned mitigation activities and advance vegetation clearance at cultural resource sites before implementing fire activities. Known archaeological sites and historic structures could be excluded from prescribed burn units or local site-specific related mitigation measures could be implemented to protect the cultural resources. Prescribed burning would reduce the probability of severe wildfires, thus reducing the overall potential for damage to archaeological sites and historic structures.

Standard management strategies would be adopted to exclude or minimize adverse impacts (see mitigation section) before or during prescribed fire activities. Should new archaeological resources be identified during prescribed fire related activities, all work would cease in the immediate vicinity of the discovery until the resource could be identified and documented and an appropriate mitigation strategy developed in consultation with the NPS cultural specialists and/or the State Historic Preservation Officer. Any known archaeological resources would be marked with special flagging and mitigation measures would be taken to protect identified resources from prescribed fire activities. Based upon current information, the Preferred Action Alternative impacts to archaeological sites and historic structures would be beneficial, minor to moderate, long-term, and site-specific by helping to reduce vegetative hazardous fuels and maintain defensible space/fuelbreaks, thus increasing the potential for wildfires to be lower intensity, surface fires.

Manual and mechanical hazardous fuel treatments could result in direct, adverse, long-term, localized impacts due to displaced surface and sub-surface materials. With avoidance of known archaeological resources and implementation of mitigation actions, the direct and indirect adverse impacts would be minor, localized, and long-term.

Targeted herbicide application applied by hand to specific basal or foliar plant areas would minimize chances for overspray and migration into the soil. In addition, targeted herbicide application would use herbicides that do not have short- or long-term residual implications to soils. In addition to the mitigation measures, limited use as a follow-up treatment to selected fuelbreaks and defensible space treatments would help to minimize impacts to archaeological sites and historic structures by minimizing vegetation cutting and ground disturbance. Spot treatments to existing invasive (non-native) plants that may be found after wildfires or in disturbed areas would also be a relatively minor use. Thus, impacts would be adverse and negligible to archaeological sites and historic structures.

Cumulative Impacts

Cumulative impacts to archaeological sites and historic structures would occur from the Preferred Alternative and other activities including past development, park management activities, past grazing, natural erosion, fire management activities planned by other agencies, and wildfires originating from adjacent lands. The Preferred Alternative in combination with the past, present, and foreseeable future actions would result in beneficial, long-term, moderate, localized impacts due to decreased potential for larger, more intense wildfires as well as adverse, long-term, negligible to minor, localized impacts.

Conclusion

Overall, the Preferred Alternative would result in beneficial, minor to moderate, long-term, and site-specific impacts due to reducing the potential for larger and intense wildfires from removing hazardous fuels and maintaining/creating defensible space and fuelbreaks. Adverse impacts to archaeological sites and/or historic structures would be minor, localized, and long-term with implementation of mitigation measures. Cumulative impacts would be beneficial, long-term, moderate, and localized due to decreased potential for larger, more intense wildfires.

Cultural Landscapes

Affected Environment

Cultural landscapes are “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 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 (DO-28).”

The cultural landscape at FODA is defined by the boundaries of FODA. Contributing elements of the cultural landscape at FODA include foundations and buildings of the first and second Fort periods, land use (diversion ditches and earthen berms, Parade ground), traces of the historic San Antonio-El Paso Road, constructed irrigation systems (remnants of well near Limpia Creek, spring and irrigation system), cluster arrangement (hospital, post cemetery), and natural systems and features (Hospital Canyon and natural drainage system; NPS 2002b). Topographic elements that contribute to significance of the FODA cultural landscape include Hospital Canyon, Sleeping Lion Mountain, and North Ridge (NPS 2002b). Although, the focus of interpretation is on the period the

site was used by the US Army as a military post, FODA was also used by Native Americans prior to the fort and by the local community after the abandonment of the fort. The vegetation in the surrounding hills above the fort is important for frame and context to the historic scene.

The FODA cultural landscape is significant for the period from 1854 to 1891 because it contains one of the most intact examples of a 19th century military complex in the southwest. The surviving spatial layout of the second fort and some of the first fort represents the US Army's planning policies of the time. Remnants of the irrigation and drainage ditches and a steam-powered water system also reflect how the US Army adapted their planning policies to the local environment. A complete list of contributing components to the landscape can be found in the Cultural Inventory Report (NPS 2002b).

The cultural landscape at FODA is also nationally significant because it reflects the 19th century conflict between the United States and the Native Americans as the nation's territory and ensuing settlement expanded westward. The cultural landscape has social values as it represents the opportunity sought and hardships experienced by US citizens in the 19th century western frontier. It also represents a place where African-American troops exercised their newly acquired freedom and opportunities. The cultural landscape also serves as a reminder of the role Fort Davis played in the controversial military policies of the late 1800s regarding the attempted systematic destruction of Native Americans and their cultural traditions. The cultural landscape is registered on the NRHP.

Methodology and Intensity Threshold

The methodology used for assessing cultural landscape resource impacts included using available literature to identify the cultural landscape resources present and identifying the potential effects to cultural landscapes by the Proposed Action. The thresholds of change for the intensity of an impact are defined as follows:

Negligible: Impact is at the lowest levels of detection, barely measurable, with no perceptible consequences, either adverse or beneficial. For the purposes of Section 106, the determination of effect would be no adverse effect to cultural landscapes.

Minor: Disturbance of a cultural landscape is confined to a small area with little, if any, loss of important information potential. For purposes of Section 106, the determination of effect would be no adverse effect.

Moderate: Disturbance of the cultural landscape would not result in the loss of integrity. For purposes of Section 106, the determination of effect would be adverse effect.

Major: Disturbance of the cultural landscape is substantial and results in the loss of most or all of the site and its integrity. For purposes of Section 106, the determination of effect would be adverse effect.

Duration:

Short-term: Any disturbance to cultural landscapes would be permanent, and are considered long-term.

Long-term: Any disturbance to cultural landscapes would be permanent, and are considered long-term.

Analysis of Alternatives and Impacts on Cultural Landscapes

Impacts of Alternative 1—No Action Alternative

Hazardous fuels would continue to be retained and increase within the cultural landscape under this alternative. This hazardous fuel buildup could lead to increased potential for larger more intense wildfires that are difficult to suppress/manage, with more potential for stand replacing and widespread vegetation loss. Soil compaction or displacement from the ground disturbances of fire suppression activities could be more prevalent.

These intense wildfires could cause the vegetated landscape to completely change around FODA historic and cultural sites, leading to the compromise of the cultural landscape. Wildfires or damage from suppression activities could result in unacceptable changes to character-defining elements of the historic district and associated structures. Wildfires could also remove important landscape elements, structures or historic sites, and create large amounts of burned and scorched vegetation, and unvegetated areas from fire line construction and/or high intensity burning. High intensity wildfires could cause soils to become sterile and hydrophobic, preventing recovery of native vegetation. These potential impacts would diminish the visual integrity of the cultural landscape and could make the adjacent infrastructure (highways, power lines, residents) more visible within FODA, further diminishing the visual integrity. Effects on associated buildings and structures would be the same as discussed above under the analysis of the No Action Alternative on Archaeological Sites and Historic Structures. The No Action Alternative, wildfire suppression only, could also lead to reduced integrity of the cultural landscape, as shrubs continue to encroach. Brush and mesquite density has increased compared to the historic period—from 1854 to 1891—that represents the cultural significance of the 19th century military complex. Wildfire suppression firelines are often straight lines on the landscape and could dissect the cultural landscape by creating unnatural lines between burned and unburned areas. These emergency management responses could have impacts that would be indirect, adverse, long-term, minor, and localized due to increased potential for larger, intense wildfires from continued retention and increase of hazardous fuels within the cultural landscape. The intensity of impacts would depend on the intensity, duration, and location of the fire, and the mitigation efforts that could be implemented.

Emergency response actions and tactics to wildfire will consider type and location of contributing elements to the cultural landscape at FODA. Most emergency management actions for wildfires will allow for protection of contributing elements to the cultural landscape (archaeological sites, historic structures). Some values at risk are higher priority than contributing elements to the cultural landscape, such as human safety. There is potential for emergency management responses for wildfires to adversely impact contributing elements of the cultural landscape. The Texas Historic Commission will be notified of management responses to unplanned wildland fires, as described in the Programmatic Agreement among the National Park Service (U.S. Department of the Interior), the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers for Compliance with Section 106 of the National Historic Preservation Act (NPS 2008).

Cumulative Impacts

Cumulative impacts to cultural landscapes would occur from the No Action Alternative plus other activities including past development, park management activities, fire management activities planned by other agencies, and wildfires originating from adjacent lands. The No Action Alternative in combination with the past, present, and foreseeable future actions would result in adverse, minor, long-term cumulative impacts due to increased risk for larger, intense wildfires and associated vegetation loss and soil or ground disturbance.

Conclusion

The No Action Alternative would have adverse, long-term, minor, and localized due to increased potential for larger, intense wildfires from continued retention and increase of hazardous fuels within the cultural landscape. Cumulative impacts would be adverse, minor, and long-term.

Impacts to Alternative 2—Preferred Alternative

Planned projects will be designed and implemented to result in “no adverse effects” to cultural landscapes in FODA. These planned projects using prescribed fire, mechanical and manual fuel reduction, and/or targeted herbicide will comply with the streamlined review process or standard review process described in the Programmatic Agreement among the National Park Service (U.S. Department of the Interior), the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers for Compliance with Section 106 of the National Historic Preservation Act (2008).

Emergency response actions and tactics to wildfire will consider type and location of contributing elements to the cultural landscape at FODA. Most emergency management actions for wildfires will allow for protection of contributing elements to the cultural landscape (archaeological sites, historic structures). Some values at risk are higher priority than contributing elements to the cultural landscape, such as human safety. There is potential for emergency management responses for wildfires to adversely impact the cultural landscape. The Texas Historic Commission will be notified of management responses to unplanned wildland fires, as described in the Programmatic Agreement among the National Park Service (U.S. Department of the Interior), the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers for Compliance with Section 106 of the National Historic Preservation Act (NPS 2008).

Management responses to wildfire would be the same as Alternative 1, but effects to the cultural landscape would be different due to the effects (beneficial and adverse) from the proposed vegetation management actions. Using vegetation management tools—prescribed fire, mechanical and manual fuel reduction, and targeted herbicide—would increase the ability and efficiency to reduce hazardous fuels (shrub density, dead and down fuels, woody encroachment in grasslands). It would also allow the creation and maintenance of defensible space and fuelbreaks, and assist in the removal of noxious weeds. These actions would increase the potential for wildfires to be of lower intensity, with smaller flame lengths, and lower rate of spread, which are easier to suppress/manage, thus reducing the potential risk of damage to the cultural landscape. These lower intensity ground fires may help maintain a more open cultural landscape representative of the historic period, and

increase abundance of native plants found in the area during the historic period. Creating a more natural fire regime would favor native plants and reduce competition from invasive plants. Impacts to the cultural landscape under the Preferred Alternative would be both beneficial and adverse. Beneficial impacts would be minor to moderate, long-term, and localized due to reducing the potential for future severe wildfires, as hazardous fuels decrease and defensible space is maintained or created. Minor, long-term, adverse impacts could occur from inadvertent damage to resources while implementing planned fuel reduction projects, or from emergency management response to unplanned wildland fire.

Prescribed fire and manual and mechanical hazardous fuel reduction treatments would be planned with NPS cultural experts to plan and develop defensible space and fuel break clearing compatible with the cultural landscape. Hazardous fuel reduction work would be designed to help enhance/maintain the cultural landscape, without creating areas devoid of vegetation that would conflict with maintaining cultural landscape integrity and aesthetics. Because the hazardous fuel reduction treatments would be planned, the impacts to the cultural landscape would be negligible to minor adverse effects on cultural landscape vegetation characteristics around archaeological sites and historic structures. These effects could consist of minor trimming or vegetation removal to more intense thinning/removal of shrubs to reduce dense stands around archaeological sites/historic structures in an effort to create and/or maintain defensible space (promotes less intense burning in wildfires).

Targeted herbicide application applied by hand to specific basal or foliar plant areas would minimize chances for overspray and migration into the soil. In addition, targeted herbicide application would use herbicides that do not have short- or long-term residual implications to soils. In addition to the mitigation measures, limited use as a follow-up treatment to selected fuelbreaks and defensible space treatments would help to minimize additional ground disturbing impacts to the cultural landscape. Spot treatments to existing invasive plants that may be found after wildfires or in disturbed areas would also be a relatively minor use. Thus, impacts would be negligible to cultural landscapes.

Cumulative Impacts

Cumulative impacts to cultural landscapes would occur from the Preferred Alternative plus other activities including past development, park management activities, fire management activities planned by other agencies, and wildfires originating from adjacent lands. The Preferred Alternative in combination with the past, present, and foreseeable future actions would result in both beneficial and adverse cumulative impacts. Beneficial impacts would be moderate, long-term, and localized due to decreased hazardous fuels (shrub density and woody encroachment of grasslands) throughout the cultural landscape, which reduces the potential for larger, more intense wildfires. Adverse impacts would be negligible due to the effects on cultural landscape vegetation characteristics around archaeological sites and historic structures would be from planned fuel reduction projects and mitigation measures implemented.

Conclusion

Overall, the Preferred Alternative would have be beneficial, minor to moderate, long-term, and site-specific by helping to maintain the cultural landscape. Planned fuel reduction projects or emergency management response to unplanned wildland fire could have adverse, long-term, minor, and

localized impacts due to inadvertent damage to contributing elements of the cultural landscape. Negligible to minor adverse effects on vegetation characteristics could result from minor trimming or vegetation removal to more intense thinning/removal of shrubs to reduce dense stands around archaeological sites/historic structures. Overall, cumulative impacts would be beneficial, moderate, long-term, and localized.

Socioeconomic Resources

Adjacent Landowners and Uses

Affected Environment

The town of Fort Davis is located on the eastern and southern boundaries of FODA. The town of Fort Davis is a small, unincorporated town of approximately 1,200 people. There is no zoning to govern the appearance or uses of the town. Tourism related to FODA and the nearby Davis Mountains State Park are important components of the local economy. Private parcels adjacent to FODA are used for both businesses and residential purposes. Davis Mountains State Park is the western boundary of FODA.

Methodology and Intensity Threshold

The methodology used for assessing adjacent landowner impacts included using NRCS GIS data and available literature to identify the adjacent landowners and uses present and identifying the potential effects to adjacent landowners, uses, and resources by the Proposed Action. The thresholds of change for the intensity of an impact are defined as follows:

Negligible: Impacts would result in a change to land use, but the change would be so slight that it would not be of any measurable or perceptible consequence.

Minor: Impacts would cause limited localized change to land use. Mitigation measures, if needed to offset adverse effects, would be simple and successful.

Moderate: Impacts would have measurable impacts to adjacent land uses that would be consequential, but would be relatively local. Mitigation measures, if needed, to offset adverse effects occurring outside the Park, would likely succeed.

Major: Impacts would cause substantial alteration to land use on a regional scale. Extensive mitigation measures would be needed to offset any adverse effects, and their success would not be guaranteed.

Duration:

Short-term: Impacts that generally last for the duration of the fire management project.

Long-term: impacts that generally last beyond the duration of the fire management project

Analysis of Alternatives and Impacts on Adjacent Landowners and Uses

Impacts of Alternative 1—No Action Alternative

Existing vegetation conditions would persist at FODA with continued retention and increased buildup of hazardous fuels, which could lead to more intense, larger wildfires that are difficult to suppress/ manage. The risk of damage to private properties outside FODA could be higher, as larger, more severe wildfires are difficult to control and the safety of the adjacent residents would be at a higher risk. Severe wildfires could result in damage or loss to buildings (e.g., residential, business) and other private property structures and vegetation, loss of life if area residents were unable to escape or refused to leave in advance of a high intensity wildfire. Permanent changes to vegetation due to soil sterilization, and/or physical alterations to the soil could also occur, leading to a decrease and changes in area vegetation and increased soil erosion, reducing visual aesthetics of the natural and developed landscapes or temporary closures in portions of Davis Mountains State Park. This effect would be direct, short- to long-term, minor to moderate, adverse, localized due to potential hazardous fuel build up and the increased risk for severe wildfires. Severity of impacts to adjacent lands would depend on the timing, size, and location of a wildfire.

Large wildfires could result in unpredictable, temporary closures of roads and reduced visibility from smoke to adjacent landowners and surrounding communities. These road closures would be related to protection of human health and safety. Closures and news media reporting could result in reduced visitation to the area, similar to what occurred during/after the 2011 Rock House Fire in Fort Davis and the Davis Mountains area. This effect would be adverse, short- to long-term, negligible to moderate, and localized.

Cumulative Impacts

Cumulative impacts to adjacent lands from other activities include development in surrounding Fort Davis community, fire management activities planned by other agencies, and wildfires originating from adjacent lands. The No Action alternative in combination with the past, present, and foreseeable future actions would result in adverse, minor to moderate, short- to long-term, localized impacts due to increased potential for future severe wildfires as hazardous fuels continue to increase.

Conclusion

The No Action alternative would result in adverse, short- to long-term, minor to moderate, localized impacts due to continued hazardous fuel build up and the increased risk for severe wildfires. Cumulative impacts would be also be adverse, minor to moderate, short- to long-term, and localized.

Impacts to Alternative 2—Preferred Alternative

Management responses to wildfire would be the same as Alternative 1, but effects to adjacent landowners would be different due to the effects (beneficial and adverse) from the proposed vegetation management actions. The use of vegetation management tools—prescribed burning, mechanical and manual fuel reduction, and targeted herbicide—would increase the ability to reduce shrub and brush density and ground cover, and to create/maintain defensible space around structures

and fuelbreaks within FODA. This would result in increased success over time in reducing hazardous fuels and increase the potential for wildfires to be lower intensity, that are easier to suppress/manage. Quicker, more effective control actions on FODA lands would present less risk of wildfires escaping from FODA and threatening adjacent property and structures. Conversely, the proposed FODA vegetation management actions would allow more effective control and management actions of wildfires that could escape from adjacent lands onto FODA; thus, providing better protection to FODA values, which are important to the local tourism economy. The Preferred Alternative would provide better protection than the “No Action Alternative” for adjacent communities and landowners. Thus, the Preferred Alternative would have direct, minor to moderate, beneficial, long-term, localized impacts by minimizing the potential for future severe wildfires, as the amount of acres restored/maintained to reflect the FODA historic scene of the 1880s increases, and hazardous fuels decrease.

Prescribed fires could result in temporary reduced visibility from smoke and road closures to adjacent landowners and surrounding communities. Road closures would be related to protection of human health and safety.

Cumulative Impacts

Cumulative impacts to adjacent lands from other activities include development in surrounding Fort Davis community, fire management activities planned by other agencies, and wildfires originating from adjacent lands. The Preferred Alternative in combination with the past, present, and foreseeable future actions would result in beneficial, minor, long-term, and localized impacts by reducing the potential for future severe wildfires as the amount of acres restored/maintained to reflect the FODA historic scene of the 1880s increases and shrub density and woody encroachment of grasslands decreases.

Conclusion

The Preferred Alternative would result in beneficial, minor to moderate, long-term, localized impacts by reducing the potential for future severe wildfires, as the quantity of acres restored/maintained to reflect the FODA historic scene of the 1880s increases and hazardous fuels decrease. Adverse impacts—reduced visibility from smoke and road closures—would be temporary to adjacent landowners and surrounding communities. Cumulative impacts to adjacent landowners and uses would be beneficial, minor, long-term, and localized.

Human Resources

Human Health and Safety

Affected Environment

The health and safety of visitors, employees, and surrounding residents and landowners of the FODA area is a primary objective of the NPS. Fire management activities and wildfires can pose unplanned, unforeseen risks to the public and employees, but firefighters and park staff face direct risks when engaged in suppression related activities. Smoke on roads in and adjacent to the park is a

visibility concern for traffic. In addition, smoke emissions from prescribed burns or wildfires can be an air quality issue to surrounding residents and the visiting public. The flaming front of a fire can put members of the visiting public, residents, park employees, and firefighters at risk. Accidents and unintended consequences can be more prevalent in chaotic, emergency wildfire situations. For this reason, risk areas from wildfires or prescribed fires will be closed to the public; mitigations will be implemented as soon as recognized and practical, such as media information issuances, closures and/or restrictions, and traffic control for smoke visibility.

Wildfires are common in the region and represent a health and safety concern for local communities and visitors to FODA. In April 2011, the Rock House Fire, one of Texas's largest, consumed 314,444 acres with 106 acres on the west side of FODA, and destroying 24 residences and 2 commercial buildings in the town of Fort Davis. In April 2012, the Livermore Ranch Complex wildfire was approximately 18 miles west of Fort Davis and consumed 24,117 acres.

The past and current fire management program in FODA has worked to mitigate the long-term threat to the safety of visitors, employees, and surrounding residents and landowners of FODA. These actions include defensible space work around the immediate FODA building area, reducing hazardous fuels using prescribed fire, and additional manual and mechanical fuel reduction treatments within FODA along the wildland urban interface (WUI) and the eastern and southern boundaries. These activities would continue under Alternative 2, but would be discontinued under Alternative 1.

Methodology and Intensity Threshold

The methodology used for assessing human health and safety impacts included identifying the potential effects to human health and safety by the Proposed Action. The thresholds of change for the intensity of an impact are defined as follows:

Negligible: Impacts would not have a noticeable effect on human health and safety, with no injuries or loss of life.

Minor: Impacts would be detectable, but would not have an appreciable effect on human health and safety, with few or minor injuries and no loss of life.

Moderate: Impacts would have readily detectable impacts and would result in substantial, noticeable effects to human health and safety on a local scale, with possible serious injuries, but no loss of life.

Major: Impacts would have readily detectable impacts and would result in substantial, noticeable effects to human health and safety on a regional scale, or with the possibility of extremely serious injuries and/or loss of life.

Duration:

Short-term: Impacts that generally last for the duration of the project or incident.

Long-term: Impacts that generally last beyond the duration of the project or incident.

Analysis of Alternatives and Impacts on Human Health and Safety

Impacts of Alternative 1—No Action Alternative

Under the No Action Alternative, FODA hazardous fuel loads would continue to accumulate and the risk of larger and more severe wildfires would stay high and continue to increase with time. No new defensible space around cultural sites and structures would be created, and no significant fuelbreaks would be developed or maintained. Direct impacts to firefighter health and safety include increased or more intense exposure to heat, smoke inhalation, and injuries from the use of numerous fire-fighting crews and resources for fire control activities on larger, more severe wildfires. In addition, the risk of damage to private properties outside FODA could be higher, larger, more severe wildfires that are difficult to control and the safety of the adjacent residents would be at a higher risk. Larger, harder to control wildfires could result in damage or loss to buildings (e.g., facilities), injury or loss of life if area residents were unable or refused to leave in advance of a high intensity wildfire, exposure to heavy smoke, and loss of quantity and quality of adjacent private and state park forest (Davis Mountains) and vegetated areas. High volumes of smoke or burning vegetation adjacent to roadways during wildfire incidents could affect or close nearby travel corridors including park roads, the adjacent state highways, and local town roads. Area recreation activities could be curtailed due to closures, including sightseeing, hiking, hunting, and camping. Overall, these effects for the No Action Alternative would be direct, short- to long-term, minor to moderate, adverse, localized due to potential hazardous fuel build up and the increased risk for larger, more severe wildfires.

In the event of a potentially hazardous wildfire within the park, the park staff would coordinate public notification, restrictions, closures, and evacuation efforts with park law enforcement staff and local emergency response agencies. The extent of public notice would depend on the specific fire situation. Assuring visitor, local residents, and park staff safety would take priority over other NPS activities.

Cumulative Impacts

Cumulative impacts to human health and safety from other activities include continued development in the park and on lands adjacent to the park. Such actions would have an adverse, minor to moderate, and short- and long-term impact because expanded WUI areas would add additional area residents, increase the number of homes and structures at risk, thus increasing the risks to firefighters and the public in protecting those areas and people in an intense wildfire. The No Action alternative in combination with the past, present, and foreseeable future actions would result in direct, minor, short- to long-term, adverse, and localized impacts due to increased potential for more severe future wildfires as hazardous fuels continue to increase.

Conclusion

The No Action Alternative would have direct, short- to long-term, minor to moderate, adverse, localized due to potential hazardous fuel build up and the increased risk for larger, more severe wildfires. Cumulative impacts would be direct, minor, short- to long-term, adverse, and localized due to increased potential for future severe wildfires as shrub density and ground and brush cover continue to increase.

Impacts of Alternative 2—Preferred Alternative

Management responses to wildfire would be the same as Alternative 1, but effects to human health and safety would be different due to the effects (beneficial and adverse) from the proposed vegetation management actions. The use of vegetation management tools—prescribed burning, mechanical and manual fuel reduction, and targeted herbicide—would increase the ability to reduce shrub and brush density and ground cover, and to create/maintain defensible space around structures and fuelbreaks. This would result in increased success over time in reducing hazardous fuels and increase the potential for wildfires to be of lower intensity, with reduced flame lengths, and lower rates of spread. Less intense wildfires would likely be easier to suppress/manage, and thus less risk to human health and safety. This provides better protection than the “No Action Alternative” for firefighters, adjacent residents and landowners as well as for visitors and FODA employees. Thus, the Preferred Alternative would have direct, minor to moderate, beneficial, long-term, localized impacts by reducing the potential for future severe wildfires as the quantity of acres restored/maintained increases, and reflects the historic scene of the 1880s. The acres of hazardous fuels (dense shrubs and brush and ground cover) decreases over time with the implemented actions of this alternative.

All herbicide treatment areas would have individual treatment plans and would only use US EPA approved herbicides. NPS herbicide use approval may be given only after considering numerous factors including: the target use, type and effects of the specific herbicide, location where the application will occur, potential threatened and endangered species concerns, potential for getting into ground water, persistence in the ecosystem, safety to employees and the public, and type of application (example, spot spraying). Herbicides would only be used after visitors were out of the area and appropriate informational signing was placed at all entryways to the spraying area. All staff utilizing herbicide would be trained in approved procedures related to proper handling, storage, transportation, mixing, spill prevention, and application procedures. Furthermore, federal FIFRA regulations and federal agency water quality monitoring indicate that use of herbicides in forestry practices constitutes low risk to humans (Shepard et al. 2004). The areas to be treated would be relatively small and targeted small scale spraying for noxious/invasive plant species, so the risk to human health and safety would be minimal.

Prescribed fire, mechanical and manual hazardous fuel reduction (thinning, defensible space work), and targeted herbicide use would involve more pre-planning and implementing activities under defined conditions. This normally allows for better health and safety protections and precautions under more planned and controlled workplace conditions than the inopportune times often occurring when wildfires burn, which is usually during more severe weather and fuel conditions. Health and safety of staff would be enhanced when additional fire personnel would be brought in, as needed, from other NPS areas or interagency cooperators for prescribed burns. Human safety is the primary objective for prescribed burns and all park activities; additional staff brought in would help to ensure safety mitigations were implemented. Therefore, the potential for direct and indirect impacts associated with management actions (though it is not possible to eliminate all risk) would be reduced overall. The impacts to health and safety because of vegetation management actions would be short-term, negligible to minor, adverse, localized with minimal human health and safety concerns for fire fighters and the public.

Prior to the ignition of any prescribed fire at FODA, all the burn parameters of the approved prescribed burn plan must be met to ensure a safe and effective prescribed fire. FODA would implement prescribed fires under the coordination of the Fire Management Office at Big Bend National Park and other partners to be determined at the time of the prescribed fire, to ensure qualified personnel are on the scene for burn implementation. Neighboring landowners and residences adjacent to prescribed fires will be notified prior to implementation of the prescribed fire. Visiting public will be informed and educated by various methods before and during prescribed fires.

Cumulative Impacts

Cumulative impacts to human health and safety from other activities include continued development on lands adjacent to the park. Such actions would have an adverse, minor to moderate, and short- and long-term impact because expanded WUI areas would add additional area residents, increase the number of homes and structures at risk, thus increasing the risks to firefighters and the public in protecting those areas and people in an intense wildfire. The Preferred Alternative in combination with the past, present, and foreseeable future actions would result in direct, negligible, short-term, adverse, localized impacts due to potential exposure to associated fire risks (e.g., heat, smoke inhalation). As well as direct, beneficial, minor, long-term, and localized impacts by reducing the potential for future severe wildfires as hazardous fuels are reduced (i.e., shrub density, brush and ground cover).

Conclusion

Overall, the Preferred Alternative would result in direct, minor to moderate, beneficial, long-term, localized impacts by reducing the potential for future severe wildfires as the acres of vegetation restored/maintained to reflect the FODA historic scene of the 1880s increases and acres of hazardous fuels (dense shrubs and brush and ground cover) decreases. Adverse impacts to health and safety would be short-term, negligible to minor, and localized with minimal human health and safety concerns for fire fighters and the public due to implementation of planned fuel reduction activities. Overall, cumulative impacts would be beneficial, minor, long-term, and localized.

CONSULTATION AND COORDINATION

The following federal and state agencies, and affiliated Native American tribes were sent scoping information or were contacted for information regarding this EA.

Federal Agencies

U.S. Fish and Wildlife Service

State and Local Agencies

Davis Mountains State Park

Fort Davis Historical Society

Texas Parks and Wildlife Department

Texas State Historic Preservation Office

Affiliated Native American Groups

Apache Tribe of Oklahoma

Comanche Nation

Fort Sill Apache Tribe of Oklahoma

Jicarilla Apache Nation

Kickapoo Traditional Tribe of Texas

Kiowa Indian Tribe of Oklahoma

Mescalero Apache Tribe

San Carlos Apache

Tonto Apache Tribe of Arizona

White Mountain Apache Tribe of the Fort Apache Reservation

Yavapai-Apache Nation

Ysleta Del Sur Pueblo of Texas

Agency Consultation

In accordance with the Endangered Species Act, the NPS consulted the USFWS with regards to federally listed species. A copy of the EA will be sent to the USFWS for review along with a request for their concurrence with FODA's determination of effects on federally listed species.

In accordance with NPS policy, the Texas Parks and Wildlife was contacted by letter dated February 19, 2013 during the public scoping period asking for information with regards to state listed species. No comments were received as of the date of the EA. A copy of this EA will be sent to Texas Parks and Wildlife for review and comment.

In accordance with Section 106 of the NHPA, as amended in 1992 (16 USC 470 *et. seq.*), NPS contacted the Texas State Historic Preservation Office by letter dated February 19, 2013 during the public scoping period asking for information concerning cultural resources. NPS has a nationwide PA with the Advisory Council on Historic Preservation and the National Conference of State Historic Preservation Officers to conduct Section 106 consultation on all treatments implemented by FODA fire management staff. A copy of this EA will be sent to Texas State Historic Preservation Office for review and comment.

Native American Consultation

Twelve affiliated Native American tribes (see list below) were contacted by scoping letter dated February 19, 2013 informing them of the proposed action and soliciting comments. Information from the tribes also was requested to determine if any ethnographic resources are in the project area and if the tribe wanted to be involved in the environmental compliance process. One response was received from the White Mountain Apache Tribe (WMAT). The WMAT stated the Proposed Action will not have an adverse impact on the WMAT's historic properties and/or traditional cultural resources and requested to be contacted immediately if Native American materials are discovered during fire management activities. All twelve Native American tribes traditionally associated with the lands of FODA will also have an opportunity to review and comment on this EA.

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List of Recipients**Federal Agencies**

Department of Interior
 Fish and Wildlife Service
 National Park Service
 Amistad National Recreation Area
 Big Bend National Park
 Big Thicket National Preserve
 Buffalo National River
 Carlsbad Caverns National Park
 Chamizal National Memorial
 Fort McHenry National Monument
 Fort Union National Monument
 Guadalupe Mountains National Park
 Lake Meredith National Recreation Area
 Padre Island National Seashore
 Palo Alto Battlefield National Historic Site
 San Antonio Missions National Historic Park

Affiliated Native American Groups

Apache Tribe of Oklahoma
Comanche Nation
Fort Sill Apache Tribe of Oklahoma
Jicarilla Apache Nation
Kickapoo Traditional Tribe of Texas
Kiowa Indian Tribe of Oklahoma
Mescalero Apache Tribe
San Carlos Apache
Tonto Apache Tribe of Arizona
White Mountain Apache Tribe of the Fort Apache Reservation
Yavapai-Apache Nation
Ysleta Del Sur Pueblo of Texas

State and Local Agencies

Arizona Historical Society
Big Bend Ranch State Park
Davis Mountains State Park
Fort Davis Historical Society
Texas State Historic Preservation Office

Organizations

Big Bend Sentinel
Chihuahuan Desert Research Institute
Chihuahuan Desert Network
Fort Davis Bank
Fort Davis Chamber of Commerce
Fort Davis Independent School District
National Parks Conservation Association
Silver Eagle Distribution, Inc.
Texas Camel Corps
Texas Cowboy Outfitters
The Nature Conservancy of Texas

Individuals

A complete list of individuals is available in the project file at FODA.

REFERENCES

Executive Orders
Executive Order 11988 (Floodplain Management)
Executive Order 11990 (Protection of Wetlands)
Executive Order 12898 (Environmental Justice in Minority Populations and Low-income Populations)
Executive Order 13007 (Indian sacred sites)

NPS Director's Orders
DO-12 Conservation Planning, Environmental Impact Analysis and Decision Making
DO-18 Wildland Fire Management
DO-24 Museum Collections
DO-28 Cultural Resource Management
DO-47 Sound Preservation and Noise Management
DO-77 Natural Resources Management Guideline (NPS-77)
DO-77-1 Wetland Protection
DO-77-2 Floodplain Management

NPS Reference Manual
RM-18 Wildland Fire

Federal and Government
36 CFR Parks, Forests, and Public Property
40 CFR Protection of Environment
50 CFR Wildlife and Fisheries
1916 Organic Act
1963 Clean Air Act, as amended
1964 Wilderness Act
1966 National Historic Preservation Act
1969 National Environmental Policy Act
1970 General Authorities Act
1972 Clean Water Act
1973 Endangered Species Act
1979 Archaeological Resources Protection Act
1981 Farmland Protection Policy Act
1993 Government Performance Results Act
Secretarial Order No. 3175—Departmental Responsibilities for Indian Trust Resources

LITERATURE CITED

- Burrow, A.L., R.T. Kazmaier, E.C. Hellgren, and D. C. Ruthven, III
2002 The Effects of Burning and Grazing on Survival, Home Range, and Prey Dynamics of the Texas Horned Lizard in a Thornscrub Ecosystem. General Technical Report NE-288,: USDA, Forest Service, Northeastern Research Station, Newtown Square, PA.
- Connell, J.H.
1978 Diversity in tropical rainforest and coral reefs. *Science* 199:1302–1310.
- Dick-Peddie, W.A.
1993 New Mexico vegetation: Past, present, future. University of New Mexico Press, Albuquerque, New Mexico.
- Dixon, J.R. and J.E. Werler
2005 Texas snakes: a field guide. University of Texas Press, Austin, Texas.

Greene, Jerome

1986 Historic Resource Study: Fort Davis National Historic Site. Fort Davis National Historic Site, Fort Davis, Texas.

Griffeth, G.E., S.A. Bryce, J.M. Omernik, J.A. Comstock, A.C. Rogers, B. Harrison, S.L. Hatch, and D. Bezanson

2004 Ecoregions of Texas, U.S. Environmental Protection Agency, Corvallis, Oregon, USA.

Grover, H.D. and H.B. Musick

1990 Shrubland encroachment in southern New Mexico, USA: An analysis of desertification process in the American Southwest. *Climate Change* 16:165–190.

Haynie, S.D.

2000 Vegetative analysis of Fort Davis National Historic Site. National Park Service Unpublished Report, Fort Davis, Texas, USA.

Henry, C.D., M.J. Kunk, and W.C. McIntosh

1994 $^{40}\text{Ar}/^{39}\text{Ar}$ chronology and volcanology of silicic volcanism in the Davis Mountains, Trans-Pecos Texas. *Geological Society of American Bulletin* 106:1359–1376.

Horsley, J., and A. Caven

2012 CHDN exotics monitoring field season summary, Fort Davis National Historic Site. Chihuahuan Desert Inventory & Monitoring Network, Las Cruces, New Mexico.

LaDuc, T., and D. Cannatella

2013 Herps of Texas: Trans-Pecos black-headed snake. Accessed September 2013 from <http://www.herpssoftexas.org/content/trans-pecos-black-headed-snake>.

McMahon C.K. and P.B. Bush

1991 No herbicide residues found in smoke from prescribed fires. Management Bulletin R8-MB 56, USDA Forest Service, Atlanta, Georgia, USA.

McPherson, G.R.

1995 The Role of Fire in the Desert Grassland. Pages 130–151 *in* Mitchel P. McClaran and Thomas R. Van Devender, editors. *The Desert Grassland*. The University of Arizona Press, Tucson, Arizona.

Muldavin, E., Y. Chauvin, P. Neville, T. Neville, L. Arnold, and A. Fettes

2012 A vegetation classification and map: Fort Davis National Historic Site. Natural Resource Technical Report NPS/ CHDN/NRTR–2012/639, National Park Service, Fort Collins, Colorado.

National Park Service (NPS)

1983 Historic Scene Management Plan. Fort Davis National Historic Site, Fort Davis, Texas.

-
-
- 1988 Resource management plan for Fort Davis National Historic Site. Fort Davis National Historic Site, Fort Davis, Texas.
- 2002a General Management Plan: Final environmental impact statement. Fort Davis National Historic Site, Fort Davis, Texas.
- 2002b Cultural Landscapes Inventory, First and Second Fort Historic Areas, Fort Davis National Historic Site. Fort Davis National Historic Site, Fort Davis, Texas.
- 2006 Management Policies 2006. NPS D1416. U.S. Department of the Interior, National Park Service.
- 2007 Weather and climate inventor, National Park Service, Chihuahuan Desert Network. Natural Resource Technical Report NPS/CHDN/NRTR–2007/034. Natural Resource Program, Fort Collins, Colorado.
- 2008 Programmatic Agreement among the National Park Service (U.S. Department of the Interior), The Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers for compliance with section 106 of the National Historic Preservation Act. Accessed January 2014 from <http://www.nps.gov/policy/106agreement.pdf>
- 2009 Baseline water quality data inventory and analysis.
- 2011a Seasonal inventory of birds in low elevation riparian habitats at Chihuahuan Desert Network. 2007 final report. Natural Resources Technical Report NPS/CHDN/NRTR–2011/491. Natural Resource Stewardship and Science, Fort Collins, Colorado.
- 2011b Chihuahuan Desert national parks reptile and amphibian inventory. Natural Resources Technical Report NPS/CHDN/NRT–2011/489. Natural Resource Stewardship and Science, Fort Collins, Colorado.
- 2013a NPS Certified Species List for Fort Davis National Historic Site. Accessed September 2013 from <https://irma.nps.gov/App/Species/Search>.
- 2013b Air quality in National Parks. Trends (2000–2009) and conditions (2005–2009). Natural Resource Report NPS/NRSS/ARD/NRR—2013/683. Natural Resource Stewardship and Science, Air Resources Division, Denver, Colorado.
- 2013c Landbird monitoring in the Chihuahuan Desert Network: 2012 annual report. Natural Resource Technical Report NPS/CHDN/NRTR–2013/702. Natural Resource and Stewardship and Science, Fort Collins, Colorado.
- 2014 National historic landmarks program. Fort Davis. Accessed February 2014 from <http://tps.cr.nps.gov/nhl/detail.cfm?ResourceId=32&ResourceType=District>.

- Natural Resources Conservation Service, United States Department of Agriculture (NRCS)
2013 Web Soil Survey. Soil Survey of Jeff Davis County, Texas. Accessed August 2013 from <http://soildatamart.nrcs.usda.gov/County.aspx?State=TX>.
- National Wildfire Coordinating Group (NWCG)
2008 Interagency Prescribed Fire: Planning and Implementation Procedures Guide. Accessed February 2013 from <http://www.nwcg.gov/pms/RxFire/rxfireguide.pdf>
- 2009 Guidance for Implementation of Federal Wildland Fire Management Policy. Accessed September 2013 from http://www.nifc.gov/policies/policies_documents/GIFWFMP.pdf.
- Porter, S.D., R.A. Barker, R.M. Slade, Jr., and G. Longley
1999 Historical perspective of surface water and groundwater resources in the Chihuahuan Desert network, National Park Service. National Park Service Report R1-09, Edwards Aquifer Research and Data Center, San Marcos, Texas, USA.
- Prival, D., and M. Goode
2011 Chihuahuan Desert National Parks Reptile and Amphibian Inventory. Natural Resource Technical Report NPS/CHDN/NRTR—2011/489. Natural Resource and Stewardship and Science, Fort Collins, Colorado.
- Pyne, S.J.
2001 Fire: A Brief History. University of Washington Press, Seattle, Washington.
- Quigley T.M. and S.J. Arbelbide
1997 An assessment of ecosystem components in the Interior Columbia Basin. General Technical Report PNW-GTR-382, USDA Forest Service, Pacific Northwest Research Station, Portland, Oregon, USA.
- Rau, B., J. C. Chambers, R. R. Blank, and D. W. Johnson
2008 Prescribed Fire, Soil, and Plants: Burn Effects and Interactions in the Central Great Basin. Rangeland Ecology Management 61:169–181.
- Redmon, Larry A. Terrence G. Bidwell
2003 Management Strategies for Rangeland and Introduced Pastures. Oklahoma Cooperative Extension Service, Division of Agricultural Sciences and Natural Resources. Accessed on August 2013 from <http://pearl.agcomm.okstate.edu/range/f-2869.pdf>.
- Reiser, M.H., C.L. McIntyre, and M.A. Powell
2012 Exotic plant monitoring in the Chihuahuan Desert Network: 2011 annual report. Natural Resource Technical Report NPS/CHDN/NRTR–2012/628. Chihuahuan Desert Inventory & Monitoring Network, Las Cruces, New Mexico.
- Rice, J, and N. Hanna
2012 CHDN exotics monitoring field season summary, Fort Davis National Historic Site. Chihuahuan Desert Inventory & Monitoring Network, Las Cruces, New Mexico.

- Romme, R. H., C. D. Allen, J. D. Bailey, W. L. Baker, B. T. Bestelmeyer, P. M. Brown, K. S. Eisenhart, M. L. Floyd Hanna, D. W. Huffman, B. F. Jacobs, R. F. Miller, E. H. Muldavin, T. W. Swetnam, R. J. Tausch, and P. J. Weisberg.
2009 Historical and Modern Disturbance Regimes, Stand Structures, and Landscape Dynamics in Piñon-Juniper Vegetation of the Western U.S. *Range Ecology and Management* 62:203-222.
- Ryan, Kevin C., Jones, Ann Trinkle; Koerner, Cassandra L., Lee, Kristine M., technical editors
2012 Wildland fire in ecosystems: Effects of fire on cultural resources and archaeology. General Technical Report RMRS-GTR-42-3. USDA Forest Service, Rocky Mountain Research Station, Fort Collins, Colorado.
- Shafer, S. L., P. J. Bartlein, and R. S. Thompson
2001 Potential Changes in Distributions of Western North America Tree and Shrub Taxa under Future Climate Scenarios. *Ecosystems* 4:200–215.
- Solomon, S., D. Qin, M. Manning, R.B. Alley, T. Berntsen, N.L. Bindoff, Z. Chen, A. Chidasong, J.M. Gregory, G.C. Hegerl, M. Heimann, B. Heritson, B.J. Hoskins, F. Joos, J. Jouzel, V. Kattsov, U. Lohmann, T. Matsuno, M. Molina, N. Nicholls, J. Overpeck, G. Raga, V. Ramaswamy, J. Ren, M. Rusticucci, R. Somerville, T.F. Stocker, P. Whetton, R.A. Wood and D. Wratt
2007 “Technical Summary” in *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, United Kingdom and New York, NY.
- Swengel AB
2001 A literature review of insect responses to fire, compared to other conservation managements of open habitat. *Biodiversity and Conservation* 10: 1141–1169.
- Swetnam, T.W. and C.H. Baisan
1996 Historical fire regime patterns in the southwest United States since AD 1700. Pages 11–32 in Allen, C. D., editor. *Fire effects in Southwestern forest*. Proceedings of the second La Mesa fire symposium, 29–31 March 1994, Los Alamos, New Mexico. USDA Forest Service General Technical Report RM-286. Rocky Mountain Research Station, USAD Forest Service, Fort Collins, Colorado, USA.
- Tatum, V.L.
2004 Toxicity, Transport, and Fate of Forest Herbicides. *Wildlife Society Bulletin* 32: 1042–1048.
- Texas Department of Agriculture
2013 Invasives database. Accessed September 2013 from http://www.texasinvasives.org/plant_database/tda_results.php.
- Texas Parks and Wildlife Department (TPWD)
2013 Threatened and Endangered Species of Texas. Accessed on September 2013. <http://gis.tpwd.state.tx.us/TpwEndangeredSpecies/DesktopDefault.aspx>.

U.S. Environmental Protection Agency (US EPA)

1998 Final Guidance for Incorporating Environmental Justice Concern's in EPA's NEPA Compliance Analysis. Washington, DC.

United States Fish and Wildlife Service (USFWS)

2013a National Wetlands Inventory. Accessed August 2013 from <http://www.fws.gov/wetlands/Data/Mapper.html>.

2013b Southwest Region Threatened and Endangered Species Lists. Accessed on September 2013 from http://www.fws.gov/southwest/es/ES_Lists_Main.cfm.

U.S. Forest Service (USFS)

2013 TACCIMO Climate Report: Jeff Davis County, Texas. Accessed September 2013 from <http://www.taccimo.sgep.ncsu.edu>.

Vogl, R.J.

1979 Some basic principles of grassland fire management. *Environmental Management* 3:51–57.

Westerling, A. L., H. G. Hidalgo, D. R. Cayan, T. W. Swetnam

2006 Warming and Earlier Spring Increases Western U.S. Forest Wildfire Activity. Available on line at [http://www.sciencexpress.org/6 July2006/Page 2/10.1126/science.1128834](http://www.sciencexpress.org/6%20July2006/Page%202/10.1126/science.1128834).

Wright, H.A. and A.W. Bailey

1980 Fire ecology and prescribed burning in the Great Plains—A research review. General Technical Report. INT-77. USDA, Forest Service, Intermountain Forest Range Experiment Station, Ogden, Utah, USA.

APPENDIX A: PUBLIC SCOPING LETTER

Fort Davis National Historic Site

Fort Davis, Texas

National Park Service

U.S. Department of the Interior



Public Scoping and NEPA Process for Fort Davis National Historic Site Fire Management Plan

Project Scoping for Environmental Assessment

February 19, 2013

The National Park Service (NPS) is starting the process to update the Fire Management Plan (FMP) for Fort Davis National Historic Site (FODA). Before this update occurs, the NPS is preparing an Environmental Assessment (EA). This EA is part of the process to update management strategies, manage vegetative fuels, and update terminology. A focus of this planning is to protect and enhance Park cultural and natural resources, and to create and improve defensible space. This process will be utilized to gather public input and suggestions for this planning effort. This brochure initiates the public scoping for the EA.

Background

FODA encompasses the buildings, ruins and artifacts, foundations, and cultural landscape of two important frontier military posts active from 1854-1862 and 1867-1891. African-American troops, popularly known today as "Buffalo Soldiers" (9th and 10th U.S. Cavalry and 24th and 25th U.S. Infantry) were garrisoned here while involved in struggles with Apache and Comanche Tribes. The troops stationed at Fort Davis protected emigrants, freighters, mail coaches, and travelers along the San Antonio-El Paso Road. This road was a transcontinental route going through west Texas to California and the surrounding frontier. Fort Davis is one of the best remaining examples in the Southwest of a typical post-Civil War frontier military post and a reminder of the role the military played in the settlement and development of the western frontier. (For more information on FODA visit <http://nps.gov/foda>).

During these historic periods, the area was more open and less forested, a result of the intense human activities such as livestock grazing and firewood gathering. Since ending those activities the vegetation has responded by growth of brush species and mesquite; the brush has increased in density and height due to fire suppression. This more abundant vegetation has developed fuel loading that lends itself to high severity wildfires that could threaten visitors, staff and firefighters, cultural sites, park structures, and neighboring lands. The NPS wants to take planned steps to manage the vegetation in a responsible way. A new FMP will assist the NPS in meeting FODA management goals.

FODA plans to continue to suppress all wildfire ignitions on its 523 acres of federal land, but also to engage in active vegetation management activities. These active measures will better protect cultural sites, facilities,

neighboring properties, and natural resource values. A new FMP will also include updates in national fire policy and terminology. The Categorical Exclusion that was utilized in the 2005 FMP is no longer available. This EA will replace the NEPA compliance work in support of a new Fire Management Plan.

Updating the Fire Management Plan

FODA plans to adhere to the following broad goals as it updates its Fire Management Plan:

1. Protection of human life is the first priority in all wildland fire management activities.
2. Historic properties will be protected from wildland fire and suppression activity damages. The NPS will also consider in-park actions that minimize the threat to adjacent private property.
3. Activities will occur to restore and maintain FODA's vegetation communities and protect natural resource values.
4. FODA will strive to enhance working relationships with appropriate federal, state, and local cooperators.
5. FODA will ensure adjacent communities are informed about park fire management activities, and that fire-related concerns are considered.

The EA process started with internal scoping by NPS specialists and staff on December 7, 2012. The NPS is preparing this EA in compliance with the National Environmental Policy Act (NEPA) to provide the decision-making framework that: 1) explores management alternatives to meet Park objectives, 2) evaluates potential impacts to Park resources and values, and 3) identifies mitigation measures to minimize the degree of these impacts.

A "No Action Alternative" includes suppression of all wildfires. Under this alternative, no fuel reduction, defensible space, prescribed burning, or targeted herbicide activities would occur. The attendant negative effects would include continued accumulations of hazardous fuels and the associated risk to human structures, people, and to park natural and cultural resources.

The only "Proposed Action Alternative" developed so far would include suppressing fires utilizing the appropriate response, but FODA would engage in active vegetation (fuel) manipulation activities including:

- prescribed burning in designated areas for the purposes of maintaining defensible space around

improvements and cultural sites, altering the vegetation for historic and cultural landscape maintenance, restoring natural habitat, and controlling invasive plant species;

- utilizing hand-held mechanical equipment during manual fuel reduction work for the same purposes; and
- limited herbicide use as a follow up treatment to vegetation cutting treatments, and/or spot treatments on targeted brush to reduce encroachment, and on invasive (non-native) plant species.

Additional objectives and mitigation tactics would be developed as part of this EA process to minimize impacts to people, park resources and manmade improvements. Examples of potential mitigation activities include limiting time periods when prescribed burns would occur, avoiding activities that cause erosion or threaten archeological sites, and utilizing techniques to minimize smoke. All prescribed burns would have formal objectives developed under a separate burn plan, and would only be implemented by qualified fire personnel.

There are two formal opportunities for the public to comment: during this initial project scoping, and again following the release of the EA document. You are invited to participate in this process by voicing your ideas, suggestions, comments, or concerns related to FODA fire management activities. These comments will be considered during preparation of the EA and FMP.

Overview of the Process

The basic steps of the NEPA process for this project include:

- **Public scoping period (February 19 – March 19, 2013)***
- **Public scoping meeting, open house format, March 5, 2013 from 5:30 PM until 7:30 PM, at Fort Davis Auditorium.***
- Preparation of the EA (public release expected summer 2013)
- **Public review of the EA***
- Analysis of public comment on the EA
- Preparation of decision document
- Announcement of decision

* indicates formal opportunities for public comment

Resources and Concerns

The Environmental Assessment will analyze potential impacts

to a number of resources including:

Public Health and Safety, Soil, Air Quality, Vegetation, Wildlife, Invasive Species (including plant and animal species), Species of Special Concern, Cultural and Historic Resources, Cultural Landscapes, and Adjacent Landowners.

Ideas to Consider

Following are a few ideas to consider as you develop comments on this project:

- Are there any missing issues or concerns that should be addressed in the EA?
- Are there other options, alternatives, or information that you think should be considered?
- Do you have other comments and suggestions for us to consider in the FODA Fire Management Program?

How Do I Comment on This Project?

Please submit your comments online at the NPS Planning, Environment, and Public Comment website:

<http://parkplanning.nps.gov/foda>

Comments may also be sent via email to the superintendent, john_morlock@nps.gov. If you are unable to submit comments electronically, then you may submit written comments to:

Attention: Superintendent
Fort Davis National Historic Site
PO Box 1379
Fort Davis, TX 79734

You may also hand-deliver written comments to the Fort Davis National Historic Site visitor center at 101 Lt. Henry Flipper Drive.

Please provide all public scoping comments by March 19, 2013.

If you wish to be added to or removed from the Park's mailing list for future correspondence, please indicate that in your response.

Fort Davis National Historic Site
Texas

National Park Service
U.S. Department of the Interior



Legend

- Fort Davis National Historic Site
- Davis Mountains State Park
- Major Roads

Datum: NAD 83 13 UTM
DSC/February 2013

Scale: 1:13,000

0 0.25 0.5 Miles