

Environmental Assessment for a new Fire Management Plan

Fredericksburg and Spotsylvania National Military Park

January 2012



Fredericksburg & Spotsylvania National Military Park
Fredericksburg, Virginia
January, 2012

Proposed Action:

The National Park Service is proposing to enact a new Fire Management Plan at Fredericksburg & Spotsylvania National Military Park consisting of Wilderness, Chancellorsville, Fredericksburg, Spotsylvania Court House Battlefields, Chatham Manor, and the Jackson Shrine. The Park's existing Fire Management Plan is outdated, and NPS policy states that all park's with burnable vegetation are required to have an up-to-date and accurate Fire Management Plan. Five alternatives were considered for the Fire Management Plan – a no-action alternative – continuing the fire management program that currently exists without change and; one action alternative - continuing the existing program, with additional areas for prescribed fire, and non-fire, mechanical and chemical reduction fuel treatments. The NPS preferred alternative is to suppress all unscheduled ignitions using the most appropriate suppression response, and continues resource management and fuels reduction projects using mechanical treatment, chemical treatment and expands the prescribed burning program. The NPS preferred alternative would introduce prescribed fire into battlefields where prescribed fire is not currently used. The three alternatives that proposed wildland fire use, or did not allow for prescribed fire were considered but rejected because of the lack of large, uninterrupted land mass and generally small numbers of firefighters available in this Park; and the successful prescribed fire program and its resource benefits that currently exists in this Park.

This document assesses the impacts related to the proposed action, which include negligible, minor, and moderate impacts to Air Quality, floodplains and wetlands, soils, threatened or endangered species, vegetation, water resources, wildlife and fisheries, cultural resources, archeological resources, cultural landscapes, historical resources, park operations and visitor experience, park facilities and operations, visitor use and experience, social and economic environment, human health and safety, transportation, and utilities.

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Note to Reviewers and Respondents:

If you wish to comment on the Environmental Assessment, you may submit comments electronically through the NPS Planning, Environment, and Public Comment system (PEPC) at <http://parkplanning.nps.gov/frsp>, or you may mail comments by February 10, 2012 to the name and address below. 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. While 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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1. Introduction

The federal government first moved to recognize those who fought and died on the four battlefields when it established the Fredericksburg National Cemetery on July 15, 1865, in accordance with the National Cemetery Act of July 17, 1862. The War Department administered the Cemetery as a landscape memorial and to "secure, as far as possible, the decent internment..." of fallen Union soldiers. A few veterans from American wars after the Civil War are buried here. However, the vast majority of the dead, more than 15,000 of them, are casualties of the War Between the States.

Fredericksburg and Spotsylvania County Battlefields Memorial National Military Park was authorized by Congress on February 14, 1927. A general statement of the purpose reads as follows:

"... commemorate the Civil War battles of Fredericksburg, Spotsylvania Court House, Wilderness, and Chancellorsville.. and to mark and preserve for historical purposes the breastworks, earthworks, gun emplacements, walls, or other defenses or shelters... used by the armies...."

The principal cultural resources of the Park are the core areas of the battlefields where the Army of Northern Virginia, the Army of the Potomac fought between 1861 and 1865. These historic patterns are defined by structures like earthworks, archeological sites, farm buildings, property lines formed by fences, marking trees that identify fields and woodlot boundaries, and strategic military positions formed by swamps, hills, or other physiographic features.

The Park is comprised of four separate Civil War battlefields: Fredericksburg, Spotsylvania Courthouse, Chancellorsville and Wilderness. The Park also includes four related sites: Salem Church, Chatham Manor, Jackson Shrine and the Fredericksburg National Cemetery. The Park has an authorized acreage of 9,440 acres. The Federal Government currently owns 7,342 acres of these authorized lands.

The Park contains more than 37 miles of Civil War earthworks, 23 miles of trails, 29 miles of roadways, 102 miles of boundary, 1,100 acres of open fields, and 5,600 acres of forest. In addition, the Park has significant terrain features, historic roads and traces, structures, house sites, ruins, cemeteries, monuments, markers, and historic objects. It supports an eastern North American riparian and woodland habitat on a substrate of the Appalachian Piedmont and the Atlantic Coastal Plain. The Park provides rich forest and wetlands, developed parkland, farmsteads, and historic landscapes.

1.1. Purpose and Need for Federal Action

Fredericksburg and Spotsylvania National Military Park (FRSP), of the NPS, Department of the Interior (DOI) proposes to have a current, up-to-date Fire Management Plan (FMP) that will take into consideration the needs of the Park's natural and cultural resources. NPS Director's Order #18, Wildland Fire Management (DO-18), requires all areas with vegetation capable of sustaining fire to develop a FMP. The Park's existing Fire Management Plan (2003) is outdated and is being revised to include other areas for fuels management.

It has long been recognized that fire plays an important role in resource management. The presence or absence of natural fire within a given habitat is one of the ecological factors contributing to the perpetuation of plants and animals in that habitat. Wildland fire management is a complex issue at FRSP for a variety of reasons.

Native American Indian uses of fire in this area are unknown. Exclusion or suppression of natural fire began in the mid-1800s and has changed the vegetative composition of the Park, which in turn has effected wildlife habitat requirements. Combining all these factors, the fuel loading has significantly increased because of the successional changes from mostly open oak/hickory woodlands to a thick undergrowth in the oak/hickory woodlands. Under the current fire management plan of the park, all Wild fires are suppressed, both human caused and lightning ignitions. This attempt to eliminate fire from the environment has altered the natural cyclic burning of the ecosystem and allowed a large build-up of fuel to occur which may lead to much larger than normal wildland fire events.

In addition to the need to utilize fire to achieve desired natural resource benefits and to restore natural ecosystem processes, FRSP is also faced with the daunting task of managing a vast system of historic earthworks (37+ miles) and hundreds of acres of open fields that were the scene of the majority of fighting during the four major Civil War battles fought here. Prescribed fire will help maintain these open vistas.

FRSP is surrounded by various private landowners that may be concerned about fires escaping the Park boundary.

Given the issues and need for action described above, the purpose of taking action at this time is to establish a new Fire Management Plan for the Park that would utilize a range of fire management strategies to expand the use of prescribed fire throughout the park. The overall objectives for this action are to restore natural ecological processes and habitat similar to pre-European times in certain areas and to manage historically open fields and earthworks, while addressing protection of Park resources and surrounding land uses. To facilitate the management of fires in the Park, the Park has been divided into two different types (Prescribed and Suppression) of Fire Management Zones (FMZ) which are further defined in the Park's FMP. See attached maps of the Park's Prescribed Fire Management Zone, taken from the Park's FMP, labeled as Appendix F, at the end of this EA.

The purpose of this federal action is to provide a long-range fire management plan and program using the benefits of prescribed fire to achieve desired natural and cultural resource conditions while protecting Park and adjacent values from the adverse impacts of fire. The

long-range fire management plan would have a lifetime of at least 5 to approximately 15 years.

The proposed action is to update and implement a long-range fire management plan in accordance with the 2001 Federal Wildland Fire Management Policy. This environmental assessment (EA) analyzes a range of reasonable long-range fire management program alternatives and their direct, indirect and cumulative impacts. Two alternatives are analyzed: Alternative 1, the no action alternative; Alternative 2, a fire management program including suppression, prescribed fire, and non-fire treatments; and Alternative 3, a fire management program including suppression, prescribed fire, and wildland fire use. Alternative 2 is the NPS preferred alternative.

1.2. *Related Laws, Policies and Plans*

1.2.1 Law and Policy

National Environmental Policy Act, 1969, as amended

The NEPA was passed by Congress in 1969 and took effect on January 1, 1970. This legislation established this country's environmental policies, including the goal of achieving productive harmony between human beings and the physical environment for present and future generations. It provided the tools to implement these goals by requiring that every federal agency prepare an in-depth study of the impacts of "major federal actions having a significant effect on the environment" and alternatives to those actions. It also required that each agency make that information an integral part of its decisions. NEPA also requires that agencies make a diligent effort to involve the interested members of the public before they make decisions affecting the environment.

NEPA is implemented through regulations of the Council on Environmental Quality (CEQ) [40 CFR 1500-1508]. The NPS has in turn adopted procedures to comply with the act and the CEQ regulations, as found in Director's Order #12: Conservation Planning, Environmental Impact Analysis, and Decision Making (DO-12, 2001) and accompanying DO-12 Handbook. This EA was prepared in compliance with NEPA, the CEQ regulations and NPS DO-12.

National Historic Preservation Act, as amended through 2000 (16 U.S.C. 470)

The NHPA of 1966, as amended through 2000, protects buildings, sites, districts, structures, and objects that have significant scientific, historic, or cultural value. The act established affirmative responsibilities of federal agencies to preserve historic and prehistoric resources. Section 106 requires federal agencies to take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment. A historic property is any "prehistoric or historic district, site, building, structure, or object included in or eligible for inclusion in the National Register of Historic Places" (36 CFR 800.16). The historic preservation review process mandated by Section 106 is outlined in regulations issued by ACHP. Revised regulations, "Protection of Historic Properties" (36 CFR Part 800), became effective January 11, 2001.

By enacting the NPS Organic Act of 1916 (Organic Act), Congress directed the U.S. Department of Interior and the NPS to manage units “to conserve the scenery and the natural and historic objects and wildlife therein and to provide for the enjoyment of the same in such a manner and by such a means as will leave them unimpaired for the enjoyment of future generations” (16 USC § 1). Congress reiterated this mandate in the Redwood National Park Expansion Act of 1978 by stating that NPS must conduct its actions in a manner that will ensure no “derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress” (16 USC 1a-1). Despite these mandates, the Organic Act and its amendments afford the NPS latitude when making resource decisions that balance resource preservation and visitor recreation.

NPS Management Policies

The NPS *Management Policies* 2006 (NPS 2006a) is the basic NPS-wide policy document, adherence to which is mandatory unless specifically waived or modified by the NPS director or certain departmental officials, including the U.S. secretary of interior. Actions under this EA/AoE are in part guided by these management policies. Sections which are particularly relevant to this project are as follows:

Sections 1.4.5, 1.4.6, AND 1.4.7 Of NPS Management Policies– Impairment Of Park Resources And Values

According to NPS *Management Policies* 2006, an action constitutes an impairment when an impact “would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values” (NPS 2006). Whether an impact meets this definition depends on the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts. An impact on any park resource or value may constitute an impairment, but an impact would be more likely to constitute an impairment to the extent that it affects a resource or value whose conservation is:

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- key to the natural or cultural integrity of the park or to the opportunity for enjoyment of the park; or
- identified as a goal in the park’s general management plan or other relevant NPS planning documents

Impairment may result from NPS activities in managing the Park, visitor activities, or activities undertaken by concessioners, contractors, and others operating in the Park. This determination on impairment has been prepared for the preferred alternative described on pages 28 and 29 of this EA. An impairment determination is made for all resource impact topics analyzed for the preferred alternative. An impairment determination is not made for

visitor experience and public safety because impairment findings relate back to park resources and values, and these impact areas are not generally considered to be park resources or values according to the Organic Act, and cannot be impaired in the same way that an action can impair park resources and values.

1.2.2 Direction For Fire Management

General Management Plan

The Park's current General Management Plan, (GMP, 1986) states in "The Plan" section that:

"Resources management and land protection recommendations will be implemented to preserve and protect the park setting."

In addition, the GMP established the following general resources management objectives related to fire management activities:

Manage the natural resources of the Park in a manner that complements the [historical] purpose of the Park.

Create visitor appreciation for the historical environmental conditions and scenes on the battlefield, by removing or adding vegetation in areas of great historical significance, to the extent possible, to duplicate as closely as possible the scene during the 1860's within the historical zone.

Protect earthworks, road traces, and other battle-related features from damaging changes caused by either natural or human forces, by selective vegetation management and limiting access to them.

Identify, evaluate, protect, maintain, and interpret the Park's cultural resources to preserve their original fabric and workmanship and, where necessary, stabilize and rehabilitate them in a manner consistent with legislative mandates and NPS policies.

The park is currently updating its GMP, the results of this FMP will be incorporated under the new GMP.

Resource Management Plan

The Fire Management Plan is a component of and an appendix to the Resources Management Plan (RMP, 1999). It integrates fire management objectives with other resource management programs.

Activities described in this plan support the effort to restore a sense of the historic scene representative of the Civil War.

The objectives of the Park's RMP relating to fire provide for the preservation, restoration, maintenance, and protection of the cultural and natural resources of the Park. These

objectives are embodied in the following resource management plan projects:

1. FRSP-N-007.026, Develop a Fire Management Program to Include Prescribed Fire Component
2. FRSP-N-008.008, Develop Open Fields Management Plan
3. FRSP-N-011.032, Develop Exotic Plant Management Plan
4. FRSP-C-015.025, Investigate and Stabilize Earthworks
5. FRSP-C-016.026, Restore Historic Ground Cover

The RMP project statement entitled “Develop a Fire Management Program to Include Prescribed Fire Component” states that “...Prescribed fire could play a role, as proposed in FRSP-I-001, in promoting the establishment of native grasses on earthworks and open fields, thereby reducing the current demands for mechanical mowing..”

Goals for Fire Management

Make firefighter and public safety the highest priority of every fire management activity.

Suppress all unwanted and undesirable wildland fires, regardless of ignition source, to protect the public, private property, and natural and cultural resources of the Park.

Manage wildland fires in concert with federal, state, and local air quality regulations.

Facilitate reciprocal fire management activities through the development and maintenance of cooperative agreements and working relationships with pertinent fire management entities.

Reduce wildland fire hazards around developed areas and areas adjacent to cultural and historic sites.

Use prescribed fire as a method of restoring and maintaining the cultural and natural landscape to meet resource objectives of the Park.

Interagency and NPS Fire Management Policies

As with any management endeavor, there are specific requirements that must be met by the Park’s fire management program to ensure that a comprehensive and effective approach is taken to meet the goals and objectives that have been established. These include measurable objectives, the use of qualified personnel to accomplish work, quantified ranges of conditions under which naturally ignited fires will be managed or planned ignitions will be applied, a description of actions which will be taken if these conditions are exceeded, a monitoring and documentation process, and a stringent review and approval process.

The authority for fire management is found in the National Park Service Organic Act (August 25, 1916), which states the agency's purpose:

...to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by

such means as will leave them unimpaired for the enjoyment of future generations.

This authority was further clarified in the National Parks and Recreation Act of 1978:

Congress declares that...these areas, though distinct in character, are united...into one national park system.... The authorization of activities shall be construed and the protection, management, and administration of these areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress.

The Management Authorities (Director's Order 18, January 2008 and Reference Manual RM-18, January 2008) are the guiding documents for fire management plan implementation. Service-wide fire management policy is expressed in the current revisions of the Director's Orders and attendant Reference Manual for the National Park Service, "The Wildland and Prescribed Fire Management Policy: Implementation and Reference Guide" (1998), Review and Update of Federal Wildland Fire Policy (2001), Interagency Strategy for the Implementation Federal Wildland Fire Management Policy (2003), Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide (2006), and Modification to the Interagency Strategy for the Implementation of Federal Wildland Fire Management Policy (2008), and is incorporated herein by reference. The Park's fire management objectives conform to the referenced documents.

Director's Order 18 states, "Wildland fire may contribute to or hinder the achievement of park management objectives. Therefore, park fire management programs will be designed to meet resource management objectives prescribed for the various areas of the park and to ensure that firefighter and public safety are not compromised.

Each park with vegetation capable of burning will prepare a fire management plan to guide a fire management program that is responsive to the park's natural and cultural resource objective and to safety considerations for park visitors, employees, and developed facilities." The full range of strategic options is available to managers provided selected options do not compromise firefighter or public safety, cost-effectiveness, resource benefits, or values to be protected.

The Virginia Department of Forestry (VA DOF) has fire suppression and prevention responsibility for much of the lands surrounding FRSP. While the overall missions of the two agencies (VA DOF and NPS) are similar in respect to wildland fire, there are some differences. In particular, Virginia Code Section 10.1-1142 B, known as the "4 PM Burning Law," comes into effect each spring, which is when the State generally experiences its highest fire danger. In brief, the 4 PM Burning Law prohibits outdoor burning before 4:00p.m., from February 15 through April 30 of each year, within 300 feet of woodland or other flammable material. The VA DOF does conduct prescribed burns, but not during this period: most of the VA DOF burns are conducted for preparation of cutover areas to be replanted, and these burns can be conducted during summer and fall months when the 4 PM Burning Law is not in effect (VA DOF 2001).

While it may initially appear otherwise, prescribed burning by the federal wildland fire agencies is not in conflict with the intent of the 4 PM Burning Law, which is intended to prevent wildfires originating from escaped trash and debris fires. Federal natural resources agencies such as the NPS are mandated to implement prescribed fire on their lands in a manner that is consistent with their respective agency policies. In order to meet specified objectives, prescribed burns must be conducted only when weather, fuel, soil, and smoke dispersal conditions are within pre-determined parameters, called a prescription. The period of time when these prescription parameters can be met is often extremely limited. The objectives of many federal burns are for ecological purposes such as vegetation and wildlife habitat improvement, and prescription requirements can usually only be met in the spring during the same time period covered by the 4 PM Burning Law. Therefore, the 4 PM Burning Law specifically exempts burning conducted on federal lands, including Fredericksburg and Spotsylvania National Military Park (VA DOF 2001).

1.3. Scoping Issues

The National Environmental Policy Act of 1969, as amended (NEPA) requires Federal agencies to invite public involvement prior to making a decision on proposed actions that may affect the environment. Scoping is the process of soliciting input from stakeholders – including NPS staff, the public, and other agencies – at the outset of an environmental analysis. Not only may the information obtained from interested and knowledgeable parties be of value in and of itself, but the perspectives and opinions as to which issues matter the most, and how, indeed whether, the agency should proceed with a given proposed action are equally important. Input from scoping helps shape the direction that analysis takes by helping planners and analysts decide which issues merit consideration. Public input also helps in the development of alternatives to the proposed action, which is an integral part of the environmental impact analysis process.

Internal scoping for FRSP's FMP and EA was informal and took place during reviews of the documents, and at various staff meetings. Issues raised during the internal scoping meetings included:

- Pre-suppression, especially pre-defined staging areas
- Reduction of wildland fuel hazard
- Concerns with construction of hand/tool created firelines during prescribed fire and Wildland fire response
- Post-fire rehabilitation and mitigation measures
- Impacts of wildland and prescribed fires and fire suppression activities on a variety of Park resources described below under Impact Topics.

External scoping was conducted through press releases and a direct mailing to potentially affect or interested parties. No issues were brought to the park's attention.

1.4. Impact Topics

Impact topics are derived from issues raised during internal and external scoping, that is, from Park staff and agency and public scoping. The following topics were determined to merit consideration in this EA.

Natural Resources

Air Quality: The Federal 1977 Clean Air Act and amendments stipulate that Federal agencies have an affirmative responsibility to protect a park's air quality from adverse air pollution impacts. FRSP is designated as a Class II area under the Clean Air Act. The Park is located near industrial and high-population-density areas and air pollution, especially ozone and visibility, has been a concern for many years. The extensive forests in the area are subject to both natural and human-caused wildland fires as well as to prescribed burns. All types of fires generate smoke and particulate matter, which will impinge on air quality in the Park and surrounding region to some extent. In 1999 the U.S. EPA issued regional haze regulations that are intended to manage and mitigate visibility impairment from a multitude of regional haze sources; wildland and prescribed fires are some of the sources of regional haze covered by the new rules. Many Park staff are concerned about both the visual and health impacts of smoke from wildland fire. All of these considerations recommend the inclusion of impacts to air quality in this analysis.

Floodplains and Wetlands: Presidential Executive Orders 11988 and 11990 mandate floodplain management and protection of wetlands, and Director's Orders 77-1 and 77-2 and the accompanying procedural manuals outline NPS procedures for complying with these Executive Orders. The presence of so many watercourses and small water bodies in the Park suggests the presence of substantial areas within 100-year floodplains. The Park has several known wetland areas. Fen and seep communities occur at the headwaters of streams and at seeps and sometimes contain unusual and rare botanical species. According to agency policy, areas along stream banks are considered wetlands, thus greatly increasing the number of wetland areas in the Park. For these reasons, impacts to floodplains and wetlands are analyzed in this EA.

Soils: Soils can potentially be adversely affected by the heat or residence time of intense fires, by suppression activities, and by fire-related removal of vegetation. Chronic and episodic acidification from air pollution has adversely impacted the Park's soils. Therefore, impacts to soils are analyzed in this EA.

Threatened or Endangered Species:

Federally-listed species: The Endangered Species Act requires federal agencies to ensure that: "any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined by the Secretary, after consultation as appropriate with the affected States, to be critical, unless such agency has been granted an exemption for such action by the Committee." Section 7 of the Endangered Species Act requires federal agencies to consult with the US Fish and Wildlife Service (USFWS) and/or the National Marine Fisheries Service (NMFS) on the likely effects

of their actions on federally-listed species and to incorporate measures to avoid and mitigate adverse impacts.

FRSP has one federally known plant and wildlife species that are listed as threatened or endangered by the U.S. Fish and Wildlife Service.

State-listed species: In addition, a Virginia Department of Conservation and Recreation Division of Natural Heritage Resources inventory recorded 2 occurrences of natural heritage resources (Ludwig et al. 1993). Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations. The Commonwealth of Virginia has been contacted and comments received regarding this Environmental Assessment for a new Fire Management Plan.

Since all species depend on habitat conditions that may be influenced by fire or fire exclusion, this EA considers the effect of the FMP on threatened and endangered species known to occur in the Park.

Vegetation: The structure and composition of the Park's forests are key elements in the types and quality of wildlife habitat present in the Park. Moreover, forests and flora more generally are heavily influenced by fire regimes. Many invasive plant species, some of which are spreading rapidly or are posing a serious threat to native vegetation, have been identified in the Park. Fire may be a tool for control of invasive species or burned areas may be more susceptible to invasion. Therefore, this EA will consider the impacts of the proposed FMP alternatives on the Park's vegetation.

Surface Water Resources: NPS policies require protection of water resources consistent with the Federal Clean Water Act. The terrain of the Park results in many streams, creeks, and other water bodies. Both fires and fire suppression efforts can adversely affect water resources by exposing soils, which leads to erosion during storm events and subsequent suspended solids and turbidity in downstream surface waters. Therefore, impacts to water resources are analyzed in this EA.

Wildlife and Fisheries: Fire management has pronounced effects on forested wildlife habitat and thus indirectly on wildlife populations. Fisheries can be indirectly impacted by impacts to water resources. Therefore, potential impacts of the alternatives are evaluated in this EA.

Cultural Resources

Cultural Resources: Section 106 of the National Historic Preservation Act of 1966 provides the framework for Federal review and protection of cultural resources and ensures that they are considered during Federal project planning and execution. Human occupation and use of the Park span over 9,000 years, and valuable archeological resources, historic structures, and cultural landscapes are found within the Park. These cultural resources can be affected both by fire itself and by fire suppression activities. Therefore, potential impacts to cultural resources will be addressed in this EA.

Park Operations and Visitor Experience

Park Facilities and Operations: Severe fires can potentially affect operations at national park areas, especially in more developed sites like visitor centers, administrative and maintenance facilities. Fire activities have the potential to cause changes or curtailment of concession and visitor services, and Park staff may be removed from scheduled duties to respond to a fire or to increased fire danger. Park staff are especially concerned with protection of smaller components of Park infrastructure such as trail features like bridges, boardwalks, and signs, and with protection of equipment that is part of natural resources experiments and monitoring projects. Thus, the potential effects of the alternatives on Park facilities and operations will be considered in this EA.

Visitor Use and Experience: The 1916 NPS Organic Act directs the NPS to provide for public enjoyment of the scenery, wildlife, and natural and historic resources of national parks “in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations.” Fire and fire ecology will need to be interpreted to Park visitors, and fire events may change the scheduling and content of interpretive programming and may impact what visitors see and can do when they are visiting the Park. Therefore, the potential impacts of the proposed FMP on visitor use and experience are addressed in this EA.

Social and Economic Environment

Human Health and Safety: Fires can be extremely hazardous, even life-threatening. Current Federal fire management policies emphasize that firefighter and public safety is the first priority; all FMPs must reflect this commitment (NIFC 2008). Therefore, impacts to human health and safety are addressed in this EA.

Transportation: Several major highways cross through FRSP, and the Park is a major tourist attraction for the region and the nation. Temporary closure of roads is possible during fire suppression and prescribed fire activities. In addition, access to some areas of the Park by emergency vehicles, both NPS and non-NPS, can be difficult because roads are few and require regular maintenance. Therefore, this topic is included for further analysis in this EA.

Utilities: Several private-company utility lines occur within the Park, as do some telecommunications equipment and some NPS-owned water treatment plants. Heavy smoke from wildland fire has been known to cause arcing from high-tension power lines, so this topic is included for further consideration in this EA.

1.5. Impact Topics Considered but not Evaluated Further in this EA

The following impact topics were considered but were judged not to be substantively affected by any of the FMP alternatives considered in this EA. The rationale for dismissing these topics from further evaluation is provided below.

Environmental Justice/Protection of Children: Presidential Executive Order 12898 requires Federal agencies to identify and address disproportionate impacts of their programs, policies, and activities on minority and low-income populations. None of the alternatives would result

in disproportionate health or environmental effects on minorities or low-income populations as defined in the EPA Environmental Justice Guidance, because although such populations exist, the effects of the alternatives would be equal across all populations. Therefore, this topic is not further addressed in this EA. Executive Order 13045 requires Federal actions and policies to identify and address disproportionately adverse risks to the health and safety of children. Since none of the fire management alternatives involves disproportionate risks to the well-being of children, this topic is not analyzed further in this EA.

Wilderness: The 1964 Wilderness Act states that wilderness, “in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain.” There are no wilderness areas designated in this Park so the impacts of the proposed alternatives on wilderness values will not be further analyzed in this EA.

Geology: The geology of the section of the piedmont and coastal plain are some of the reasons that battles were fought in this area. Nonetheless, no fire management activity proposed in the alternatives would be expected to have any impact on the geology of the Park or the surrounding area, so this topic is not considered further in this EA.

Indian Trust Resources: Secretarial Order 3175 requires that agencies assess environmental impacts of proposed actions on Indian trust resources. The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights, and it represents a duty to carry out the mandates of federal law with respect to American Indian and Alaska Native tribes. There are no Indian trust resources within or adjacent to FRSP. None of the alternatives will impact Indian trust resources. Therefore, this topic is not analyzed further in this EA.

Land Use: The region in which FRSP is located includes the several regional parks and Virginia State Wildlife Management Areas. The majority of land adjacent to Park boundaries is in private ownership. Historically the land base surrounding the Park could be characterized as one populated by year-round agricultural residents, residential homeowners, and light industrial users. Primary land uses currently are forests, agriculture and idle open fields, residential, and commercial and industrial sites.

The Park has no authority to limit development outside its boundaries, and none of the FMP alternatives would be expected to have any impact on the Park’s official position with regard to development in the region. Impacts on Air Quality are discussed in detail in this EA separately in Chapter 3 under the heading Air Quality.

A severe wildland fire might increase property owners’ interest in maintaining defensible space around their property, a potentially beneficial impact. On the other hand, the visual appearance of a burned area could possibly lower property values in the immediate area for a short time. However, such impacts would not be within the control of a Fire Management Plan. The visual appearance of an area burned by a prescribed fire could also possibly lower property values in the immediate area, but since the purpose of such a burn would be to reduce fire risk to the properties it could also raise property values. Either way, the effect would be expected to be short-term, very localized, and negligible. None of the alternatives

would have any significant impact on the way landowners within and around the Park use their lands, so this topic will not be analyzed further in this EA.

Public Services: Nearby local governments provide certain services to local communities, including law enforcement, search and rescue, emergency medical transport, and firefighting services. Some kinds of projects or programs can interfere with or add to the burden on these public services. Law enforcement within FRSP is provided by NPS law enforcement staff, and local communities and counties have their own sheriff's offices and police departments. FRSP law enforcement occasionally collaborates with or, rarely, requests assistance from surrounding law enforcement entities, but none of the FMP alternatives would be expected to increase demand on any of these agencies. The Park conducts its own search and rescue operations, calling for assistance from other area National Parks or from the NPS Park Police when additional resources are needed. Although the Park does occasionally request search and rescue assistance from local law enforcement agencies, Park staff also provide assistance to local agencies. None of the alternatives would be expected to have any significant impact on search and rescue operations or service providers within or around the Park. Emergency medical services, especially transportation, for Park staff and visitors are provided by local rescue squads and medical facilities. None of the alternatives would be expected to increase demand on local emergency services or facilities.

Structural firefighting services are provided to the Park by local paid and volunteer fire departments. The majority of land adjacent to Park boundaries is in private ownership, and falls under the wildland fire protection responsibility of the Virginia Department of Forestry. The Park provides its own wildland firefighting services, calling in assistance from other State and federal wildland firefighting agencies when additional resources are needed. The Park cooperates with local fire departments to provide wildland firefighting training, equipment, and support, while local fire departments occasionally participate in prescribed fire operations and in structure protection during wildland fires in the Park. None of the FMP alternatives would be expected to significantly alter demands on local fire departments.

Local cities and counties are responsible for local infrastructure, such as wastewater treatment, storm sewers, and solid waste disposal. The Park maintains and manages its own solid waste disposal, as described in detail below. No fire management activities proposed under any of the alternatives would be expected to have any significant impact on local infrastructure or public services, and therefore this impact topic will not be analyzed further in this EA.

Local Economy: FRSP lies within the boundaries of four counties, Stafford, Spotsylvania, Caroline, and Orange and the independent City of Fredericksburg. The local region is predominantly rural with a large amount of residential, as well, with approximately two-thirds of the population living in urban communities and the remainder in rural areas. The regional economy has been shifting in recent decades, from a subsistence farming economy to a more balanced economy including farming, light industry, tourism, and Washington, D.C. and Richmond, commuters.

The Park represents a substantial component of local and regional tourism. To the extent that fires influence the surrounding environment in ways that matter to tourists, fires can affect regional economy. Smoke, aesthetic and visual effects, and damage to property all represent means by which the socioeconomic environment, including in-park concessions and local

community businesses, can be impacted by fire. Wildland or prescribed fire smoke can have impacts on regional air quality, and these impacts are addressed in detail in the impact topic Air Quality. Likewise fire or fire management activities can result in closures of trails or of the Park roads, and these impacts are addressed in detail in the impact topic Visitor Use and Experience. Other possible impacts include activities of the fire organization necessary to manage a large wildland fire, which can boost local employment and spending; this would be a short-term, localized, beneficial impact. Burned forests may appear less attractive to visitors, but would not be expected to reduce visitation because many alternative recreational opportunities and destinations would be available both within the Park and within the region as a whole. Overall, possible impacts would be short-term and localized and would have a negligible effect on the local population, income, or employment base. Therefore, this impact topic is not included for further analysis in this EA except as indicated above.

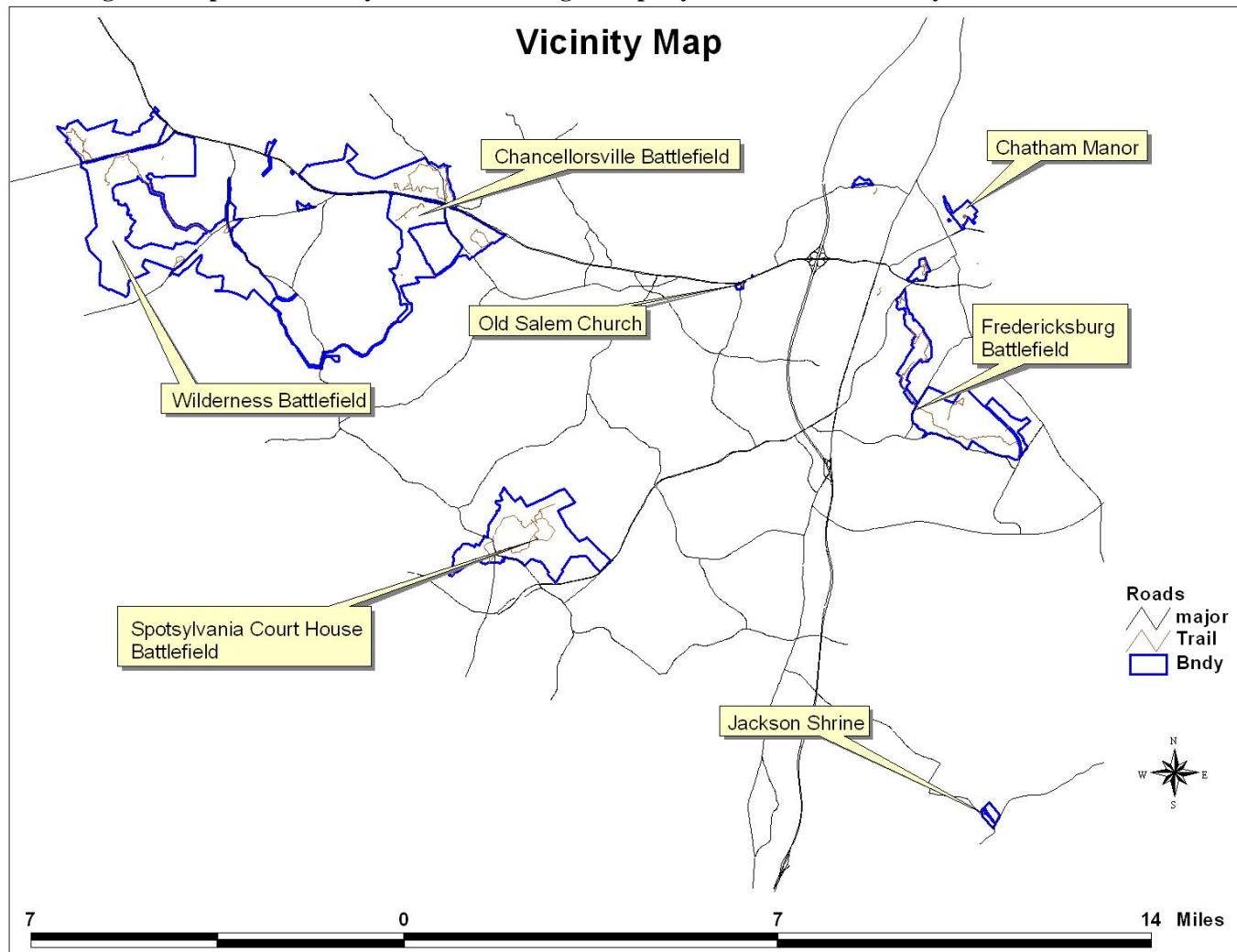
Waste Management: Presently solid waste is disposed of in one of two ways: by trucking by contractor to the Spotsylvania County landfill, or by recycling. None of the FMP alternatives will generate significant additional quantities of solid wastes.

The Park's recycling program has recently expanded due to National Park Service and Park policy. Materials are sorted, and transported to county facilities. Mixed paper, corrugated cardboard, and aluminum are disposed in this way. None of the alternatives outlined in this document will generate unusual quantities of recyclable solid wastes.

FRSP has a detailed program to minimize and dispose of hazardous wastes. Although fire management activities may produce waste fuels or oil, these can be safely and cost-effectively disposed of within normal Park operating procedures. Fire activities may produce small quantities of other hazardous materials, primarily batteries, but there are procedures in place, administered by the Maintenance Division, to safely recycle small and occasional items such as batteries and catalytic converters. None of the alternatives will generate quantities of hazardous wastes that cannot be comfortably handled within existing standard operating procedures.

Because none of the alternatives will generate noteworthy quantities of solid, hazardous, or recyclable wastes, this impact topic is dropped from further evaluation in this EA.

Figure 1 Map of the Vicinity of Fredericksburg and Spotsylvania National Military Park



2. Range of Alternatives

2.1. Alternatives Analyzed in this EA

Alternative 1 – No Action: Fire Suppression and Prescribed Fire

Under Alternative 1, existing conditions and management practices would continue in accordance with the existing 2003 FMP. All wildland fires would continue to be suppressed. An average of approximately 75 acres would be treated with prescribed fire each year. No wildland fire use fires, naturally-ignited fires that are managed for benefits to natural resources, would be allowed. The FMP would not be updated to reflect recent changes in NPS and Federal wildland fire policy and direction. The Park would not change its fire management strategies.

Under Alternative 1, the fire management unit (FMU) established under the 2003 FMP would remain. Wildland Fire Use would not be utilized, and prescribed fires would occur only in Spotsylvania Court House Battlefield. All Wildland fires would continue to be suppressed along existing control lines, wherever possible. New control lines will only be built when imminent threat to life or property exists. Prescribed fires would be monitored according to the Fire Effects Monitoring Plan (2009).

An average of 110 acres would be burned each year for the next five years, as described in the “Five-year Plan” of Proposed Fire and Fuels Treatments Projects found in Chapter 6 of this EA.

Non-fire, mechanical, fuel treatments would be used in the Park to reduce hazardous fuels conditions in a safe, environmentally friendly manner where fire use is inappropriate. Non-fire fuel treatments are manipulation or removal of wildland fuels to reduce the likelihood that a fire will start, to reduce the potential damage from a fire, or to reduce the difficulty of managing a fire. They include any fuels treatment except fire. For example, non-fire treatments may include one or any combination of mechanical treatments, herbicides, and animal grazing. Mechanical treatments are, specifically, non-fire fuels treatments involving the physical manipulation of fuels using tools, and may include cutting, lopping, crushing, scattering, piling, thinning, pruning, chipping, mulching, or mowing with hand tools or, outside of designated wilderness, power tools or equipment.

Alternative 2 – Fire Suppression, Expanded Prescribed Fire, and Non-fire Treatments (NPS Preferred Alternative)

Under Alternative 2, a wildland fire program would be implemented that integrates wildland fire suppression, expanded prescribed fire, and non-fire fuel treatment activities to meet management objectives. Expanded prescribed fire will be utilized in all of the battlefields throughout the Park, to restore and maintain historic vistas, reduce Wildland Urban Interface (WUI) fuel loading, and to return fire to Park ecosystems. Non-fire treatment projects would be conducted in those areas where fuel treatment is needed, but because of the conditions present, prescribed fire is not a viable option. Under Alternative 2, the 2003 FMP would be revised to reflect recent NPS policy changes. Federal wildland fire policies in the areas of safety, planning, wildland fire, prescribed fire, preparedness, suppression, prevention, protection priorities, interagency cooperation, standardization, economic efficiency, wildland/urban interface, and administration and employee roles would be incorporated into the FMP. The FMP would comply with NPS Director's Order 18, Wildland Fire Management, and the Federal Wildland Fire Management Policy national standards.

Alternative 2 would establish one FMU (Figure 1). In this FMU, prescribed fire options are available to use throughout the Park, in an area of 2995 acres. Wildland fires would continue to be suppressed, using existing control lines, wherever possible. New control lines will only be built when imminent threat to life or property exists. Specific prescribed burn and non-fire fuel treat projects are described in the “Five-year Plan” of Proposed Fire and Fuels Treatments Projects found in Chapter 6 of this EA. Prescribed fires would be used in the FMU to accomplish resource management objectives. An average of 110 acres of the FMU would be burned each year over the next five years. Non-fire (primarily mechanical) fuel treatment methods would be used to manage hazardous fuels and to aid in accomplishing

vegetation management objectives in areas where safe and effective prescribed fire treatment is precluded by fuel arrangements or is otherwise not feasible.

Prescribed fires would be planned in the FMU and conducted according to site-specific objectives, prescriptions, and mitigating measures identified in individual prescribed burn plans submitted and approved prior to implementation. This schedule is designed to allow for treatment of potentially dangerous arrangements of fuels and to restore or mimic the role of fire within certain vegetation communities that benefit from the effects of fire, and to manage the historic scene within the Park. Prescribed fire would also be used to treat populations of exotic invasive species and move towards restoration of those areas that have been heavily impacted by these species.

All prescribed fires would be carefully monitored according to the FRSP Fire Effects Monitoring Plan. All prescribed fires, as well as non-fire treatment projects, will be subject to a cultural resource clearance pursuant to the guidelines established in the National Historic Preservation Act of 1966, Section 106 and guidelines set forth by the Virginia State Historic Preservation Officer.

Figure 2 Potential Burn Units in Chancellorsville Battlefield

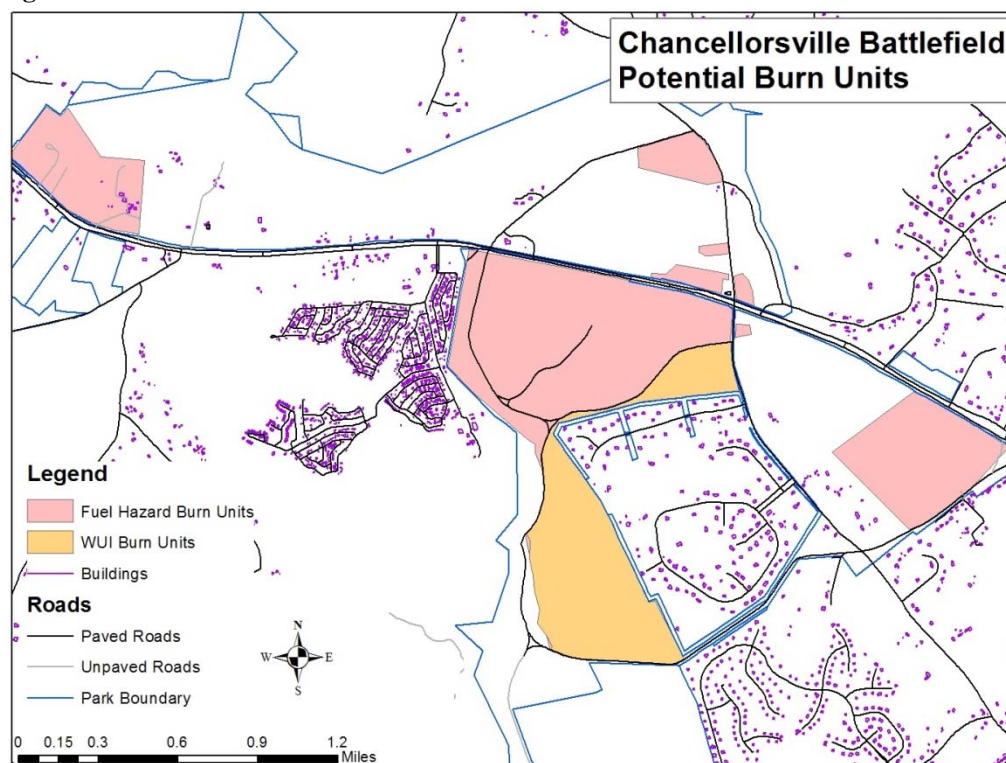


Figure 3 Potential Burn Units in Fredericksburg Battlefield

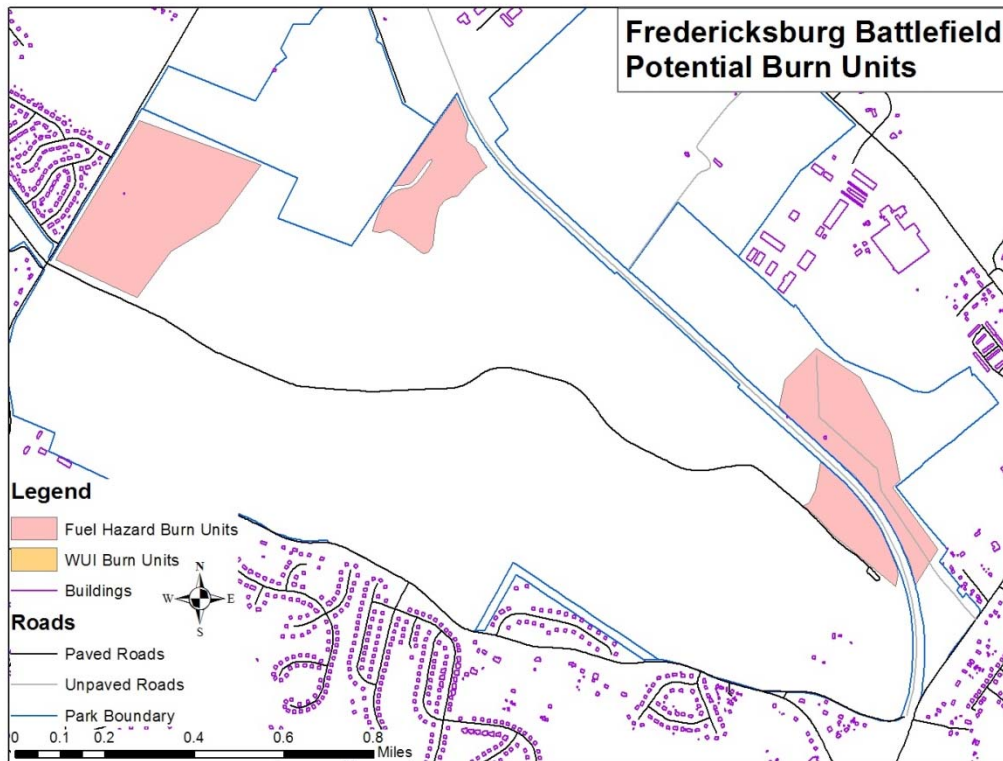


Figure 4 Potential Burn Units in Spotsylvania Court House Battlefield

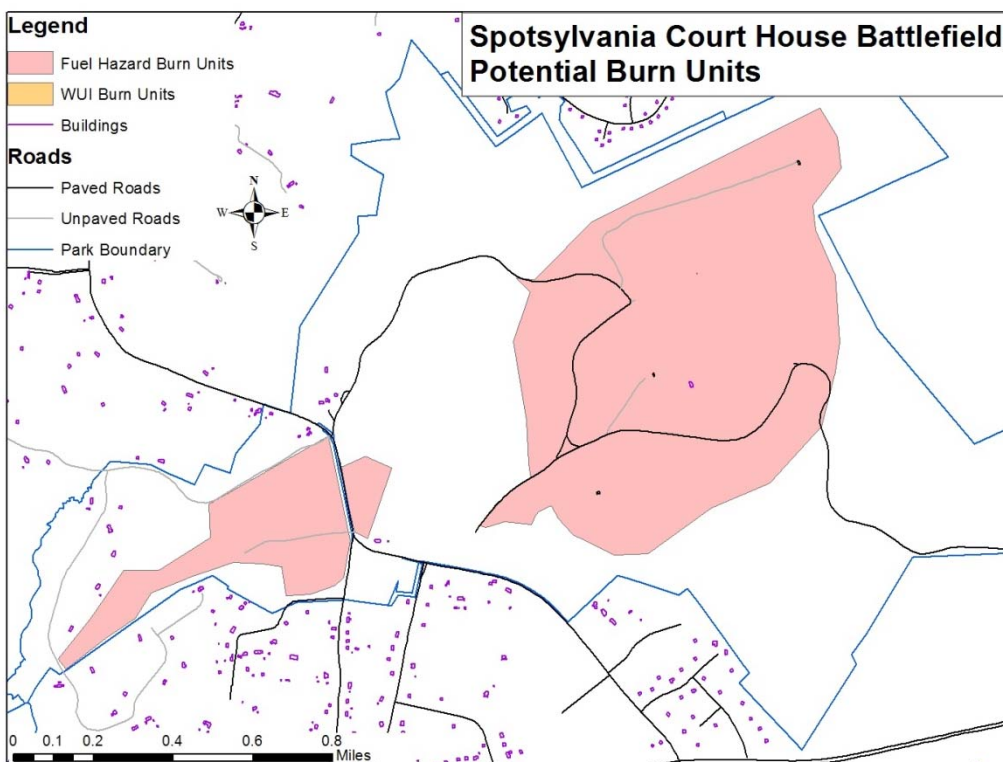
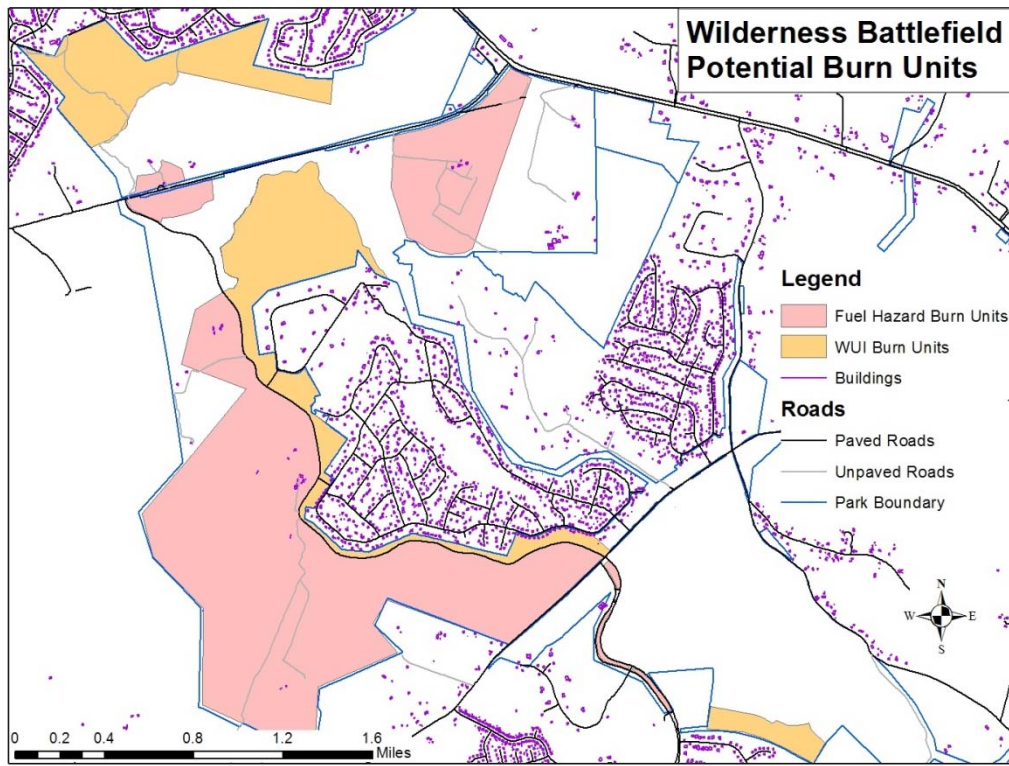


Figure 5 Potential Burn Units in Wilderness Battlefield



2.2. *Alternatives Considered but not Analyzed Further in this EA*

Alternative 3 – Full Suppression and Non-fire Treatments

Under this alternative, a wildland fire program would be implemented in which all fires, regardless of location or ignition source, would be immediately suppressed using the appropriate management response with emphasis on keeping the fire as small as possible. Non-fire treatment projects would be conducted in those areas where fuel treatment is needed. No prescribed fire or wildland fire use would occur. The 2003 FMP would be revised to reflect recent NPS policy changes. Federal wildland fire policies in the areas of safety, planning, wildland fire, preparedness, suppression, prevention, protection priorities, interagency cooperation, standardization, economic efficiency, wildland/urban interface, and administration and employee roles would be incorporated into the FMP. The FMP would comply with NPS Director's Order 18, Wildland Fire Management, and the Federal Wildland Fire Management Policy national standards.

The purpose of the federal action is to provide a long-range fire management plan and program using the benefits of natural and prescribed fire to achieve desired natural resource conditions. Fire is and has been an important natural process in the establishment and maintenance of vegetation communities in the Park. Because this alternative excludes the use

of fire for resource benefits, it does not meet the purpose and need for federal action and therefore, is not analyzed further in this EA.

Alternative 4 – Fire Suppression, Prescribed Fire, and Wildland Fire Use

Under Alternative 4, a wildland fire program would be implemented that integrates wildland fire suppression, prescribed fire, and wildland fire use to meet management objectives. Naturally ignited fires (wildland fire use, or WFU, fires) could be used as a management tool, in concert with prescribed fire, to restore and maintain Park ecosystems. Non-fire treatments would occur. This alternative would revise the 2003 FMP to reflect recent NPS policy changes. Federal wildland fire policies in the areas of safety, planning, wildland fire, prescribed fire, preparedness, suppression, prevention, protection priorities, interagency cooperation, standardization, economic efficiency, wildland/urban interface, and administration and employee roles would be incorporated into the FMP. The FMP would comply with NPS Director's Order 18, Wildland Fire Management, and the Federal Wildland Fire Management Policy national standards.

All unwanted wildland fires would be suppressed using an appropriate management response.

Prescribed fires would be planned in the FMU and conducted according to site-specific objectives, prescriptions, and mitigating measures identified in individual prescribed burn plans submitted and approved prior to implementation. This schedule is designed to allow for treatment of potentially dangerous arrangements of fuels and to restore the role of fire within certain vegetation communities that benefit from the effects of fire. Prescribed fire would also be used to treat populations of exotic invasive species and move towards restoration of those areas that have been heavily impacted by these species. It would be used to manage vegetation in the historic vistas in the Park.

Naturally-ignited WFU fires would be allowed to burn in the Park, if they meet the decision criteria for the fire management unit in which they occur, in order to permit natural ignitions to exert their historical influence upon Park ecosystems at time(s) and place(s) that are defined by the resource itself. However, due to the nature of FRSP – its disjointed and dispersed geography, the closeness of subdivisions adjacent to the Park, and the relatively small number of FRSP firefighters, this alternative does not meet the purpose and need, and therefore is not analyzed further in this EA.

Alternative 5 – Fire Suppression, Wildland Fire Use, and Non-fire Treatments

Under Alternative 5, a wildland fire program would be implemented that integrates wildland fire suppression, wildland fire use, and non-fire treatments to meet management objectives. Naturally ignited fires (wildland fire use, or WFU, fires) could be used as a management tool to restore and maintain Park ecosystems. Non-fire treatment projects would be conducted in those areas where fuel treatment is needed, but because of the conditions present, WFU fire does not occur or is not a viable option. No prescribed fire would occur. This alternative would revise the 2003 FMP to reflect recent NPS policy changes. Federal wildland fire policies in the areas of safety, planning, wildland fire, preparedness, suppression, prevention,

protection priorities, interagency cooperation, standardization, economic efficiency, wildland/urban interface, and administration and employee roles would be incorporated into the FMP. The FMP would comply with NPS Director's Order 18, Wildland Fire Management, and the Federal Wildland Fire Management Policy national standards.

The purpose of the federal action is to provide a long-range fire management plan and program using the benefits of natural and prescribed fire to achieve desired natural resource conditions. Because Native American and early Euro-American peoples were an important source of wildland fire ignitions in vegetation communities in the Park, natural ignitions would be insufficient to maintain natural communities and therefore prescribed fire is an important component of a program with this goal. Because this alternative excludes the use of prescribed fire, it does not meet the purpose and need for federal action and therefore is not analyzed further in this EA.

2.3. *Environmentally Preferable Alternative*

In accordance with the DO-12 Handbook, the NPS identifies the environmentally preferable alternative in its NEPA documents for public review and comment [Sect. 4.5 E(9)]. The environmentally preferable 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 preferable alternative is identified upon consideration and weighing by the Responsible Official of long-term environmental impacts against short-term impacts in evaluating what is the best protection of these resources. In some situations, such as when different alternatives impact different resources to different degrees, there may be more than one environmentally preferable alternative (43 CFR 46.30).

In this case, the NPS Preferred Alternative, Alternative 2, Suppression, Prescribed Fire, and Non-fire Treatments, is the environmentally preferred alternative for the new and revised Fire Management Plan for FRSP since it best protects and preserves natural and cultural resources. Alternative 2 would keep the focus of fire suppression activities to keeping fires as small as possible while minimizing damage to resources by using existing fire breaks (trails, roads, streams), and would allow for more area in WUI (Wildland Urban Interface) to benefit from prescribed fire in the Park.

2.4. *Mitigation Measures Common to All of the Alternatives*

A number of common mitigation measures apply to all the alternatives equally, except where specifically noted. Mitigation measures apply to all wildland fire, prescribed fire, non-fire fuel treatment, and post-fire rehabilitation activities proposed in this EA or included in the final FMP. These mitigation measures are described below by resource area.

Air Quality

There are a number of procedures that may be implemented during a prescribed fire that will reduce the magnitude of impacts on air quality, including:

- Burn only when meteorological conditions are favorable, that is, visibility is greater than 5.0 mi (8 km), mixing heights of 1640 ft (500 m) or greater, and the Ventilation

- Index is 2,000 or greater (Ventilation Index = mixing height above ground level, in meters x transport wind speed, in meters per second).
- Comply with recommended mitigation measures during state/county ozone advisories, including decreasing the use of gasoline-powered equipment, re-fueling vehicles before 0800 or after 1700, and carpooling.
 - Use backing and flanking ignition patterns to reduce smoke production.
 - Use smoke prediction models to identify smoke dispersion patterns.
 - Use smoke density models to identify potential road closings and/or advisories.
 - Avoid sensitive receptors through pre-planning, modeling, and careful implementation. Sensitive receptors are defined as groups of individuals who may be more susceptible to health risks associated with smoke, or the places where such groups of individuals congregate, such as an elementary school.

Biological Resources

- Locate incident facilities at pre-determined staging areas identified in Geographic Information Systems (GIS) data layers. Exceptions must be approved by the Superintendent or his/her designee.
- Emphasize minimum impact suppression tactics (MIST; RM-18, Chapter 9) during operational briefings. Suppression personnel will choose methods and equipment commensurate with suppression needs and a strategy that will least disturb Park resources.
- On extended attack and wildland fire use fires, the Park's superintendent will designate a Resource Advisor. The Resource Advisor will evaluate that management tactics are commensurate with resource objectives and will provide daily direction regarding the location and protection of biological and cultural resources projected to be adversely impacted by suppression activities or by the fire itself.
- Chose helicopter bucket drops and water or wet water over tanker drops or retardant.
- Allow fires to burn out to natural or existing man-made barriers whenever possible.
- As soon as possible during initial attack, and daily during extended attack, the Incident Commander will notify the Communications Center EICC (or Fire Dispatcher, if one is used during extended attack) of the location of the fire, and the Communications Center will notify the Incident Commander of sensitive areas within or in the path of the fire (biologically or culturally sensitive areas are identified in GIS data layers and on maps stored in the Park's GIS). These areas should be avoided whenever possible during suppression operations. If initial attack operations are required in these areas, the preferred suppression tools will be water, leaf blowers, and claw or leaf rakes.
- Constructed fire line, if necessary, will be built the minimum width and depth needed.
- During fireline construction, minimize the cutting of trees, burned trees, and snags. Leave some trees randomly in the fire line. Cut brush, small trees, and stumps from cut trees flush to the ground. Limb trees adjacent to the fire line only enough to prevent additional fire spread. Scatter debris from cutting operations to appear natural.
- During mop-up activities, roll logs to check for hot spots rather than buck them up with saws.

- Do not use heavy equipment, such as bulldozers and graders, and fireline explosives for fireline construction, burn area preparation, non-fire treatments, or rehabilitation without the approval of the Superintendent or his/her designee.
- A Burned Area Emergency Rehabilitation (BAER) Team may be requested following a large wildland fire, based on an interdisciplinary needs analysis. When a BAER Team is requested, include one or more personnel with biological expertise.
- Provide prescribed burn and non-fire treatment plans to Park natural resource staff far enough in advance of the proposed ignition date to allow survey of the project area. Fire management staff will cooperate and coordinate with resource staff to alleviate or mitigate specific issues identified during a survey.
- Give Park natural resource staff with the opportunity to survey post-burn and post-treatment areas for invasive or exotic species.

Cultural Resources

Fire management activities within the Park will be carried out in a manner that minimizes impacts to the Park's cultural resources.

- Locate incident facilities at pre-determined staging areas identified in GIS data layers and on maps found in the Park's GIS. Approval of the Superintendent or his/her designee is required for exceptions.
- Suppression personnel must choose methods and equipment commensurate with suppression needs and a strategy that will least disturb Park resources.
- The Park's Superintendent will designate a Cultural Resource Technical Specialist(s) to provide daily direction regarding the location and protection of cultural resources projected to be impacted by a wildland fire.
- Ensure that all prescribed fire and non-fire fuels treatment plans have a section addressing the impacts of the fire on cultural resources contained within the projected fire area, a description of the susceptibility of these resources to damage from fire effects, and a description of the mitigation actions to be taken by personnel involved in fire line operations.
- Ensure that all prescribed fire and non-fire fuels treatment activities that may take place are fully reviewed for Section 106 compliance before implementation by the Park's Cultural Resource Manager and the park's cultural resource management advisor team for cultural resource impacts and acceptable mitigation or avoidance measures.
- Exclude historic structures, including ruins of historical structures (not including earthworks), from prescribed fire treatment unit. When this is not possible, use leaf blowers to remove fine fuels such as leaves from the interior of structures or ruins to minimize the fuel bed available to spotting embers.
- Archeologically sensitive areas are identified in GIS data layers. As soon as possible during initial attack, and daily during extended attack, the Incident Commander will notify the Communications Center - EICC (or Fire Dispatcher, if one is used during extended attack) of the location of the fire, and the Communications Center will notify the Incident Commander of sensitive areas within or in the path of the fire. Avoid these areas whenever possible during suppression operations. If initial attack operations are required in these areas, water, "wet" water, foam, leaf blowers, and claw or leaf rakes are the preferred suppression tools.

- Do not use heavy equipment, such as bulldozers and graders, and fireline explosives for fireline construction, burn area preparation, non-fire treatments, or rehabilitation without the approval of the Superintendent or his/her designee.
- Use minimum impact suppression tactics (MIST) during all fire management activities. In addition to measures for protecting soils, tactics relevant to cultural resources include:
 - Minimize tree-falling. Snags within or adjacent to firelines will be removed only if they show evidence of fire, present hazard to firefighters, or constitute a legitimate threat to the integrity of the fireline. Living trees will be left undisturbed as much as possible. Lower branches will be limbed to remove ladder fuels rather than removing whole trees (ladder fuels are fuels which provide vertical continuity between strata, allowing fire to carry from surface fuels into the crowns of trees or shrubs).
 - After the emergency is over, transport personnel, equipment, and trash out of the Park in a manner that is consistent with Park management objectives.
 - In the event that the use of bulldozers is authorized in an emergency, assign an archeologist, or cultural resource specialist to the bulldozers to minimize damage to resources.
 - Favor a consumption strategy during mop-up operations to minimize disturbance to buried cultural resources (a consumption strategy means that smoldering fuels are allowed to burn up instead of using tools or other potentially destructive methods to extinguish them).

Park Neighbors

Park neighbors are those private parties having property within or immediately adjacent to the boundaries of the Park. These parties can be directly impacted by fire management activities in both positive (beneficial impacts) and adverse (adverse impacts) ways. Keeping Park neighbors informed of fire management activities is a key component of mitigating adverse impacts of those activities. In order to accomplish this:

- Notify landowners having property adjacent to prescribed fire units of the planning process via press release or other means.
- Each spring before prescribed burning begins, the Park will prepare and release a press release describing the locations, objectives, and planned treatment windows of prescribed fire projects planned for initiation in the following spring, summer, and fall. The notice will be released to at least one newspaper covering each of the counties that may be affected by smoke from any of the prescribed fires. The notice will include a contact name and number for more information.
- Use the Park web site to provide information, or links to information, about fire ecology and about prescribed fire activities in the Park.
- Inform all parties requesting or receiving information about fire operations in the Park about the web site as a source of updated and detailed information.

Safety of Firefighters and the Public

Safety will always be the first priority during all fire operations at FRSP.

- Park personnel will exchange information concerning wildland and prescribed fire at

Visitor Centers, and at all public use facilities throughout the Park.

- Inform Park staff about wildland or prescribed fire operations through Park radio announcements, and information sent out via email.
- Inform Park visitors about wildland or prescribed fire operations through public radio announcements, notices on the Park web site, site bulletins, and personal contacts with Park staff. Inform visitors about fire danger status, trail and road closures, and areas where smoke might be present along roads, trails, and other visitor use areas.
- The Division of Natural Resource Management and Visitor Protection is responsible for enforcing all closures, and the Burn Boss will ensure that closure and informational signs on all prescribed fires are properly posted.
- Plan prescribed fires to prevent heavy smoke volume under high-tension power lines.
- When propane tanks or gas lines are present within prescribed burn units, prepare fuels before ignition to prevent direct flame impingement on these features.
- Include mention of power lines, propane tanks, or gas lines in safety briefings for every fire operation in which any of these features might be encountered.
- Ensure that a Safety Officer or Public Information Officer is assigned to all extended-attack wildfires, and prescribed burns larger than 10 acres.
- Assure visitor safety will be given a higher priority than fire suppression and monitoring activities. For example, personnel will be drawn from monitoring and suppression forces to ensure visitor safety if necessary.
- Any time human life is endangered, take all necessary means to warn or evacuate visitors and neighbors.
- Limit or prevent visitor use near wildland fires and potentially affected areas.
- Ensure NPS personnel are available to patrol the perimeter of prescribed fires to inform visitors about the role of fire in a natural area, explain the risks associated with approaching too close to a fire, and enforce visitor compliance with area closure orders.

Soils

Unless there is a direct threat to life, property, or significant natural or cultural resources, heavy mechanized equipment will not be used in the Park. A process is in place to allow for authorization for heavy equipment use in the Park in the event of an emergency need. In addition, minimum impact suppression tactics (MIST) will be used during all fire management activities. Tactics relevant to protecting soils include:

- Do not use tracked, motorized equipment off designated road surfaces, without the approval of the Superintendent.
- Cold-trail the fire edge instead of constructing additional fireline, when practical.
- Use natural firebreaks, water, or water and chemical fire retardant in lieu of constructed fire line wherever possible.
- Install water bars on all constructed fire line on slopes more than 15%. Request specifications for water bars from a designated, qualified Resource Advisor.
- Use soaker hose or foggers in mop-up to avoid "boring" hydraulic action on soils.
- Build firelines to the minimum width needed to allow backfiring, burn-out, or the creation of safe blackline. Use natural or existing man-made barriers wherever possible.
- Choose a consumption strategy (allowing smoldering fuels to burn up instead of

- extinguishing them) during mop-up whenever possible to minimize soil disturbance.
- Use bulldozers only with written authorization from the Superintendent; the Superintendent may authorize their use when high value resources are at risk.
 - If bulldozers or other heavy equipment are authorized in an emergency, add or change lubricants associated with that equipment only in places designed for this purpose. Ensure spill cleanup materials are readily available.
 - Use solvents for cleaning tools, power tools, or equipment only in places designed for this purpose. Ensure spill cleanup materials are readily available.
 - A Burned Area Emergency Rehabilitation (BAER) Team may be requested following a large wildland fire, based on an interdisciplinary needs analysis. When a BAER Team is requested, include one or more personnel with soils expertise.

Utilities

Mitigation measures listed above for Soils will provide protection for pipelines and for firefighters working around the pipelines.

Visitor Use and Experience

Many of the above measures (especially related to smoke and safety) will mitigate the impacts of the fire management program on visitor use and experience.

- Conduct treatments or projects which could disrupt visitor experience in any way, such as the use of chainsaws to remove brush around a structure, during periods of low visitation (spring or late fall rather than summer) whenever possible.
- The Park will undertake an information and education program to ensure that citizens, key contacts, and employees understand the current status of the fires within the Park and the mission of the specific action(s) being taken.

Water Resources

- Provide materials on-site at fire camps and staging areas for cleaning up spills of hazardous materials, especially fuels and lubricants.
- Do not dump flagging or other trash in standing or flowing bodies of water.
- Except in emergencies, obtain approval from a designated Resource Advisor with natural resource expertise, or from the Park's Natural Resources Office, before fording streams with vehicles or other equipment.
- Instruct firefighters in the proper disposal of human waste in camp and in the field.
- Do not apply retardants and water with chemical additives to streams or wetlands.
- If bulldozers or other heavy equipment are authorized in an emergency, add or change lubricants associated with that equipment only in places designed for this purpose. Ensure spill cleanup materials are readily available.
- Use solvents for cleaning tools, power tools, or equipment only in places designed for this purpose. Ensure spill cleanup materials are readily available.
- A Burned Area Emergency Rehabilitation (BAER) Team may be requested following a large wildland fire, based on an interdisciplinary needs analysis. When a BAER Team is requested, include one or more personnel with expertise in water resources.

2.5. Summary and Comparison of the Alternatives

The first goal for the fire management program at FRSP is to protect human life and property within and adjacent to Park boundaries (Section 1.2.3). Alternative 1 would accomplish this by setting safety as the highest priority of every fire management operation. Alternative 2 would accomplish this by setting safety as the highest priority of every fire management operation, in which emphasis would be on keeping fires as small as possible.

The second goal for the fire management program at the Park is to suppress all unwanted and undesirable wildland fires, regardless of ignition source, to protect the public, private property, and natural and cultural resources of the Park. Alternative 1 and 2 would accomplish this by placing suppression emphasis on selecting an appropriate management response that will achieve suppression objectives while minimizing resource damage and maximizing cost effectiveness.

The third goal for the fire management program at the Park is to manage wildland fires in concert with federal, state, and local air quality regulations, and the fourth is to facilitate reciprocal fire management activities through the development and maintenance of cooperative agreements and working relationships with pertinent fire management entities. Alternative 1 and 2 would accomplish these goals by ensuring that the FMP is up-to-date with new regulations, and making aware the Park's policy and procedures to neighboring jurisdictions, and by maintaining Memoranda of Understanding cooperative agreements with the local counties, and the Virginia Department of Forestry.

The fifth goal for the fire management program at FRSP is to reduce wildland fire hazard around developed areas and areas adjacent to cultural and historic sites. Both alternatives accomplish this goal using fire prevention programs that incorporate education, engineering, and enforcement.

The sixth goal for the fire management program at the Park is to use prescribed fire as a method of restoring and maintaining the cultural and natural landscape to meet resource objectives of the Park. Alternative 1 would accomplish this goal by the continuing the existing prescribed fire program in the Park. Alternative 2 would accomplish this goal by expanding the prescribed fire program to additional lands that are not currently maintained using prescribed fire.

Table 1. Summary and Comparison of the Alternatives.

	<u>Alternative 1</u>	<u>Alternative 2</u>
	No Action: Fire Suppression, Prescribed Fire in Limited Areas, and	Fire Suppression, Expanded Prescribed Fire, and Non-fire Treatment NPS

		Non-fire Treatment	Preferred Alt
Fire Management Unit		Prescribed Fire in Spotsylvania Courthouse Battlefield Only	Additional Acreage for Prescribed Fire throughout Park
		130 acres	2995 acres
Fire Management Strategies	Suppression	yes	yes
	Prescribed Fire	yes	yes
	Wildland Fire Use	no	no
	Non-fire Treatments	yes	yes

Table 2. Summary of the Potential Impacts of the Alternatives. Alternative 1, No Action: Fire Suppression Prescribed Fire and Non-Fire Treatment; Alternative 2, Fire Suppression, Expanded Prescribed Fire, and Non-fire Treatments (NPS Preferred Alternative).

		Alternative 1	Alternative 2
Natural Resources	Air Quality	negligible to minor, short-term, localized to regional, adverse	minor to moderate, short-term, localized to regional, adverse
	Floodplains	negligible	negligible
	Wetlands	minor, short-term, localized, both adverse and beneficial	minor, short-term, localized, both adverse and beneficial
	Soils	minor to moderate, short-term, localized, adverse and beneficial	minor to moderate, short-term, localized, adverse and beneficial
		Alternative 1	Alternative 2

	Threatened / Endangered Species	negligible	negligible
	Vegetation	minor to moderate, short- to long-term, localized to regional, adverse	minor to moderate, short- to long-term, localized to regional, beneficial
	Water Resources	negligible to minor, short-term, localized to regional, adverse	negligible to minor, short-term, localized to regional, adverse
	Wildlife and Fisheries	minor to moderate, short- to long-term, localized, adverse and beneficial	minor to moderate, short- to long-term, localized, largely beneficial
Cultural Resources	Archeological Resources	negligible to minor, permanent, localized, adverse	negligible to minor, permanent, localized, adverse
Park Operations and Visitor Experience	Cultural Landscapes	negligible to minor, temporary to long-term, localized, adverse and beneficial	negligible to minor, temporary to long-term, localized, adverse and beneficial
	Historical Resources	negligible to minor, permanent, localized, adverse and beneficial	negligible to minor, permanent, localized, adverse and beneficial
		<u>Alternative 1</u>	<u>Alternative 2</u>
	Facilities and Operations	negligible to minor, temporary,	minor to moderate, temporary,

		localized, adverse	localized, adverse
Social and Economic Environment	Visitor Use and Experience	minor, temporary to short-term, localized, beneficial and adverse	minor, temporary to short-term, localized, beneficial and adverse
	Human Health and Safety	negligible to minor, temporary to short-term, localized to regional, overall adverse	negligible to moderate, temporary to short-term, localized to regional, adverse and beneficial
	Transportation	negligible to minor, temporary, localized, adverse	negligible to minor, temporary, localized, adverse
	Utilities	negligible to minor, temporary, localized, adverse	negligible to minor, temporary, localized, adverse

Table 3. Comparison of the Relative Impacts of the Alternatives. Alternative 1 is assigned a value of zero (0), and Alternatives 2 is rated based on how they compare to Alternative 1: 0 indicates impacts that are similar to those of Alternative 1; + indicates impacts that are more beneficial; ++ indicates much more beneficial; - indicates impacts that are more adverse; and - - indicates much more adverse.

		<u>Alt. 1</u>	<u>Alt. 2</u>
Natural Resources	Air Quality	0	- -
	Floodplains and Wetlands	0	+ +
	Soils	0	+ +
	Threatened and Endangered Species	0	+
	Vegetation	0	+ +
	Water Resources	0	+ +
	Wildlife and Fisheries	0	+ +
Cultural	Archeological Resources	0	+

Resources	Cultural Landscapes	0	+
	Historical Resources	0	0
Park Operations and Visitor Experience	Park Facilities and Operations	0	-
Social and Economic Environment	Visitor Use and Experience	0	-
	Human Health and Safety	0	++
	Transportation	0	0
	Utilities	0	0

3. Affected Environment

3.1. Natural Resources

Air Quality

FRSP is located within the Chesapeake Bay airshed, a large geographic area which, because of meteorology, topography, and climate, routinely shares the same air mass. This airshed contains numerous major stationary sources of air pollutant emissions, and emissions from both stationary and mobile (e.g., vehicles) sources are expected to continue to increase with population and industry growth in Virginia and other states in the airshed. The Virginia Department of Environmental Quality is the air pollution control authority having jurisdiction over air quality matters affecting the Park, including the permitting of new and modified stationary sources of air pollution.

The area surrounding the Park has experienced a surge of growth in the past 25 years as a result of increased use of I-95 as a major north-south transportation corridor. This expansion has resulted in new industries, increased development, and traffic adjacent to the Park. In 1992, Stafford County was listed as a "non-attainment" area under the Clean Air Act, suggesting serious air quality problems. Hydrocarbon pollution from three major areas, Washington, D.C. Richmond, VA, and Fredericksburg metro areas, are potential contributors to the decline of air quality in the Park. Air pollution may be causing yet undetermined impacts on the Park's natural and cultural resources. The Park was classified as a Class II park in the clean air act of 1977. This designation relates to the amount of air quality degradation that is allowable. This classification allows only moderate amounts of degradation of the existing air quality condition.

In conducting the fire management program for the Park, the NPS will comply with all applicable federal, Virginia Department of Environmental Quality, and local air quality requirements, including those that relate to burn permits and smoke management.

Numerous streams and swamps on gently rolling wooded plateaus dissect Chancellorsville, Wilderness, and Spotsylvania Courthouse Battlefields. Chancellorsville Battlefield lies on the divide separating the watershed of the Rappahannock River from the Po and the Ni rivers, and Spotsylvania Courthouse Battlefield lies between the drainage areas of the Po and the Ni rivers. The site of the Wilderness Battlefield is in the Wilderness Run drainage, which flows north into the Rapidan River. There are approximately 650 acres of wetlands in the Park. Throughout the Park are beaver complex wetlands that have been in the area for a number of years. In addition, the Park has a Coastal Plain / Piedmont Acidic Seepage Swamp. This seepage wetland association is considered either globally rare or uncommon in the state of Virginia. Executive Order 11988 on Floodplain Management requires all Federal agencies to take action to reduce the risk of flood loss, to restore and preserve the natural and beneficial values served by floodplains, and to minimize the impact of floods on human safety, health, and welfare. Because many wetlands are located in floodplains, Executive Order 11988 has the secondary effect of protecting wetlands.

Executive Order 11990, Protection of Wetlands, states an overall wetlands policy for all agencies managing Federal lands, sponsoring Federal projects, or providing Federal funds to state or local projects.

In 2002, the National Park Service re-issued DO 77-1, establishing NPS policies, requirements, and standards for implementing Executive Order 11990 (NPS 2002) along with a procedural manual for wetland protection (NPS 2008). DO 77-1 identifies the goal of “no net loss” of wetlands in national parks and commits the NPS to a longer-term goal of achieving a “net gain” of wetlands in the national park system by means of restoring degraded wetlands.

In 2003, the National Park Service issued DO-77-2, establishing NPS policies, requirements, and standards for implementing Executive Order 11988 (NPS 2003) along with a procedural manual for floodplain management (NPS 2008). DO 77-2 was issued to “to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative.”

Soils

Soil is an integral component of most terrestrial ecosystems. The physical, chemical (nutrient), and biotic properties are important in determining function, productivity, and other characteristics of the ecosystems (DeBano et al. 1998 *in* SEKI EA 2004). Important physical properties of soil include texture, compositions (sand/silt/clay), bulk density, porosity, structure, infiltration, temperature, and water repellency. Chemical properties refer to processes, characteristics, or reactions that derive from the chemical composition or reactions occurring in the soil. Biotic properties relate to functions or attributes of soils that reflect the roles of living or dead organisms, including the many relationships between plants and microorganisms that enhance uptake of nutrients or soil organisms that are responsible for diseases (SEKI EA 2004).

Approximately 90% of the Park is in the Piedmont physiographic province, and about 10% is on the Coastal Plain. The fall line divides the Park roughly from Chatham Manor through

Fredericksburg Battlefield, with Lee Drive being the line of demarcation. Jackson Shrine is also located on the Coastal Plain. Granite, gneiss, and schist of the Paleozoic and Precambrian ages dominate bedrock of the Piedmont area. The Battlefields contain deep, well-drained sandy loam soils with clayey or loamy subsoil. These soils are categorized as being medium textured, strongly acidic, and low in fertility. The Coastal Plain consists mainly of the Sunderland and Brandywine terraces, which support large sand mining operations in the region.

Threatened and Endangered Species

The only non-transient federally listed species located in the park is the small whorled pogonia. The small whorled pogonia, *Isotria medeoloides* was found in the Park in 2006.

From 1989 to 1991, the Virginia Department of Conservation and Recreation's Division of Natural Heritage conducted an inventory for "Natural Heritage Resources" in FRSP. Natural Heritage Resources include "the habitat of rare, threatened, or endangered plant and animal species, rare or state significant natural communities or geologic sites, and similar features of scientific interest." Two populations of the state listed vulnerable ranked plant, Red Milkweed *Asclepias rubra* were recorded in the 1993 final report (Ludwig, 1993). The plants were found at two locations. The first location, adjacent to Stuart Drive, had one sterile plant when observed in July 1990. The second location, in the headwaters of Little Hunting Run, is in a partially open, low-nutrient groundwater seepage area. Nine sterile plants were observed in October 1992. Management recommendations provided in the 1993 final report include monitoring the long-term health of the plant population, land use, and management practices and consulting with Department of Natural Heritage staff to avoid negative impacts to the rare plant should land use or management practices change.

The swamp milkweed *Asclepias incarnata* state listed as S3 (vulnerable) has been found, and indeed, flourishing in Spotsylvania Courthouse Battlefield, in an area that has been burned repeatedly for the last four years, and it was not seen previously in this location.

Vegetation

The forest community structure of Park lands responds to two major factors: Past land use and soil conditions. The forest patterns reflect past land use in successional stages from pioneer community types (pine) to disturbance climax communities (oak-hickory). The vegetation of the battlefields is classified as oak-hickory forest in the temperate deciduous biome. There is some discussion about oak-hickory forest community and whether it is fire adapted or not. Fire does have an influence on this forest type, however, it is uncertain at this time if this is indeed a fire adapted community or not. Typical tree species include oaks, hickories, red maple, sweetgum, and yellow poplar. Subcanopy trees consist of dogwood, red cedar, tupelo, mountain laurel and sassafras. Shrub species include blackberries, poison ivy, and American hazelnut. Virginia pine and shortleaf pine are found in areas recently cultivated or pastured. The vegetation of Chatham ranged from mixed hardwood forests to

landscaped formal gardens to farm fields. Above Chatham Lane, there are predominantly grassy meadows with a cedar hedgerow. The steeply sloping portion of the site contains primarily deciduous hardwoods, including yellow poplar, hickory elm, and dogwood. A dense ground cover consists mainly of honeysuckle, greenbrier, arrowwoods, and blueberries. Since woodlands have been repeatedly disturbed, opportunistic exotic plants have invaded the native woodlands, and in some cases, reached possible problem stages. These problem plants are: Japanese honeysuckle, English ivy, kudzu vine, princess tree, ailanthus, vinca and mimosa.

The vegetation of the Piedmont Plateau has been severely altered by a long history of clearing, agriculture, logging, and other anthropogenic disturbances. Except in the increasingly large urban and suburban areas, the province currently has a patchwork of secondary forests, pastures, and fields used for the production of feed grains or tobacco. Most Piedmont forests have a history of repeated cutting, or have regenerated on former agricultural lands, some of which were abandoned more than 150 years ago. Recently, disturbed Piedmont forests tend to have a large component of pines, Virginia pine (*Pinus virginiana*) and/or shortleaf pine (*Pinus echinata*), and shade-intolerant hardwoods such as tuliptree (*Liriodendron tulipifera*) and sweetgum (*Liquidambar styraciflua*). The composition of more mature hardwood forest communities varies with soils and topography. Dry, acidic soils support oak / heath forests, while more basic upland soils usually support oak-hickory forests. White oak (*Quercus alba*) is a ubiquitous dominant in both groups. Mixed forests of American beech (*Fagus grandifolia*), oaks (*Quercus* sp.), and tuliptree are common in mesic, acidic ravines throughout the Piedmont. Forests of silver maple (*Acer saccharinum*), American sycamore (*Platanus occidentalis*), American elm (*Ulmus americana*), box-elder (*Acer negundo*), and other flood-tolerant trees are well developed along the larger rivers that cross the Piedmont, such as the Rappahannock River, which crosses the Park boundary near Fredericksburg (Fleming et al. 2006).

The upland forests that originally covered much of the Coastal Plain have been extensively cleared or altered, so much so that it is now difficult to determine which species and communities were prevalent. Much of the contemporary forest consists of successional or silvicultural stands of loblolly pine (*Pinus taeda*), and secondary pine-hardwood forests that have developed after repeated cutting or agricultural abandonment. The most mature remnant stands on mesic uplands are characterized by associations of American beech (*Fagus grandifolia*), several oaks (*Quercus* spp.), and American holly (*Ilex opaca* var. *opaca*). Patches of drier oak-dominated forest are fairly common in the dissected inner Coastal Plain, especially north of the James River. Wetlands of the Coastal Plain are extensive and have fared somewhat better than the province's upland forests, supporting a great variety of natural communities (Fleming et al. 2006).

The upland forest classes are Oak / Heath Forest, Acidic Oak - Hickory Forest, Mesic Mixed Hardwood Forest, and Eastern White Pine - Hardwood Forest. These upland forest types are associated with the well-drained, low fertility, acidic soils found throughout the Park. Except for the Eastern White Pine - Hardwood Forest, these types are common on uplands throughout the mid-Atlantic region and are frequently found.

The most common upland forest class is Oak / Heath Forest which covers 1,677 acres of the park land.

Eastern White Pine - Hardwood Forest is found in only one isolated patch in the northwestern portion of Wilderness Battlefield. It is unclear as to why Eastern White Pine - Hardwood Forest occurs with such a limited extent in the Park, although the location is near the eastern distributional limit of white pine in Virginia (Wieboldt et al. 2005).

Acidic Oak - Hickory Forest is the matrix forest on middle to lower slopes of the Park. This dry hardwood forest is typically composed of various species of oaks (*Quercus* spp.) and hickories (*Carya* spp.), but disturbed stands may have a significant component of early successional pines (*Pinus* spp.) or tuliptree (*Liriodendron tulipifera*) in the canopy. Mesic Mixed Hardwood Forest occurs in scattered patches on lower slopes of the Park, covering two percent of the Park area (178 acres). This association is typically dominated by American beech (*Fagus grandifolia*), but can be co-dominated by white oak (*Quercus alba*) and/or tuliptree.

The Wilderness and Chancellorsville battlefields also have a land use history that varies from many other areas of the Piedmont. While the majority of Piedmont uplands were cleared at some point in the post-settlement era, the Wilderness and Chancellorsville forests were utilized almost immediately in the early 1700s to fuel several iron furnaces in Spotsylvania County (Orwig and Abrams 1994). During much of the 18th and early 19th centuries, these forests were repeatedly logged, resulting in the very dense, oak-dominated coppice forests that hosted the two battles fought here in 1863 and 1864. Although some additional logging occurred through the early 1900s, the Wilderness and Chancellorsville forests today are physically mature and have a physiognomic character far different from that of the Civil War-era stands.

Coastal Plain / Piedmont Floodplain Forest may be one of three associations. The three vegetation associations are Coastal Plain / Piedmont Small-Stream Floodplain Forest, Successional River Birch - Red Maple Floodplain Forest, and Successional Tuliptree Floodplain Forest. Coastal Plain / Piedmont Small-Stream Floodplain Forest is the only forest type of the three that represents later successional vegetation. It is a common floodplain forest throughout the region and in the Park it occurs on well-drained floodplains of perennial streams with relatively acidic soil, such as Wilderness Run in Wilderness Battlefield. The well-drained mesic conditions of this forest association make it highly susceptible to exotic species invasion. The successional alluvial forests occur in well-drained floodplain areas that have had recent disturbance or are undergoing succession from open wetland to forest.

Piedmont / Mountain Floodplain Forest is a common association on floodplains of major mid-Atlantic rivers dominated by silver maple (*Acer saccharinum*). The only river in the Park large enough to support this type is the Rappahannock River, and the association covers about 22 acres on the floodplain near Chatham Manor. The soils are quite nutrient-rich, especially in comparison to the relatively acidic soils of the Coastal Plain / Piedmont Small-Stream Floodplain Forest. Nutrient levels are enhanced through flood deposition of base rich alluvium washed from more fertile areas upstream.

Coastal Plain / Piedmont Floodplain Swamp Forest (Mixed Oak – Red Maple Type) is a poorly drained floodplain swamp forest that often occurs in the backswamps of broad alluvial floodplains. It is found in the Coastal Plain and eastern Piedmont, where it is uncommon. In the Park, Coastal Plain / Piedmont Floodplain Swamp Forest (Mixed Oak – Red Maple

Type) only occurs along the upper reaches of the Ni River in Chancellorsville where soil drainage is impeded and the floodplain is wide enough to support the association. Coastal Plain / Piedmont Floodplain Swamp Forest (Mixed Oak – Red Maple Type) occurs adjacent to and grades into Successional River Birch - Red Maple Floodplain Forest, which is an early-successional temporary flooded forest with little to no oaks in the canopy. Small inclusions of Coastal Plain / Piedmont Floodplain Swamp Forest (Mixed Oak – Red Maple Type) can occur in the adjacent successional forest. The area is largely disturbed forest and was therefore classified as Successional River Birch - Red Maple Floodplain Forest. Coastal Plain / Piedmont Floodplain Swamp Forest (Mixed Oak – Red Maple Type) should be an important conservation priority for the Park, both because of its conservation status and because swamps can support diverse animal populations due to an abundance of food and habitat resources.

Non-alluvial forested wetlands include the classes Coastal Plain / Piedmont Acidic Seepage Swamp, Coastal Plain Depression Wetland (Red Maple – Sweetgum – Willow Oak Type), and Non-Riverine Saturated Forest. All three associations represented by these map classes are uncommon to rare in Virginia or the mid-Atlantic region and are vulnerable to alteration or destruction, such as by hydrologic modifications. Stands typically have standing water due to impermeable soils with poor drainage and high clay content. These isolated wetlands are important as amphibian breeding areas and provide habitat for many at-risk plant and animal species (Comer et al. 2005).

Coastal Plain / Piedmont Acidic Seepage Swamp is an uncommon wetland habitat, scattered in the Coastal Plain from southeastern New York and New Jersey to southeastern Virginia. In Fredericksburg and Spotsylvania National Military Park, 15 stands of Coastal Plain / Piedmont Acidic Seepage Swamp are mapped in Wilderness, Chancellorsville, and Fredericksburg battlefields, with an average size of about 5 acres.

Coastal Plain Depression Wetland (Red Maple – Sweetgum – Willow Oak Type) occupies poorly-drained basins and occurs in the Park as isolated wetlands in upland settings. Similar wetlands are scattered throughout the Mid-Atlantic Coastal Plain and occasionally occur in gentle, highly acidic terrain of the eastern Piedmont. It is an uncommon association in the Park, only documented at four sites and covering a total of 19.3 acres. The vegetation and habitats vary from closed forests in saturated soils to more open woodland occupying standing water (water levels fluctuate with the seasons). Because these isolated wetlands are typically free of fish that eat the eggs of frogs and salamanders, they provide important breeding habitats for amphibians.

Non-Riverine Saturated Forest is a globally rare community restricted to flat terraces and very wide, ancient floodplains that are no longer subject to alluvial processes. Its hydrology varies from seasonally to permanently saturated, and is maintained by a high water table rather than by overland flooding. Shallow surface water ponding is common during periods when the water table is perched, and groundwater emanating from adjacent toe slopes may produce localized sheet flows. These specialized wetland habitats were probably never common on the landscape and are only known from about 25 sites in 13 counties in Virginia and may range into Maryland. Much of the suitable habitat for the association has been lost to agriculture, hydrologic alterations, and conversion of hardwood forests to silvicultural pine. This association is particularly vulnerable to changes in hydrology that can alter the species composition and can encourage invasion by nonnative invasive plants. The natural

hydrology of this association has been impacted by historic anthropogenic activities and historic berms and ditches are often evident. Within the study area, this community occurs only in Fredericksburg Battlefield and one particularly mature and extensive stand is found just north of Lee Drive. The stand is mapped as 193 acres, which is over half of the total acreage of Non-Riverine Saturated Forest in the Park (303 acres). Younger and smaller stands of this association occur along roadways and near the railroad in Fredericksburg Battlefield and tend to have higher cover of red maple in the understory and canopy.

The remaining 11 classes in the Park represent early successional/transitional vegetation or cultural map classes which together cover 47.8% of the Park. Land use history and ongoing management to maintain the historic and cultural landscape of the Civil War era are the most influential factors determining the current composition of these map classes.

Surface Water Resources

Numerous streams and swamps on gently rolling wooded plateaus dissect Chancellorsville, Wilderness, and Spotsylvania Courthouse Battlefields. Chancellorsville Battlefield lies on the divide separating the watershed of the Rappahannock River from the Po and the Ni rivers, and Spotsylvania Courthouse Battlefield lies between the drainage areas of the Po and the Ni rivers. The site of the Wilderness Battlefield is in the Wilderness Run drainage, which flows north into the Rapidan River. Streams in the Park generally have good sustained flows. The availability of groundwater varies with the underlying rock formations, but in most areas of the two counties, an adequate supply of water may be obtained from springs and wells. Water quality depends on the chemical content of both underground and surface waters, the tidal influence of larger surface streams, and the degree of contamination from residential and industrial development.

Wildlife and Fisheries

The interspersed vegetative types provides habitats for a wide variety of wildlife in the Park. The Park currently has on record twenty eight species of mammals, forty-two species of fish, one hundred twenty-five species of bird, and fifty-six species of reptiles and amphibians.

Open land wildlife includes rabbits, groundhogs, quail, mourning dove, hawks, owls, field sparrows and several other bird species normally found in cropland, pasture, and meadows.

Woodland wildlife includes white-tailed deer, gray squirrels, raccoon, opossum, wild turkey, ruffed grouse, woodpeckers and warblers. Wetland wildlife includes beaver, mink, muskrat, ducks, geese, and other water birds that live along streams, in ponds, marshes, and swamps. There is also a wide variety of reptiles and amphibians.

Fishing pressure is mainly on pond species – bass, bluegill, and catfish. There are no listed fish species known to exist in Park waters.

For a list of known wildlife recorded for the Park please refer to the Park's natural resource management files.

3.2. Cultural Resources

On four separate occasions, the main eastern armies of the United States and the Confederate States fought major battles in and around Fredericksburg, Virginia. The Fredericksburg and Spotsylvania NMP preserves portions of the four battlefields and the sites associated with them. The woods and fields of the battles are the primary resources of the Park. A number of historic structures dating from the mid-19th century add to the Park's significance: more than 37 miles of earthworks built by the soldiers, Salem Church, the house where Stonewall Jackson died, Ellwood, Chatham Manor, and several other structures that were landmarks on the historic fields. More than 15,000 Federal soldiers killed in or near Fredericksburg are buried in the national cemetery.

Archeological Resources

The story of FRSP reveals a continuous interaction between land and people for over 9,000 years. Archeological evidence indicates that paleo-Indians were using the area as early as 8,000 B.C. These people were hunter-gatherers who lived in seasonal camps in the vicinity of the Park. By 1,000 A.D., agricultural communities had developed in the valleys and use of the mountains was reduced to short hunting trips.

A number of archeological investigations have indicated numerous house sites and other sites in the area. In addition, a number of archeological investigations have indicated potential for extensive prehistoric occupation of the area from the early archaic to late woodland periods. There are numerous archeological sites documented in the Park, and it is estimated that less than 10% of the Park land base has been surveyed for archeological resources.

Cultural Landscapes

Although the Park does not have any Cultural Landscape Reports, the Park is in the process of having these documents completed. The cultural landscapes of the Park consist of the core areas of the battlefields where the Army of Northern Virginia, and the Army of the Potomac fought between 1862 and 1864. The military strategies of the battles of the Civil War relied heavily upon the terrain. Hills, watercourses, and other physiographic features helped to define tactical and strategic military positions. The landscape dictated the placement of defensive fortifications, which remain today around Fredericksburg, in part, as units of the Park. The pattern of field to forest is often extremely important in interpreting battles.

It is likely that reestablishment of native warm season grasses in open fields will be recommended in the future Cultural Landscape Reports. Prescribed fire will be used to maintain the presence of these grasses.

The scenic views and visibility of the earthworks are extremely important to the visitor's understanding of the battles that took place in this area. The cultural landscape is a critical component of the Park's interpretive programs.

A principle objective of the Park is to approximate the historic scene where possible, and to preserve the earthen structures using the best management practices while affording the visitor the opportunity to see these historic structures.

The Park contains more than 42 miles of Civil War earthworks and 29 miles of Civil Conservation Corps (CCC) roadways, and the Fredericksburg Visitor's Center, also a WPA structure. There are numerous other historic structures scattered throughout the Park that were built by the CCC. The Park has significant terrain features, historic roads and traces, house sites, ruins, cemeteries, monuments, markers, and historic objects. In addition, the entire Park is listed on the National Register of Historic Places, and the Mission 66 structures are of historical significance.

3.3. *Park Operations and Visitor Experience*

Park Facilities and Operations

The Park is comprised of four separate, non-contiguous Civil War battlefields: Fredericksburg, Spotsylvania Court House, Chancellorsville and Wilderness located over 145 square miles. The Park also includes four related sites: Salem Church, Chatham Manor, Jackson Shrine and the Fredericksburg National Cemetery. The Park has an authorized acreage of 9,440 acres. The Federal Government currently owns 7,342 acres of these authorized lands. The Park is located in the counties of Caroline, Orange, Spotsylvania, and Stafford, and in the city of Fredericksburg.

Headquarters complex is located at Chatham Manor, in Stafford County. The complex includes administration buildings, and offices. Due to the large number of seasonal park employees, researchers, and volunteers, the Park maintains seasonal housing areas at three locations, Chancellorsville, Sunken Road area of Fredericksburg Battlefield, and adjacent to Lee's Hill in Fredericksburg Battlefield.

In total, the Park generally has approximately 40 permanent employees and generally hires about 15 temporary employees. Of these 55 employees, about 9, or 16%, are red-carded (that is, they have certification indicating that they are trained and qualified to participate in a wildland or prescribed fire operation) and could be asked to leave their regular duties to participate in a prescribed or wildland fire operation in the Park.

Park staff is divided into four divisions: Administration, Interpretation, Maintenance, Natural Resource Management and Visitor Protection (includes Fire Management). Maintenance has 2 permanent employees that are red-carded. NRM and VP has 8 employees that are red-carded. Numbers of employees and number of red-carded employees tend to change over time. In addition, there are approximately 3-5 emergency hire personnel that are Red-carded – these people tend to be local college students that have previously worked in the Park, or have been associated with the Park and had acquired their red- cards. These personnel are generally available on short notice to assist with prescribed or Wildland fires.

FRSP receives approximately 480,000 recreational visits per year, with an additional 1.07 million non-recreational visits, for a total of approximately 1.55 millions visits per year.

The non-recreational visitors are largely commuters or locals cutting through the Park for shortcuts through town. Some of the most popular things to do in the Park are participating in ranger-guided activities, viewing audio-visual programs or exhibits at visitor centers, hiking, picnicking, or just plain relaxing in the peaceful surroundings. Other opportunities include auto touring, biking, bird watching, horseback riding, and wildlife viewing.

The Park has two Visitor Centers: Fredericksburg Battlefield and Chancellorsville Battlefield Visitor Centers. There are over 25 miles of hiking trails. There are seven picnic areas: Pickett Circle in Fredericksburg Battlefield, Chancellorsville Battlefield Visitors Center, near the exhibit shelter at Spotsylvania Court House Battlefield, and the Hill-Ewell Drive Picnic area in Wilderness Battlefield.

3.4. Social and Economic Environment

Human Health and Safety

FRSP provides information about visitor safety through pre-visit information by mail and on the web, visitor contacts, and orientation bulletin boards. The Park has safety plans that address winter operations, hazardous tree management, search and rescue, and emergency medical services.

The smoke, heat, and flames from wildland fires can threaten human lives and health, both of the public at large and firefighters in particular. A number of considerations have a bearing on protection of the public from fires, including the following:

- Visitor use is lower during the fall and spring fire seasons, usually mid-October to mid-April.
- Opportunities for visitors to escape a fast-moving fire may be limited along a trail.
- Some individuals will approach a prescribed or wildland fire and may even attempt suppression action.
- Visitors will frequently ignore warnings or are unaware of potential dangers and may wander through burned or burning areas and thus put themselves at risk.
- Smoke from fires near roads can reduce visibility and create dangerous driving conditions.

Transportation

Two State Highways cut through two of the Park's battlefields, Rt. 20 cuts through the middle of Wilderness Battlefield, and Rt. 3 cuts through the middle of Chancellorsville Battlefield. The Park maintains approximately 28 miles of paved and gravel roads within the boundaries of the battlefields.

The two state highways well-traveled commuter roads carrying significant volumes of through traffic. In addition, Lee Drive, Bullock Road, and Hill – Ewell Drive well traveled throughout the year with local commuters. No Park roads are included on school bus routes.

Utilities

Many miles of power lines occur within the Park. These lines are owned by either Dominion Power or Rappahannock Electric Cooperative, Dominion Power owns a high-power transmission line just west of Fredericksburg Battlefield. Verizon Telephone Company has multiple lines that travel through and serve the Park at all of the offices throughout the Park.

4. Environmental Consequences

In accordance with NEPA, evaluation of environmental effects requires consideration of the intensity, duration, and cumulative nature of effects, as well as a description of measures to mitigate for adverse effects. This section presents the potential environmental effects or consequences of implementing each of the fire management program alternatives described in Chapter 2 of this EA. It also presents the scientific and analytic basis for the comparisons of the alternatives. Each of the resource areas whose affected environment was described in Chapter 3 is addressed here. Impacts are described as adverse or beneficial and are assessed according to their duration, extent, and intensity. Analysis of impacts is based on the predicted ability of each alternative to achieve the desired wildland fire management goals of the Park, as described in Chapter 1. In each resource area, potential impacts common to all of the alternatives are discussed, and then additional impacts specific to each of the alternatives are discussed separately.

Definitions of the terminology used to describe impacts are included below for clarity. Unless otherwise specified in the description of impacts, the terms below represent a qualitative estimate of expected impacts based on best professional judgment, expert experience, and/or review of relevant literature. When impacts are based on quantitative data, the data will be described in detail in the section for the resource area to which it applies and the source(s) of the data will be noted at that time.

Adverse: Impact would be harmful.

Beneficial: Impact would be helpful and would tend to promote well-being.

Duration: Duration refers to the time period over which an impact persists. For impact topics evaluated in this document, duration is defined as:

Temporary – Impact would occur only simultaneously with the fire, management action or suppression activity; once the fire, action, or activity has ended, resource conditions are likely to return to pre-activity conditions.

Short-term – Impact would extend beyond the fire, management action or suppression activity, but would last at most a couple of years.

Long-term – Impact would extend well beyond the fire, management action or suppression activity, and would likely last a decade or more.

Extent: Extent refers to the spatial scale over which an impact is expressed and is defined as follows for this document:

Local – Impact would affect the resource only at site of the fire, management action or suppression activity, or its immediate surroundings, and would not extend into the Park at large or the region outside the Park.

Regional – Impact would affect the resource on a park level, extending well past the immediate location of the fire, management action or suppression activity, and spreading into substantial portions of the Park or areas beyond its boundary.

Intensity: Intensity refers to the magnitude, or severity, of the impacts.

The intensities of impacts on natural and cultural resources are defined as:

Negligible - Minimal or no impact on the resource occurs and change is not detectable at the lowest levels of detection currently available.

Minor – Detectable change in a resource area occurs, but no substantial resource impact results; the effect is localized and slightly detectable but would not affect overall structure of any natural community or is confined to a small area of a cultural resource.

Moderate - Measurable change in a resource occurs, but the integrity of the resource remains intact.

Major - Substantial impact or change occurs in a resource area that is easily defined, noticeable, and measurable; the effect is highly noticeable, and would have a substantial influence on natural resources, including effects on individuals and groups of species, communities, and/or natural processes; or results in a substantial and highly noticeable change in character-defining features of a cultural resource.

The intensities of impacts on visitor experience and aesthetic resources are defined as:

Negligible - Minimal or no impact on the resource occurs; the effect would not be detectable by visitors and would have no discernible effect on visitor experience.

Minor - Change in a resource area occurs, but no substantial resource impact results; the effect is slightly detectable by visitors but would not affect overall visitor experience.

Moderate - Noticeable change in a resource occurs, but the integrity of the resource remains intact; the effect is clearly detectable by visitors but would have little effect on overall visitor experience.

Major - Substantial impact or change occurs in a resource area that is easily defined, noticeable, and measurable; the effect would have a substantial, highly noticeable influence on various aspects of the visitor experience.

Cumulative Impacts: Cumulative impacts are effects on the environment that result from the incremental effect of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what entity (Federal or non-Federal) undertakes such actions (40 CFR 1508.7). Cumulative effects can result from individually minor, but collectively significant, actions taking place over a period of time. Cumulative effects analyzed in this document consider the incremental effects of the proposed action, as well as the no-action alternative in conjunction with past, current, and future actions at FRSP.

Past and ongoing projects and actions include enhancing the restroom facilities at Chancellorsville Visitors Center, repaving roads throughout the Park, painting of Park buildings, stabilization of Park road bridges, enhancing visitor interpretive facilities – including Park trails, and removing non-historic farm ponds. Improvements to the Park in these projects have resulted in long-term, minor, localized, beneficial impacts on human health and safety; minor short-term impacts on the Park's natural resources may occur from repaving roads with minor, short term soil disturbance, along with the minor potential to introduce exotic plant species; and No Adverse Effect on cultural resources.

None of the actions proposed in any of the alternatives would be expected to combine with these projects to contribute to cumulative adverse effects.

4.1 Natural Resources

Many of the effects of each alternative stem from the relative amount of fire on the landscape. While evaluating impacts it is important to keep in mind that the alternatives are for proposed fire management programs, which represent planned, predictable actions by Park and fire management staff. The amount of prescribed fire is fairly predictable, but the scale, scope, and necessary response to unwanted wildland fires are largely unpredictable and are not controllable by management actions proposed in the alternatives.

Air Quality

Methodology for Assessing Impacts

Impacts to air quality were qualitatively assessed by means of a review of pertinent laws, guidance and regulations, consultation with Park experts, professional judgment, and experience with comparable actions. Major air resource issues include ozone, visibility, safety, and public health. Under the Federal Clean Air Act the Park is required to consider impacts on each of these areas. In this section impacts are assessed with respect to the Park's Class II airshed, to ozone, and to visibility. Air quality issues related to safety and to public health impacts are addressed later, under Human Health and Safety and Transportation.

The extent to which smoke events occurred as part of the natural background condition in the Park prior to European settlement is not known. Although accidental ignitions are currently a primary ignition source, it is also believed that native Americans were an ignition source under the pre-European settlement fire regime to which the Park's vegetation is adapted. In general, it is commonly accepted that the number of fires and the area burned in the region are less than they were before European settlement (Brose et al. 2001, Abrams 1992). Given this background information, natural background conditions are factored in to any new analyses of impacts on air quality.

Impacts Common to All of the Alternatives

FRSP is designated a Class II airshed under the Clean Air Act. This designation is intended to prevent further degradation of the airshed from anthropogenic pollutants such as those generated by industry, power plants, transportation, and burning of agricultural waste. Smoke from fire, together with all other existing air pollution sources affecting the area, must not allow violations of the National Ambient Air Quality Standards (NAAQS) for any pollutant. Under all of the alternatives, the NPS would comply with all applicable federal, Virginia Department of Environmental Quality, and local air quality requirements, including those that relate to burn permits and smoke management.

The Park does occasionally experience relatively high concentrations of ozone during the summer. High ozone levels are associated with hot, stable air masses and usually occur during the summer months. Ozone levels are particularly important because they are used to define overall air quality ratings and "alerts" posted daily during the summer months. A portion of the Park is within the 2008 Fredericksburg Nonattainment area for 8-hour ozone. Burning vegetation produces small amounts of nitrogen compounds and volatile organic compounds, which are ozone precursors. These compounds react photochemically to produce ozone downwind of a fire.

Light scattering and absorption by fine particulate matter (< 2.5 microns in diameter) strongly affect visibility. Wildland and prescribed fire smoke contains significant amounts of fine particulate matter. Treatment of wildland fire smoke emissions for visibility protection purposes is at the discretion of the State, consistent with national policies. Visibility impacts may occur anywhere in the Park, but are of particular concern on roadways and at historic scenes. Smoke impacts on roadway visibility will be discussed in detail under Transportation. Currently, there are no nonattainment areas for fine particulate matter in the vicinity of FRSP.

Under all of the alternatives, non-fire and prescribed fire treatments are planned for the Park's historic scenes. Treatment activity, such as cutting of trees and brush or burning, could degrade the view and impair visibility. However, the purpose of the activities would be to improve the vista in the long term and the impacts would be temporary (less than one day at a time, and certainly less than ten days per year at any one vista).

The assessment of smoke impacts on human health is a key to ensuring that the Park's fire program is consistent with air quality requirements. Public health impacts of smoke from wildland and prescribed fires will be discussed later under Human Health and Safety.

Smoke emissions from wildland fires would continue to occur each year under all of the alternatives. Some alternatives allow more control over when and where fires, and therefore smoke events, will occur; some alternatives allow more wildland fire use and prescribed fires than others. Large unwanted wildland fires could produce large amounts of smoke, but these would be infrequent in the lifetime of the proposed FMP.

Mitigation measures such as those described in Chapter 2 under the topic heading, Mitigation Measures Common to All of the Alternatives, apply equally to each of the alternatives.

Impacts to air quality from non-fire treatment activities would be related primarily to emissions from fossil fuel-powered tools and equipment, such as vehicles, chippers, chainsaws, and weed-whackers. The majority of impacts would be temporary, lasting only the duration of the activity, and localized, impacting only the area of the activity, and would be comparable to the impacts of everyday impacts of normal Park operations such as mowing and trail maintenance. Nonetheless, non-fire fuel treatment activities would comply with the recommendations of ozone advisories, such as decreasing the use of gasoline-powered equipment, re-fueling vehicles before 0800 or after 1700, and carpooling, as described in Chapter 2.4 Mitigation Measures Common to All the Alternatives.

Impacts Specific to Each Alternative

Alternative 1 – No Action: Fire Suppression, Prescribed Fire, and Non-fire Treatments.

Alternative 1 would have negligible to minor, short-term, localized to regional adverse impacts on air quality in and around the Park. Although it is impossible to prevent the production of some smoke from unwanted wildland fires, ignitions would be suppressed as quickly as possible and at the smallest feasible fire size, thus resulting in negligible to minor, short-term, localized impacts to air quality. Large unwanted wildland fires could have regional impacts on air quality, but would be rare during the lifetime of the FMP. Prescribed fires would be planned and conducted under conditions that will minimize impacts of smoke, as described in Mitigation Measures Common to All of the Alternatives. Approximately the 130 acres would be treated with prescribed fire over the next five years, an average of 80 acres per year. Non-fire treatments would not produce smoke at all, but would produce negligible amounts of exhaust emissions from power equipment such as chainsaws and would have negligible impacts on air quality.

Alternative 2 – Fire Suppression, Expanded Prescribed Fire, and Non-fire Treatments (NPS Preferred Alternative).

Alternative 2 would have minor to moderate, short-term, localized to regional adverse impacts on air quality in the Park, slightly more than Alternative 1.

Alternative 2 has the potential for more area burned and therefore greater air quality impacts on a yearly basis than Alternative 1. Prescribed fires would be planned and conducted under conditions that will minimize impacts of smoke, as described in Mitigation Measures Common to All of the Alternatives. Approximately 2995 acres, an average of 500 acres per year, could be burned over the next five years. Non-fire treatments would not produce smoke at all, but would produce negligible amounts of exhaust emissions from power equipment such as chainsaws and would have negligible impacts on air quality. The same area for non-fire treatments is the same as under Alternative 1.

FRSP is located near industrial and high-population-density areas and air quality, especially ozone, has been a concern for many years. The Park does experience relatively high concentrations of ozone on occasion during the summer months.

Visibility is occasionally degraded in the Park, usually during the summer months. Light scattering and absorption by fine particulate matter strongly affect visibility. Effects are greatest during the summer months because stable air masses are most common during this season. Fine particulate matter is present in wildland fire smoke. As stated above, treatment of wildland fire smoke emissions for visibility protection purposes is at the discretion of the State, consistent with national policies.

All types of fires generate fine particulate matter and ozone precursors. Unwanted wildland fires are not considered planned events for the purposes of the Clean Air Act, but prescribed fire are planned events. All of the alternatives would have minor to moderate, short-term cumulative impacts on regional air quality and visibility. Alternative 1 would contribute the least to regional air quality degradation. Mitigation measures such as those described in Chapter 2 under the topic heading, Mitigation Measures Common to All of the Alternatives, would be used to minimize these impacts.

The NPS will comply with all applicable federal, Virginia Department of Environmental Quality, and local air quality requirements, including those that relate to burn permits and smoke management.

Conclusion

All of the alternatives would have some adverse impacts on air quality in the Park. Impacts to the Class II airshed would be negligible, while impacts to ozone levels and visibility would be minor to moderate. Alternative 1 would result in the least impacts to air quality.

Floodplains and Wetlands

Methodology for Assessing Impacts

Impacts to floodplains and wetlands were qualitatively assessed by examining the hydrologic features and processes of the Park and the distribution of stream courses and wetlands, and by comparing these with the predicted effects of fire management activities, wildland and prescribed fires, and fire suppression efforts. The general procedures followed are outlined in DO 77-1 (NPS 2002) and NPS Procedural Manual for Wetland Protection (NPS 2008).

Impacts Common to All of the Alternatives

The most common impacts of fire and fire management activities on floodplains are related to changes in streamflow, as described in detail below under the topic heading, Water Resources. In brief, reduction or removal of vegetation, whether by consumption in a fire, by mechanical removal during fireline construction, or by mechanical treatment to mitigate

hazardous fuels situations, can lead to increased runoff and then to increased streamflow. This additional or sudden streamflow, which could be severe if heavy precipitation occurs shortly after a fire event or mechanical removal project, can cause scouring, alter the course of channels, and create new channels in floodplains.

Because the size of most wildland and prescribed fires would be small, the impacts on floodplains would be negligible, temporary, and localized. Although a large, severe fire could have moderate, short-term, localized impacts on floodplains, such an event is not controllable and would be rare in the lifetime of the proposed FMP. Non-fire fuels treatments could disturb soils in floodplains, but such activities would be rare in floodplains and would be planned to have negligible impacts.

Wetlands perform a wide variety of biologic and hydrologic functions in ecosystems. Biotic functions include providing fish and wildlife habitat and food sources. Hydrologic functions include flood attenuation, streamflow regulation, groundwater recharge and discharge, erosion and sediment control, and water purification.

Impacts of fire and fire management activities on wetlands are related to changes in soils, vegetation, and streamflow, all of which are described in detail below under the topic headings Soils, Vegetation, and Water Resources in this Chapter. In brief, sediment transported by overland flow after fire events or mechanical removal projects is deposited in wetlands and can carry influxes of nutrients or carbon, changing biochemical processes, or can smother emergent vegetation or alter the courses of channels. Increases in overland flow as a result of removal or reduction of vegetation will increase water inputs into wetland systems and can create new channels. Fire retardant chemicals, especially long-term retardants, have been shown to have detrimental impacts on wetlands, such as reduction in germination of wetland vegetation (Angeler et al. 2004).

However, impacts can also be beneficial. Wetland vegetation usually adapts well to the natural fire cycle of the surrounding uplands. Fires help maintain a mosaic of wetland vegetation which supports ecological diversity and can result in new, succulent vegetation which is a high-quality food source for wildlife. In the Harrison House Field, in Spotsylvania Court House Battlefield, for example, fire maintains a grassy open condition beneficial to many uncommon sedges and herbs by periodically curtailing the growth of fast-growing shrubs. Suppression activities, in particular digging of fireline and hydraulic action of water used during mop-up, can have detrimental impacts on wetlands such as channeling of water. The mitigation measures described in Chapter 2 apply to all of the alternatives and would be used to prevent or minimize these impacts.

The Spotsy Fields and the Brygider/Ashley Stream Bottoms fuels treatment projects, described in the “Five-year Plan” of Proposed Fire and Fuels Treatment Projects in Chapter 6, is the only proposed project that could impact a wetland. This proposed project is the same in both alternatives, and does not include the digging of firelines or the disturbance of soils in wetland areas. Above-ground vegetation of wetland plants would be usually be burned, but the native species would recover quickly and fire would be extinguished before it could burn organic soil layers and damage roots and underground reproductive systems of wetland plants.

Alternative 1 – No Action: Fire Suppression, Prescribed Fire, and Non-fire Treatments.

Alternative 1 would have negligible impacts on floodplains. Impacts on the extent and functions of wetlands would also be negligible. Impacts on wetland vegetation would be minor to moderate, short-term, localized, and both adverse and beneficial. Unwanted wildland fires are usually small, and prescribed fires would be planned to minimize adverse impacts, such as increases in overland water flow, and to maximize benefits, such as maintaining a vegetation mosaic.

Alternative 2 – Fire Suppression, Expanded Prescribed Fire, and Non-fire Treatments (NPS Preferred Alternative).

Alternative 2 would have negligible impacts on floodplains, the same as Alternative 1. Impacts on the extent and functions of wetlands would also be negligible, the same as Alternative 1. Impacts on wetland vegetation would be similar to Alternative 1 but largely beneficial, such as stimulating new, succulent growth (Somers et al. 2000). Although impacts from suppression activities would still occur. Adverse impacts of wildland fire use fires would be less than after unwanted wildland fires because prescribed fires are allowed to burn under specific conditions, including weather conditions, that tend to decrease the severity of Wildland fire and therefore decrease the potential for post-fire erosion and sediment transport. Non-fire treatments would not occur in floodplains or wetlands, and activities adjacent to floodplains or wetlands would be planned to have at most a negligible impact.

Cumulative Impacts

No other reasonably foreseeable, future projects within or around the Park are known that would combine with any of the above alternatives to result in cumulative impacts on floodplains or wetlands.

Conclusion

Overall, impacts from each of the alternatives to floodplains would be negligible and to wetlands would generally be minor. Alternative 2 allows the greatest opportunity for beneficial impacts, while Alternative 1 holds the greatest potential for adverse impacts. None of the alternatives would result in a loss of wetlands or affect floodplain characteristics.

Soils

Methodology for Assessing Impacts

Soil impacts were qualitatively assessed using literature review, professional judgment, and experience with comparable actions. Analysis considered risk of loss of key ecosystem components and maintenance of natural processes: alternatives that would mimic or restore natural processes were favored over those that would alter or reduce natural processes.

Impacts Common to All of the Alternatives

All fire, whether natural or human-caused, changes the cycling of nutrients and the biotic and physical properties of soils. The magnitude and longevity of effects depend on many factors, including fire regime, severity of an individual fire, vegetation and soils type before the event, topography, season of burning, and pre- and post-fire weather conditions, especially precipitation. Effects can be direct, or indirect through changes in soil biota and erosion rates. Sites supporting ecosystems that historically had frequent fire tend to be well-adapted to fire and repeated burning. Fire can influence soil biota directly by killing or injuring organisms or indirectly by altering properties of the soil environment in which organisms live. Burning usually causes a reduction in soil invertebrates and fungi while microorganisms such as bacteria usually increase in abundance (SEKI EA 2004).

Changes to soil nutrients occur in the form of shifts in composition, distribution, amount, and availability as a result of leaching, volatilization of elements during burning of fuels, and convection of ash. Volatilization is the transformation to a gaseous state, or evaporation, of soil nutrients and is temperature-dependent. Nitrogen and, to a lesser extent, sulfur and phosphorous are most easily lost because they volatilize at lower temperatures than other soils nutrients, but others may also be lost as temperature and residence time increases. Changes in above-ground vegetation, such as the removal of nitrogen-fixing plant species, can indirectly impact soils and interact with soil nutrient status (Newland and DeLuca 2000 *in* SEKI EA 2004). Consumption of dead and down fuels by fire releases nutrients stored in the biomass and makes it available to plants by convection or leaching of ash.

Changes in physical characteristics of soil following fire are the result of many complex interactions. Fire can cause changes in organic horizons, water repellency, infiltration capacity, porosity, structure, temperature, hydrologic properties, and processes of erosion. Fire may result in increased potential for erosion through removal of above-ground biomass which holds soil in place and sometimes even reduction or removal of organic soil layers. The more severe the fire the greater the potential for erosion, because severe fires remove more biomass. Prescribed fires generally result in less erosion than uncontrollable wildland fire, because wildland fires are usually more severe than prescribed fires (Wohlegmuth et al. 1999 *in* SEKI EA 2004). Other factors, such as steepness of the slope and pre-fire vegetation, also affect post-fire erosion.

Fire suppression activities can also have impacts on soils. Construction of fireline disturbs and mixes soil horizons; the effect is generally localized, but the wider the fireline, the greater the disturbance. Firelines can become channels for water transport, causing rutting and severe erosion in the fireline itself if heavy rains occur before the fireline is rehabilitated naturally or deliberately. Aerial water application involves dropping large volumes of water from airplanes or helicopters. Because the water may fall a large distance (up to several hundred feet), it arrives with considerable force. This can promote rutting and channeling in localized areas. The effects of fire retardant chemicals are similar to the effects of applying high-nitrogen fertilizer to the soil; for example, post-fire re-growth of grasses may be favored over re-growth of forbs such as clover. These effects can last up to ten years (Larson and Duncan 1982). Aerial application of fire retardants carries with it the effects of both fertilizer application and the rutting potential of high-velocity water.

Non-fire treatments generally have negligible impacts on soils. Impacts, when they do occur, are direct and may be the result of mechanical disturbance of the soil surface, soil compaction from heavy equipment, or erosion in ruts from vehicle tires. Many minimum impact suppression tactics (MIST), such as those described in Chapter 2, apply equally well to non-fire activities and will apply to all of the alternatives equally to minimize impacts on soils from non-fire treatment activities.

All of the alternatives allow fire to occur within the Park and therefore all of the alternatives would result in changes to soils properties and processes. In addition, all of the alternatives would result in impacts to soils from fire-related management activities such as fireline construction and water application.

Impacts Specific to Each Alternative

Alternative 1 – No Action: Fire Suppression , Prescribed Fire, and Non-fire Treatments.

Alternative 1 would have minor to moderate, short-term, localized impacts on soil resources in the Park. Some impacts would be adverse while others would be beneficial. Aggressive suppression of all wildland fires with emphasis on extinguishing each fire at the smallest possible size would result in adverse impacts to soils including physical restructuring of soil horizons from digging of fire lines, channeling and erosion in fire lines, and tying up of nutrients in both live and dead and down biomass. Prescribed fire would have fewer adverse impacts, such as restructuring and erosion, and more beneficial impacts, such as release of nutrients.

Alternative 2 – Fire Suppression, Expanded Prescribed Fire, and Non-fire Treatments (NPS Preferred Alternative). Alternative 2 would have minor to moderate, short-term, localized impacts on soil resources in the Park. Some impacts would be adverse while others would be beneficial. For example, managers could let a wildland fire burn out to a natural or man-made barrier like a stream or trail instead of digging fireline. Non-fire treatments would be expected to have at most a negligible impact on soils.

Cumulative Impacts

Present and reasonably foreseeable future actions have and continue to contribute impacts to soils in and around the park. These projects include road restoration and both Wildland and prescribed fire. The road restoration project in the park will have a negligible to minor, short term impact on soils. Any new road construction will be offset by equal or more removal of pavement reducing impervious surfaces, thereby decreasing rainfall run-off. Best Management Practices will be used when soil disturbance occurs. Fire suppression, prescribed fire, and non-fire treatments will have minor, short-term affects on the soils in the park. Wildland fire control, where possible, will use streams, manmade fire obstacles, and trails as fire lines; avoiding soil disturbance. Prescribed fire will rarely disturb the soils, fire intensity will be low enough so as to not change soil composition, short term impacts will occur from run-off, but will be filtered by unburned wetlands. These practices will result in minor, short-term, and very localized impacts.

Impacts would be minor and very localized, depending on local projects throughout the Park.

All of the alternatives would result in minor to moderate impacts on soil resources. Alternative 2 would give managers at the Park the widest range of tools to choose from to minimize adverse impacts from any particular project or event.

Threatened and Endangered Species

Methodology for Assessing Impacts

Impacts to threatened or endangered species were qualitatively assessed by means of a literature review of the effects of fire on these species, consultation with biologists, and professional judgment. Analysis of the alternatives considered the potential for take of individuals protected as threatened or endangered, the potential for loss of viable populations or special concern species, and the potential for loss, maintenance, or restoration of habitat. No critical habitat, as defined by 50 CFR 17.95, has been identified in the Park so the potential for loss of critical habitat was not analyzed. The U.S. Fish and Wildlife Service, Virginia Field Office, and the Commonwealth of Virginia Department of Conservation and Recreation (DCR) Division of Natural Heritage were consulted in this analysis.

The following species are considered individually in this analysis:

- Small whorled pogonia *Isotria medeoloides* is Federally listed as threatened and State-listed as endangered.
- Red Milkweed *Asclepias rubra* is state listed as vulnerable.

Impacts Common to All of the Alternatives

Small whorled pogonia is an orchid about 1 foot (30 cm) tall with whorled leaves, a hollow stem, and inconspicuous, yellow-green to white flowers that appear in late spring and early summer. It occurs on mesic, acid soils on slopes with good water drainage in open, mixed evergreen and deciduous forests (NatureServe 2004). It occurs only in Spotsylvania County in the Park. Its response to fire is unknown, but orchids as a family are sensitive to disturbance. The single known colony of this orchid are mapped, and these areas will be avoided during prescribed fire and non-fire treatment. In addition, these areas will be considered biologically sensitive areas as described in Chapter 2 under the Biological Resources section of the topic Mitigation Measures Common to All of the Alternatives.

Two populations of the state listed vulnerable ranked plant, Red Milkweed *Asclepias rubra* were recorded in the 1993 final report (Ludwig, 1993). The plants were found at two locations. The first location, adjacent to Stuart Drive, had one sterile plant when observed in July 1990. The second location, in the headwaters of Little Hunting Run, is in a partially open, low-nutrient groundwater seepage area. Nine sterile plants were observed in October 1992. Management recommendations provided in the 1993 final report include monitoring the long-term health of the plant population, land use, and management practices and

consulting with Department of Natural Heritage staff to avoid negative impacts to the rare plant should land use or management practices change.

The swamp milkweed *Asclepias incarnata* has been found, and indeed, flourishing in Spotsylvania Courthouse Battlefield, in an area that has been burned repeatedly for the last four years, and it was not seen previously in this location.

The U.S. Fish and Wildlife Service, Virginia Field Office, confirmed that the small whorled pogonia is the only Federally listed species known to occur in the Park and concurred with the above analysis.

The Commonwealth of Virginia Department of Conservation and Recreation (VA DCR), Division of Natural Heritage, does not anticipate that any of the proposed alternatives will adversely impact natural heritage resources in the Park. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations. In addition, VA DCR files do not indicate any State Natural Area Preserves under DCR's jurisdiction in the vicinity of the Park.

Under a Memorandum of Agreement established between the VA DCR and the Virginia Department of Agriculture and Consumer Services (VA DACS), the VA DCR represents VA DACS in comments regarding potential impacts on State-listed threatened and endangered plant and insect species. VA DCR has determined that none of the alternatives will adversely affect any documented State-listed plants or insects.

Impacts Specific to Each Alternative

Alternative 1 – No Action: Fire Suppression, Prescribed Fire, and Non-fire Treatments. Alternative 1 would have negligible impacts on threatened or endangered species. Although unwanted wildland fire events could have adverse impacts, these events are not controllable under any of the alternatives. Because the distribution in the Park of most of these species is small and known, suppression and prescribed fire activities would be planned to protect these species.

Small whorled pogonia – may affect, not likely to adversely affect
Swamp milkweed – may affect, not likely to adversely affect

Alternative 2 – Fire Suppression, Expanded Prescribed Fire, and Non-fire Treatments (NPS Preferred Alternative). Like Alternative 1, Alternative 2 would have negligible impacts on threatened or endangered species. Because the distribution in the Park of most of these species is small and known, suppression, prescribed fire, wildland fire use, and non-fire treatment activities would be planned to protect or benefit these species.

Small whorled pogonia – may affect, not likely to adversely affect
Swamp milkweed – may affect, not likely to adversely affect

There are no particular reasonably foreseeable future projects or actions that, in conjunction with any of the alternatives, would threaten the continued existence of any listed species.

Conclusion

All of the alternatives would have negligible impacts on threatened or endangered species. Alternative 2 has the greatest potential for minimizing adverse impacts and gaining benefits, because it offers managers the widest array of tools to accomplish resource objectives.

Vegetation

Methodology for Assessing Impacts

Impacts to vegetation were qualitatively assessed by means of a review of Park documents concerning the fire ecology in the region, consultation with Park specialists, and professional experience with similar actions. Factors considered included resemblance to the historical fire regime and maintenance or restoration of historical plant communities.

Impacts Common to All of the Alternatives

Historical and ecological evidence indicates that fire has been a part of the forest disturbance regime for thousands of years (Brose et al. 2001, Lorimer 1993, Van Lear and Watt 1993, Abrams 1992). Because of this, fire has played a significant role in shaping the vegetation communities of the Park.

In recent decades, drier oak / heath and oak - hickory forests throughout the eastern United States have progressively exhibited compositional changes characterized by a lack of oak recruitment and the abundant establishment in understories of shade-tolerant, later-successional trees (Lorimer 1984; Abrams 1992, 1996). The principal reasons for these changes are believed to be the widespread exclusion of fire during the twentieth century, as well as the cessation of other disturbances (e.g., repeated cutting on short rotations) that favor oaks. In the mid-Atlantic region, red maple (*Acer rubrum*) and American beech are two of the most abundant, shade-tolerant invaders of oak forests, and this trend is evident over parts of Fredericksburg and Spotsylvania National Historical Park. As a result, stands of Acidic Oak - Hickory Forest and Mesic Mixed Hardwood Forest in the Park may be intergradational and difficult to distinguish, given the spread of American beech throughout oak-hickory understories. American beech is scarce in this part of the study area, possibly because of unfavorable Nason, Tatum, and Catharpin soils with somewhat impermeable, clayey subsoils with moderate shrink-swell potential (Elder 1985). Even the more adaptable red maple is less abundant here than in most other parts of the region. This forest type is adapted to periodic fire. Surface fire reduces competition for oak seedlings and maintains an open canopy, allowing more light penetration. The majority of canopy species are tolerant of surface fire when mature. Most associated species are prolific sprouters, and many stems develop as a result of the passage of a fire. In the absence of fire, the regeneration layer of many oak

forests is becoming dominated by later seral species such as maple and birch (Brose et al. 2001).

Forested wetlands cover 13.6% (1062 acres) of the Park area. These classes include alluvial floodplain forests, found in drainage swales and on floodplains, and non-alluvial wetlands that occur away from active floodplains in various environmental settings in the Park. These forested wetlands rarely, if ever burn due to high water tables, and saturated soils. If a Wildland fire were to occur during a drought, significant organic soils would be destroyed, however, these areas will not be affected by prescribed fire, as prescribed fires are only used during normal weather conditions – not during drought conditions.

Early successional or transitional vegetation covers 26.2% of the land in the Park (2,046 acres). Classes representing early successional or transitional vegetation are Successional Virginia Pine Forest, Successional Tuliptree Forest, Successional Red-cedar Forest, Successional Mixed Scrub, and Beaver Wetland Complex. This vegetation is the result of relatively recent (20–60 yrs) abandonment of fields or tree canopy removal by disturbances such as wind disturbance, beaver activity, or silvicultural practices. The upland stands are dominated by early successional, weedy tree species in the canopy and subcanopy, and have high cover of nonnative invasive plants in the shrub and herbaceous layers. Beaver-disturbed areas typically occur as semipermanently flooded habitat variously dominated by trees, shrubs, herbs, or open water. All of these classes are rapidly changing in species composition and vegetation structure, and if invasive species and beaver activity can be kept in check or eliminated, the stands will eventually succeed into one of the later successional forest types mapped in the Park. The most prevalent nonnative invasive species documented in the Park during this study are Japanese honeysuckle (*Lonicera japonica*), Nepalese browntop (*Microstegium vimineum*), mutliflora rose (*Rosa multiflora*), and Chinese privet (*Ligustrum sinense*). These vegetation covers are generally a shade-intolerant species and are adapted to disturbance, but as a whole these forests occur on mesic sites where fires are uncommon. Most species would be top-killed by fire, but would begin to recover within a year, primarily by re-sprouting but also by other means such as off-site seed sources.

As described under Affected Environment, many non-native invasive plants are present in the Park. It is important to address invasive plant threats early after forest disturbances such as wildfire and mechanical fuel treatments, because nonnative plants can invade quickly after disturbance and crowd out native vegetation, resulting in loss of native vegetation, loss of wildlife habitat, and reduction in species diversity of both plants and animals. Non-native plants that invade aggressively after disturbance in the Park include oriental bittersweet, tree of heaven, Japanese stiltgrass, Canada thistle, and oriental lady's thumb. However, fire may also be used as a tool in the management of nonnative plants.

For example, fire can be used to stress plants during the growing season and make them more susceptible to herbicides, or fire can be used to remove dead or live vegetation, temporarily or permanently, to make it easier for personnel to gain access to apply herbicides to nonnative plants.

Fireline construction during suppression activities could result in removal of trees, shrubs, and lower tree branches and cutting or trampling of grass and herbaceous layers, resulting in negligible to minor, short-term, localized, adverse impacts to vegetation. Non-fire treatments to mitigate hazardous fuels conditions would also result in these impacts, but treatments

would impact a very small area relative to the size of the Park and would be intended to have direct or indirect beneficial impacts, such as removal of invasive species and allowing more light penetration by thinning the understory.

Impacts Specific to Each Alternative

Alternative 1 – No Action: Fire Suppression , Prescribed Fire, and Non-fire Treatments.

Alternative 1 would have minor to moderate, short- to long-term, localized to regional, largely adverse impacts on the vegetation in the Park. Suppression activities, when conducted according to the mitigation measures outlined in Chapter 2 under the topic heading Mitigation Measures Common to All of the Alternatives, would have minor, short-term, localized, adverse impacts on vegetation. Prescribed fire would be planned to have minor to moderate, short- to long-term, localized, beneficial impacts on vegetation, but could not be used to treat large areas of the Park. Under Alternative 1, approximately 130 acres would be treated with prescribed fire. However, this is only a small percentage, less than 1%, of the total area of the Park that is adapted to fire. The remaining 99% of the Park's fire-adapted vegetation communities could experience long-term, minor, and adverse impacts such as failure of oak and pine species to reproduce and recruit successfully.

Alternative 2 – Fire Suppression, Expanded Prescribed Fire, and Non-fire Treatments (NPS Preferred Alternative). In contrast to Alternative 1, Alternative 2 would have minor to moderate, short- to long-term, localized to regional, beneficial impacts on the Park's vegetation communities. Suppression and prescribed fire activities would have the same impacts as under Alternative 1. Approximately 2995 acres would be treated with prescribed fire; this is more than under Alternative 1, but still only about 1.5% of the fire-adapted communities of the Park. Non-fire treatments would be planned to minimize adverse impacts and maximize benefits and would affect only a very small proportion of the Park as a whole.

Cumulative Impacts

There are many factors impacting the Park's and the region's vegetation communities, including air quality that hovers between remaining poor and improving slightly, climate change, invasion by nonnative pests and pathogens, an increase in nonnative invasive plants and animals, and a long history of fire exclusion. Out of all of the previously mentioned cumulative impact projects, road rehabilitation throughout the Park could result in permanent or temporary removal of vegetation in localized areas along the Park roads, but, being offset by the removal of road surfaces, and the subsequent restoration of vegetation in the asphalt removal areas. Another possible cumulative impact would result from herbicide treatment of invasive species within treatment units. One of the objectives of each of these treatments is reduction of invasive, usually exotic, species. The total impact of these other projects and actions is negligible to minor, and short to moderate term impacts.

Alternative 1 would be negligible to minor because Alternative 1 would continue the detrimental impacts of excluding fire from fire-adapted ecosystems. Alternative 1 would contribute a negligible increment to the overall cumulative impact.

The overall cumulative impact of the other projects and actions plus the impacts of Alternative 2 would be negligible to minor because Alternative 2 would promote fire in more areas in the Park and tend to undo past damage as well as reduce future detrimental impacts. The contribution of Alternative 2 to the overall cumulative impact would be negligible.

Conclusion

Overall, Alternative 1 would have negligible short-term impacts on vegetation, and moderate beneficial impacts on vegetation; while Alternatives 2 would have beneficial impacts – more areas burned.

Water Resources

Methodology for Assessing Impacts

Impacts to water resources were qualitatively assessed based on professional judgment and experience with comparable actions applied to the general hydrologic conditions at FRSP. Impacts were examined with respect to conformity with the provisions of the Clean Water Act and to the degree to which impacts are beneficial to resource conditions.

Impacts Common to All of the Alternatives

Important components of water resources include the hydrologic cycle, streamflow regimes, sedimentation, water chemistry, and water temperature (DeBano et al. 1998 *in* SEKI EA 2004). Fire affects water quantity, quality, chemistry, and physical and biotic characteristics. Effects vary according to the severity, size, season, frequency, and location on the slope of a fire, and according to post-fire weather, primarily precipitation (Elliot and Vose 2005, Clinton et al. 2003, Neary and Currier 1982).

The primary sources of nutrient input into streams are geological weathering and atmospheric deposition. Fire can cause changes in nutrient levels through ash fall during a fire event and leaching afterwards. Other characteristics of water chemistry, such as buffering capacity and therefore pH, can also be impacted in similar ways. Depending on the percent of the watershed burned and the severity of the fire, these effects can be insignificant or can last a year or more (Minshall 2001, Megahan and Hornbeck 2000, Swank and Vose 1997).

The most common way fire can alter water conditions is by increasing the temperature of the water. Many stream courses, particularly narrow courses like most of those at the Park, are shaded by adjacent and overhanging vegetation. Reduction or removal of this vegetation can allow additional sunlight to penetrate to water surfaces and increase the temperature of the water. These impacts may last several years as vegetation re-grows and may affect stream reaches below the location of the fire as warmer water flows downstream.

Increases in streamflow discharge often occur following fire due to the reduction or removal, through combustion, of vegetation and organic soil layers. Reducing these layers decreases

interception and infiltration and therefore increases the overland and subsurface flow of water. These effects are usually short-term, with streamflow returning to pre-fire levels as vegetation and litter layers recover (SEKI EA 2004).

Sediment is eroded soil particles transported into water channels by overland flow (DeBano et al. 1998 in SEKI EA 2004). Impacts of fire will be greatest where slopes are steep, soils are shallow, and high-intensity rainfall, such as severe thunderstorms, is common. Like streamflow discharge, effects are usually short-term, returning to pre-fire levels as vegetation and litter layers recover (SEKI EA 2004).

Suppression and other fire management activities, especially mechanical non-fire treatments, can also impact water resources. Disturbance of soil and litter layers during fireline construction and mechanical removal of vegetation can increase sedimentation. Fire retardant chemicals can be dropped or carried by overland flow into water, causing nutrient influxes and changes in pH. Streamflow or water quantity may be temporarily reduced by removing water from stream courses or water bodies using pumps or helicopter water buckets.

Some changes to characteristics of water resources, such as nutrient levels, pH, temperature, streamflow, and sedimentation, would occur under all of the alternatives.

Impacts Specific to Each Alternative

Alternative 1 – No Action: Fire Suppression, Prescribed Fire, and Non-fire Treatments.

Alternative 1 would have negligible to minor, short-term, localized to regional, adverse impacts on water resources in the Park. Aggressive suppression of all wildland fires with emphasis on extinguishing each fire at the smallest possible size would result in impacts to water resources including short-term nutrient influxes, temporary changes in pH, increased temperatures, short-term increases in stream flow, and reduction in water volume due to removal of water for suppression purposes. Prescribed fire would have fewer impacts, because projects could be planned to burn riparian vegetation (vegetation growing near the water course) in controlled conditions thereby burning less severely and thus remove less vegetation and litter layer, which would lead to less sedimentation and less increase in stream flow. Impacts from prescribed fire would be negligible to minor, temporary, and localized. Non-fire treatments would continue in open wetland areas, leading to minor, temporary, and localized impacts on sedimentation and streamflow.

Alternative 2 – Fire Suppression, Expanded Prescribed Fire, and Non-fire Treatments (NPS Preferred Alternative). Alternative 2 would have negligible to minor, short-term, localized to regional, adverse impacts on water resources in the Park. Overall, impacts would be less than those of Alternative 1. Impacts would be similar to those of Alternative 1, but Alternative 2 allows managers to select strategies that minimize adverse impacts to natural resources rather than focusing on extinguishing the fire at the smallest possible size. For example, managers could let a wildland fire burn out to a natural or manmade barrier like a stream or trail instead of digging fireline. Non-fire treatments would be expected to have at most a negligible, temporary impact on water resources if vegetation were reduced or removed adjacent to and in riparian areas. However, with increased prescribed fire, additional wetland areas could be burned, keeping non-fire treatment equipment and personnel out of the open wetland areas in

historic vistas – thereby reducing overall impacts to streamflow and sedimentation – while maintaining the historic scene.

Cumulative Impacts

The road rehabilitation project could result in minor, adverse impacts on water resources through possible siltation of streams, but since one objective of the project is to improve drainage along the roadway, adverse impacts would be temporary and beneficial impacts would be long-term. Fire management activities throughout the Parks would not be expected to combine with this project to contribute to cumulative adverse impacts because the two activities would not occur at the same time. In the places where herbicides are used to treat exotic or invasive species, this could combine with the nutrients released by burning and leach into water resources but this is unknown, nor are the potential impacts known. However, mitigation measures from Chapter 2.4 used to protect soils and water resources would minimize these impacts.

Conclusion

All of the alternatives would result in negligible to minor, short-term impacts to water resources. Alternative 2 would give managers at the Park the widest range of tools to choose from to minimize impacts from any particular project or event.

Wildlife and Fisheries

Methodology for Assessing Impacts

Impacts to wildlife and fisheries were qualitatively assessed based on professional judgment and experience with comparable actions. Impacts were examined under the assumption that native wildlife and fish populations in the Park evolved in the presence of, and are therefore to some degree adapted to, fire. In accordance with this assumption and with NPS policy, the loss of individual animals was not considered in assessing impacts of the alternatives. Area affected by fire, maintenance of habitat diversity, and risk of catastrophic loss of habitat were considered in evaluating the environmental consequences of the alternatives. Impacts on special status species, where the loss of individual animals could be important, were assessed separately in this Chapter under the heading Threatened and Endangered Species.

Impacts Common to All of the Alternatives

Fire and fire management activities affect wildlife to the extent that they affect vegetation. The fire itself and associated smoke can cause the death of individual animals, but this is insignificant to the population as a whole. Consumption or mechanical removal of vegetation or fuels can also remove or reduce habitat for certain species, such as when consumption of large dead and down fuels or removal of snags reduces habitat for small mammals or cavity-nesting birds, but it equally increases habitat or prey for other species, such as when raptors can hunt easily for exposed small mammals, when large trees are killed and become snags, or when succulent new growth provides browse for deer. The mosaic pattern of most fires

creates a natural diversity of habitat while leaving refugia for fire-sensitive species. Although impacts to wildlife would be moderate and long-term, there would be both adverse and beneficial impacts.

Fire and fire management activities affect fisheries to the extent that they affect water resources. Fire retardant chemicals can be toxic to fish and other aquatic wildlife. Changes in water resources also change habitat for water-dwelling species; for example, an increase in water temperature due to reduction in canopy cover, whether by prescribed fire or by non-fire treatments such as mechanical removal, may make water too warm for certain fish species. Another example is when increased sediment influx makes the water column too silty for certain species. Because impacts to water resources would be negligible to minor, impacts to fisheries resources would also be negligible to minor.

Non-fire treatment activities, especially mechanical treatments, would be expected to have negligible to minor impacts on wildlife and negligible impacts on fisheries. Impacts on wildlife would be primarily from modification of vegetation resulting in alteration of habitat, and impacts would be similar to those from modification of habitat by fire. Activity and noise related to vegetation removal could have impacts: individuals could be alarmed or frightened away. These impacts would be negligible because non-fire treatment areas are small so animals would have plenty of places to go to and not far to get there to avoid the disturbance, treatments usually take place slowly so animals would have time to escape, and few individuals would be disturbed relative to the population as a whole. Activities would be planned to minimize impacts on fisheries – for example, by leaving sufficient shading over watercourses and by not depositing debris into watercourses.

Impacts Specific to Each Alternative

Alternative 1 – No Action: Fire Suppression, Prescribed Fire, and Non-fire Treatments.

Alternative 1 would have minor to moderate, short- to long-term, localized, adverse and beneficial impacts on wildlife and fisheries in the Park. Aggressive suppression of all wildland fires with emphasis on extinguishing each fire at the smallest possible size would result in impacts to vegetation and water resources, such as reduced sprouting of riparian vegetation and sedimentation, which would have adverse impacts on wildlife and fisheries, such as reduced nutrient-rich browse and changes in water pH. Suppressing wildland fires at the smallest possible size would prevent large fires from burning in mosaic patterns and would therefore reduce natural habitat diversity. Prescribed fire would have fewer adverse impacts and far more beneficial impacts, because projects would be planned to minimize adverse impacts to vegetation and water resources and to maximize benefits to wildlife and fisheries, such as increasing browse or exposing prey.

Alternative 2 – Fire Suppression, Expanded Prescribed Fire, and Non-fire Treatments (NPS Preferred Alternative). Alternative 2 would have minor to moderate, short- to long-term, localized, largely beneficial but occasionally adverse impacts on wildlife and fisheries in the Park. Overall, adverse impacts would be less than those of Alternative 1 and benefits would be greater. Impacts would be similar to those of Alternative 1 but Alternative 2 allows managers to select strategies that minimize adverse impacts to natural resources rather than focusing on extinguishing the fire at the smallest possible size, and maximizing opportunities

for creation of natural vegetation mosaics. Over time, the impacts of wildland fire would be largely beneficial - for example, by creating mosaics for habitat diversity. Non-fire treatments reducing or removing vegetation adjacent to riparian areas could have a negligible, temporary impact on wildlife and fisheries. Expanded prescribed fire would produce long-term beneficial impacts by being more likely to create mosaics in forested areas.

Cumulative Impacts

There are many factors impacting the Park's and the region's wildlife and fisheries communities, including air quality that hovers between remaining poor and improving slightly, climate change, invasion by nonnative pests and pathogens, an increase in nonnative invasive animals, and a long history of fire exclusion. Out of all of the previously mentioned cumulative impact projects, road rehabilitation throughout the Park could result in temporary disturbance to wildlife from machinery, and removal of vegetation in localized areas along the Park roads, but, being offset by the removal of road surfaces, and the subsequent restoration of vegetation in the asphalt removal areas and removal of disturbance from road equipment. Another possible cumulative impact would result in individual deaths of wildlife from treatment, and short-term changes vegetation coverage within treatment units. However, wildlife impacts would be minor, and recover quickly. The total impact of these other projects and actions is negligible to minor, and short to moderate term impacts.

Alternative 1 would be negligible to minor because Alternative 1 would continue the detrimental impacts of excluding fire from fire-adapted ecosystems. Alternative 1 would contribute a negligible increment to the overall cumulative impact.

The overall cumulative impact of the other projects and actions plus the impacts of Alternative 2 would be negligible to minor because Alternative 2 would promote fire in more areas in the Park and tend to undo past damage as well as reduce future detrimental impacts. The contribution of Alternative 2 to the overall cumulative impact would be negligible to minor, and short-term in duration.

The road rehabilitation projects could result in minor, temporary disturbance of wildlife and in the permanent loss of very small amounts of vegetation and therefore wildlife habitat alongside the roadway. However, these impacts would be unlikely to combine with fire management activities to contribute to cumulative adverse impacts as they are not in the same areas of the park, and the road rehabilitation project has a small footprint.

Although ash fall and sediment transport during and after fire events would contribute incrementally to pollution inputs, wetlands will filter ash and sediment run-off from the burned areas until green-up occurs, thereby making these inputs short-term in duration, localized to the burn areas, and have a negligible impact on wildlife and fisheries in the park.

All of the alternatives would result in minor to moderate, short- to long-term, localized, beneficial and adverse impacts to wildlife and fisheries. Alternative 2 would give managers at the Park the widest range of tools to choose from to manage impacts.

4.2 Cultural Resources

Methodology for Assessing Impacts

Impacts on cultural resources were assessed qualitatively through review of Park literature, consultation with Park cultural resource experts, professional judgment, and experience with similar actions. The effects of fire on cultural resources are not well understood or documented. Thus, the following discussion of potential impacts of fire and fire management on cultural resources is general and somewhat speculative. Impacts were assessed based primarily on the likely extent of ground disturbance and the level of pre-planning possible to mitigate impacts.

Impacts Common to Archeological and Historical Resources and Cultural Landscapes

Unwanted wildland fire is unpredictable and therefore impacts are uncontrollable. However, impacts from suppression activities are controllable to a certain degree.

Mitigation described in Chapter 2 under the topic heading Mitigation Measures Common to All of the Alternatives would help prevent adverse impacts to the Park's known cultural resources and would reduce the likelihood of impacts to unknown sites. Due to the limited nature of the information about the Park's cultural resources, it is possible that some unknown sites, structures, or objects could be impacted during a fire event.

Archeological Resources

Impacts Common to All of the Alternatives

Historical and ecological evidence suggests that fire has been a part of the landscape at FRSP for thousands of years; in fact, evidence suggests that Native Americans themselves lit fires, accidentally and intentionally (Abrams 2003, Brose et al. 2001). If so, this suggests that archeological resources have survived fires in the past. The risk to archeological resources is from both the ground disturbance associated with building of fireline and from the heat and flames of the fire itself.

Significant archeological sites often contain buried culturally-related items of metal, glass, fabric, ceramics, bone and other materials. Clearing firelines associated with prescribed fire preparation and fire suppression activities can damage subsurface archeological resources by exposing, crushing, rearranging, or removing them. Resources can be physically damaged or destroyed, and the scientific information they could furnish is often lost forever when they are disturbed or removed from their context.

The amount of surface and subsurface heating has a direct impact on buried archeological resources. The three major factors involved in determining the nature and extent of soil heating are fire intensity, duration of heat, and heat penetration into the soil. Fuel loading, fuel moisture content, and weather are considered to be the most important influences on fire intensity. Hotter surface fires penetrate more deeply into the subsurface and can potentially cause more damage. On several documented wildfires in the southwest, the severity of burning at sites seemed to correspond closely to the density of the fuel load adjacent to and on the site. Research with in-place artifacts during prescribed fires in Minnesota state parks indicates that depth of heat penetration is related to soil texture and moisture. Soil heating occurred to a greater depth on sandy and rocky soils, while soils high in clay had limited heating (GRPO 2004). Clay soils are common in the Park.

The vulnerability of subsurface archeological resources and artifacts to fire depends not only on the intensity of the fire and on soil moisture but on the nature of the materials themselves. Besides being directly consumed by fire, artifacts can be physically or chemically altered by heat. For example, glass bottles can be cracked or broken, while objects carved or chipped from stone are likely to be more resistant to fire and heat. Several current dating techniques are no longer useful after the artifact has been exposed to even low intensity fires (GRPO EA 2004).

Non-fire fuel treatments, especially mechanical treatments, can also have impacts on archeological resources. As with fire suppression activities, soil disturbance can damage subsurface archeological resources by exposing, breaking, crushing, trampling, rearranging, or removing them, but treatment activities would be carefully planned and approved by cultural resources staff to minimize the chances that such damage could occur.

Impacts Specific to Each Alternative

Alternative 1 – No Action: Fire Suppression , Prescribed Fire, and Non-fire Treatments. Alternative 1 could have minor to moderate, permanent, localized impacts, such as crushing or scattering during suppression activities, on archeological resources from suppression activities. Prescribed fire activities would be planned to have negligible impacts on archeological resources. Overall, impacts would be negligible to minor, permanent, and localized.

Alternative 2 - Fire Suppression, Expanded Prescribed Fire, and Non-fire Treatments (NPS Preferred Alternative). Alternative 2 would have fewer impacts than those of Alternative 1. Impacts from suppression activities would be fewer because an appropriate management response would allow fires to be suppressed at a larger size if such a strategy would minimize damage to archeological resources - for example, by using natural or manmade barriers instead of constructed fireline to stop fire spread. Through activities such as those described in Chapter 2 under the topic heading Mitigation Measures Common to All of the Alternatives, prescribed fire and non-fire treatments would be planned to have negligible impacts on archeological resources. Overall, impacts would be negligible to minor, permanent, and localized.

Archeological resources are limited, non-renewable, and often fragile. Over time, forces such as corrosion, erosion, microbial action, weathering, rainfall, oxidation, and vandalism all take their toll on the continued existence and integrity of these resources. Post-fire observations are often unable to distinguish between damage to archeological resources caused by the fire itself and damage that was pre-existing. Wildland fire will be managed so as to have minimal impact by choosing locations to construct firelines, or to use existing natural or manmade fire breaks. Prescribed fire will be managed to be culturally sensitive; so as to choose areas with little or no chance of disturbing the archaeological record. Overall cumulative impacts would be negligible to minor, and localized, however, if a culturally sensitive area were to be disturbed, the impacts would be long-lasting.

Conclusion

All of the alternatives could have some adverse impacts on archeological resources. Alternative 1 has the greatest potential to cause impacts to archeological resources because it involves the most aggressive suppression activities. Alternative 2 would have similar impacts.

Cultural Landscapes

Impacts Common to All of the Alternatives

Significant cultural landscapes are usually associated with human-altered natural features or with historic districts. They are impacted by fire or fire management activities insofar as the fire or activities alter the vegetation or soils of the landscape. Prescribed fire and non-fire treatment activities will be planned to prevent impacts to known cultural landscapes. Under both alternatives, some prescribed fire treatments are planned to assist in the maintenance of cultural landscapes, such as by using fire to maintain a clearing that was historically maintained; these would be beneficial impacts. Pre-planning for wildland fire will minimize the possibility of impacts to known cultural landscapes. Therefore, the greatest potential for adverse impacts is from fire suppression activities such as ground disturbance and clearing of brush to create fireline. Prescribed fire can have an impact by opening up canopy, changing the vista, or changing the characteristic vegetation which may affect a cultural landscape. Non-fire treatments can adversely affect cultural landscapes by removing vegetation that may be important to a historic scene and can have beneficial impacts by reducing the risk from unwanted wildland fire by reducing fuels.

Impacts Specific to Each Alternative

Alternative 1 – No Action: Fire Suppression, Prescribed Fire, and Non-fire Treatments. Alternative 1 could have minor to moderate, short- to long-term, localized impacts on cultural landscapes from suppression activities. Prescribed fire activities would be planned to have negligible impacts. Overall, impacts would be negligible to minor, temporary to long-term, and localized.

Alternative 2 - Fire Suppression, Expanded Prescribed Fire, and Non-fire Treatments (NPS Preferred Alternative). Alternative 2 would have fewer impacts than Alternative 1. Impacts from suppression activities would be fewer because an appropriate management response would allow fires to be suppressed at a larger size if such a strategy would minimize damage to cultural landscapes. Prescribed fire and non-fire treatments would be planned to have negligible impacts. Overall, impacts would be negligible to minor, temporary to long-term, and localized.

Cumulative Impacts

There are many factors impacting the Park's cultural landscapes, including succession, climate change, invasion by nonnative pests and pathogens, an increase in nonnative invasive plants, lack of maintenance for upkeep, and outright vandalism. Succession is a naturally occurring event; over time, if the Park does nothing to maintain the landscape, the open fields will turn into mature hardwood forests. If the Park does nothing to manage nonnative pests, the park will be overrun with exotic plants, and will lose native bio-diversity of the existing open fields. The park is currently managing the open fields of our cultural landscape with a combination of bush-hogging and prescribed fire. This management regime is precluding succession, and aiding in controlling exotic invasive pests, while also decreasing needed bush-hogging. While Alternative 1 could combine with these impacts to worsen the condition of cultural landscapes by exposing them to potentially destructive suppression activities, Alternative 2 would not be likely to contribute incrementally to adverse impacts to cultural landscapes. Overall, Alternative 2 will likely have more positive, long-term cumulative impacts.

Conclusion

All of the alternatives could have some adverse impacts on cultural landscapes. Alternative 1 has the greatest potential to cause impacts to cultural landscapes because it involves the most aggressive suppression activities. Alternatives 2 would have similar impacts, less than those from Alternative 1.

Historical Resources

Impacts Common to All of the Alternatives

Fires themselves can and often do destroy historic structures or properties, especially those constructed of wood or other flammable material. Direct ground disturbance associated with the building of fire lines and with mechanical fuel treatment activities can impact historic resources directly. Mechanical activities can physically damage or move resources or parts of resources. Besides being directly scorched or consumed by fire, resources can be chemically or physically altered by heat. For example, several dating techniques are no longer useful after the resource has been exposed to even relatively low intensity fires.

Fire management activities can also provide beneficial impacts to historical resources. In particular, both prescribed fire and non-fire fuel treatments can be used to reduce fuels around historic structures to minimize the risk in the event of an unwanted wildland fire.

Impacts Specific to Each Alternative

Alternative 1 – No Action: Fire Suppression, Prescribed Fire, and Non-fire Treatments.

Alternative 1 could have minor to moderate, permanent, localized, adverse impacts on historical resources. Prescribed fires and non-fire treatments would be planned to have negligible adverse impacts on historical resources. Some prescribed fire and non-fire fuel treatment activities would be designed to have beneficial impacts such as reducing fire risk to structures by reducing fuels. Overall, adverse impacts would be negligible to minor, permanent, and localized, and beneficial impacts would be minor, short-term, and localized.

Alternative 2 - Fire Suppression, Expanded Prescribed Fire, and Non-fire Treatments (NPS Preferred Alternative).

Alternative 2 would have impacts similar to those of Alternative 1. Overall, adverse impacts would be negligible to minor, permanent, and localized, and beneficial impacts would be minor, short-term, and localized.

Cumulative Impacts

Present and reasonably foreseeable future actions have and continue to contribute impacts to historical resources in and around the park. Construction outside of the park will have the biggest impact, which can't be ignored, but little can be done about the construction. Road construction inside the park is usually replacement in kind, with some minor changes for accessibility. Fire management activities will have minor, short-term impacts (smoke and accessibility) to the overall scene, but should have little actual impact on the historical resources in the park. Other forces, over time forces such as corrosion, erosion, microbial action, weathering, rainfall, oxidation, and vandalism all take their toll on the continued existence and integrity of these resources.

Conclusion

All of the alternatives could have both adverse and beneficial impacts on historical resources.

4.3 Park Operations and Visitor Experience

Park Facilities and Operations

Methodology for Assessing Impacts

Impacts to facilities and operations at FRSP were assessed qualitatively by using discussions with Park staff, professional judgment, and experience with similar actions to predict the likely effects of wildland fires, prescribed fires, and fire suppression on normal Park operations.

Impacts Common to All of the Alternatives

Fires can potentially affect operations at national parks, especially in developed sites like visitor centers, campgrounds, administrative and maintenance facilities, and concessionaire-operated services. Fire activities have the potential to cause changes or curtailment of concession and visitor services. Impacts can occur directly from the threat to facilities and field data collection instrumentation from an approaching wildland fire, and indirectly from smoke and the diversion of personnel to other projects. Wildland fires, and rarely prescribed fires, have occasionally caused closures of facilities in parks around the country. Roads normally used for maintenance operations may be closed for short periods of time during wildland, or prescribed fires. Field operations such as data collection, herbicide application, or trail maintenance may be disrupted during wildland fires. All impacts would last no longer than the period of time during the fire event, usually not more than 12 to 36 hours, and generally impact only the area of the Park immediately adjacent to the fire area.

Non-fire fuel treatment activities would be expected to have negligible impacts on facilities and operations at the Park. Temporary road closures are possible, but would be extremely unlikely to last more than an hour and could be announced to all Park staff well in advance of the closure.

In the event of a severe wildland fire, it is estimated that over 5% of Park non-fire staff could be diverted from their regular duties for directly fire-related activities (all red-carded staff in the Park). However, wildland fires are beyond the control of the proposed Fire Management Plan. Prescribed fires are planned activities and non-fire personnel participate on prescribed fires with the approval of their supervisors. On average, 3% of Park staff participate on any single prescribed fire. Non-fire treatments might require non-fire staff for traffic control or public relations, but this would occur only rarely and would require few personnel.

Impacts Specific to Each Alternative

Alternative 1 – No Action: Fire Suppression, Prescribed Fire, and Non-fire Treatments.

Alternative 1 would have negligible to minor, temporary, localized, adverse impacts on Park facilities and operations. While a large, severe unwanted wildland fire could have significant impacts, such an event is unpredictable and uncontrollable under all of the alternatives. Prescribed fires would be planned to minimize impacts.

Alternative 2 - Fire Suppression, Expanded Prescribed Fire, and Non-fire Treatments (NPS Preferred Alternative). Alternative 2 would have minor to moderate, temporary, localized, adverse impacts on Park facilities and operations, more impacts than Alternative 1. Impacts of suppression and prescribed fire activities would be similar to those of Alternative 1, and non-fire treatments would also be planned to minimize impacts.

Cumulative Impacts

There are no other reasonably foreseeable events or actions that would combine with any of the proposed FMPs to produce cumulative impacts on Park facilities or operations.

Conclusion

All of the alternatives would have minor to moderate, temporary, localized, adverse impacts on Park facilities and operations.

Visitor Use and Experience

Methodology for Assessing Impacts

Impacts to visitor use and experience at FRSP were assessed qualitatively by discussions with Park staff, professional judgment, and experience with similar actions to predict the likely effects of wildland fires, prescribed fires, and fire suppression on the way visitors use and experience the Park.

Impacts Common to All of the Alternatives

Fires and fire management activities can have a wide variety of both beneficial and adverse impacts on visitor use and experience. Smoke from fires can reduce visibility, be perceived as smelling unpleasant, and aggravate health conditions. Facilities such as visitor centers may be closed due to staff's being needed elsewhere in the Park, to smoke conditions, to direct threat from the fire, or to use of the facility for fire operations. Trails or roads may be partially or fully closed to allow access by emergency vehicles or to avoid to risks to public safety. Noise or activity from fire management activities may be distracting or offensive. Burned areas may be perceived as unattractive or, once new growth has begun, as exceptionally attractive. Educational and ranger-led programs may change in topic or content in response to fires in the Park. Visitors may feel they are getting a mixed message regarding non-fire treatments, especially mechanical treatments, as vegetation is manipulated and often removed in a Park setting that is otherwise protected from human disturbance.

Impacts Specific to Each Alternative

Alternative 1 – No Action: Fire Suppression , Prescribed Fire, and Non-fire Treatments.

Alternative 1 would have minor, temporary to short-term, localized, beneficial and adverse impacts on visitor use and experience in the Park. Suppression activities could have all of the impacts described above. Prescribed fire activities would be planned to minimize impacts, but would still have occasional impacts, especially to air quality, aesthetics, and visitor access.

Alternative 2 - Fire Suppression, Expanded Prescribed Fire, and Non-fire Treatments (NPS Preferred Alternative). Alternative 2 would have impacts similar to Alternative 1. Non-fire treatments would have negligible impacts on visitor use and experience.

There are no other reasonably foreseeable events or actions that would combine with any of the proposed FMPs to produce cumulative impacts on visitor use and experience.

Conclusion

All of the alternatives would have minor, temporary to short-term, localized, beneficial and adverse impacts. None of the alternatives would result in impacts that would impair visitor use and experience at the Park.

4.4 Social and Economic Environment

Human Health and Safety

Methodology for Assessing Impacts

Impacts to human health and safety were assessed qualitatively by using discussions with Park staff, professional judgment, and experience with similar actions to predict the likely effects of wildland fires, prescribed fires, and fire suppression on the health and safety of the public, Park visitors, Park staff, and firefighters. The alternatives were evaluated based on each one's ability to minimize the exposure of firefighters and others to direct and indirect hazards of the fire itself, and ability to minimize exposure of firefighters and others to wildland and prescribed fire smoke.

Impacts Common to All of the Alternatives

There are two major categories of health and safety issues. The first is activity-caused injuries or fatalities. This includes direct injury to the public, visitors, or staff by the fire itself, such as by being burned by the heat of the fire. It also includes indirect injury, such as injury by falling rocks or trees loosened or weakened by the fire, by fire suppression activities, or by non-fire treatment activities. Injuries to firefighters are infrequent but do occur, and are managed through the use of personal protective equipment, training, safety briefings, qualification standards, and other elements of an aggressive safety program. Injuries to members of the public and to Park staff are very rare. Mitigation measures are described in Chapter 2.4 under Mitigation Measures Common to All of the Alternatives, Safety of Firefighters and the Public.

The second category is the health and safety impacts of smoke generated by fires. The risks are well-studied and include carbon monoxide, hydrocarbons, and particulates found in smoke. Most byproducts of combustion that are of health concern are concentrated on the fireline, and decrease to negligible levels in very short distances. Fine particulates, however, can travel long distances from the fire in smoke. Smoke impacts are related to the amount of fuel consumed and how efficiently it burned, not to the size of the burned area (SEKI EA 2004). Mitigation measures are described in Chapter 2 under the topic Mitigation Measures Common to All of the Alternatives, Safety of Firefighters and the Public and Air Quality.

Firefighters are exposed to the greatest health risks from smoke on or near firelines. Standard firefighting practices are practiced to minimize exposure, including planning location of fires to minimize exposure, rotating personnel out of smoky areas at regular intervals, and providing sleep areas away from smoke accumulations during extended attack events. The greatest risk to the health of Park visitors, staff, and other public is from fire particulates in smoke, because these can travel long distances from the fire. Local weather patterns affect smoke mixing and dispersal patterns, especially at night.

Impacts Specific to Each Alternative

Alternative 1 – No Action: Fire Suppression, Prescribed Fire and Non-Fire Treatment.

Alternative 1 would result in negligible to minor, temporary to short-term, localized to regional, adverse and beneficial impacts on human health and safety. While unwanted wildland fires are unpredictable and therefore their impacts cannot be managed by any of the alternatives, suppression activities can expose firefighters to measurable risks. Prescribed fire activities will be planned to minimize impacts, but all impacts cannot be eliminated.

Alternative 2 - Fire Suppression, Expanded Prescribed Fire, and Non-fire Treatments (NPS Preferred Alternative). Alternative 2 would have negligible to moderate, temporary to short-term, localized to regional, adverse and beneficial impacts on human health and safety. There would be slightly more adverse impacts than those of Alternative 1, because more areas will be burned. Risks to firefighter safety would be less adverse compared to Alternative 1 through the use of an appropriate management response to unwanted wildland fires. Impacts to Park staff and the public, such as exposure to smoke, would be more adverse than under Alternative 1 because of the presence of more fire on the landscape due to wildland fire use.

Cumulative Impacts

For the most part, none of the alternatives will combine with any reasonably foreseeable future action or event to contribute incrementally to adverse impacts on human health and safety. While fire projects will be managed to minimize impacts, some individuals may be sensitive or susceptible to smoke impacts. Both alternatives, especially Alternative 2, could contribute to cumulative impacts on the health of these few individuals.

Conclusion

All of the alternative would have both adverse and beneficial impacts on human health and safety. No alternative eliminates all health and safety concerns. Safety of firefighters, the public, and other staff is always the highest priority for all fire management actions under all of the alternatives. Nonetheless, Alternative 2 gives managers the most flexibility to choose the tool or tools that will minimize adverse impacts while accomplishing management goals.

Methodology for Assessing Impacts

Impacts of the alternatives on transportation were qualitatively assessed based on professional judgment, experience with similar actions, and consultation with Park staff. Alternatives were compared based on impacts to roads outside and inside the Park.

Impacts Common to All of the Alternatives

Wildland or prescribed fire events could have impacts on transportation in and around the Park. Outside of the Park, smoke passing over a roadway can be dense enough to impede vision and make road conditions hazardous for short periods of time. Prescribed fire events are planned to minimize this impact, by burning under wind conditions that blow smoke away from roadways and by using traffic control personnel to manage traffic during periods of reduced visibility. Impacts would last no longer than the time the fire is burning.

Within the Park, administrative roads used for maintenance and other access may be temporarily closed due to poor visibility or to facilitate access by firefighting equipment.

Many small roads throughout the Park are used by emergency vehicles for access to facilities and to remote sections of the Park. Visitor traffic on main Park roads may be temporarily slowed, reduced to one lane, or closed for the duration of a fire event, reducing visitor access.

In very rare cases, a non-fire, especially mechanical, fuels treatment project may necessitate the temporary closure of public roadways, or Park roads, such as to protect travelers from a felled tree, but the duration of the impact would not be more than one hour. Non-fire fuel treatment projects would have a negligible impact on transportation.

Impacts Specific to Each Alternative

Alternative 1 – No Action: Fire Suppression, Prescribed Fire and Non-Fire Treatment.

Alternative 1 would have negligible to minor, temporary, localized, adverse impacts on transportation in and around the Park. As described above, impacts would result from road closures, especially within the Park, and the safety risk if drifting smoke from a fire were to reduce visibility on a roadway.

Alternative 2 - Fire Suppression, Expanded Prescribed Fire, and Non-fire Treatments (NPS Preferred Alternative). Alternative 2 would have impacts similar to those of Alternative 1.

Cumulative Impacts

No reasonably foreseeable future event or management action would be expected to combine with any alternative to contribute to cumulative impacts on transportation in or near the Park.

None of the FMP alternatives will substantively affect road, water-based, or aerial transportation in and around the Park. One exception is the possible temporary closure of roads during fire suppression activities or because of heavy smoke emanating from wildland fires or prescribed burns. Over the long term, closures would be infrequent and would not significantly impinge on local transportation. All of the alternatives would have negligible to minor, temporary, localized impacts on transportation in and around the Park.

Utilities

Methodology for Assessing Impacts

Impacts of the alternatives on utilities within the Park were assessed qualitatively based on professional judgment, experience with similar actions, and consultation with Park staff.

Impacts Common to All of the Alternatives

Heavy smoke from wildland fire has been known to cause arcing from high-tension power lines. The gas contained in gas lines is flammable. It is possible that extreme heat from a fire could damage the pipe line, but this is unlikely. It is more likely that ground disturbance during fire suppression activities, especially due to the use of heavy equipment, might physically damage the pipe line. Access to utility equipment could be temporarily denied during a fire event to protect the safety of utilities staff or to ensure that roadways are free to allow access for emergency or firefighting vehicles. Equipment could be damaged by the passing flame front of a fire. Prescribed burning or non-fire fuels treatments in utilities corridors would have the beneficial impact of helping to keep the corridor open for utility access. Non-fire fuels treatments would be planned to have no adverse impact on utilities.

Impacts Specific to Each Alternative

Alternative 1 – No Action: Fire Suppression Prescribed Fire and Non-Fire Treatment. Alternative 1 would have negligible to minor, temporary, localized, some beneficial but mostly adverse impacts on public or private utilities within the Park.

Alternative 2 - Fire Suppression, Expanded Prescribed Fire, and Non-fire Treatments (NPS Preferred Alternative). The impacts of Alternative 2 would be similar to those from Alternative 1.

Cumulative Impacts

No reasonably foreseeable future event or management action would be expected to combine with any of the alternatives to contribute to cumulative impacts on utilities within the Park.

All of the alternatives would have negligible to minor, temporary, localized impacts on public and private utilities within the Park.

5 Public Involvement, Consultation and Coordination

5.1 Public Involvement

As required by NPS policies and planning documents, it is the Park's objective to work with state, federal, and local governmental and private organizations to ensure that the Park and its programs are coordinated with theirs, and are supportive of their objectives, as far as proper management of the Park permits, and that their programs are similarly supportive of Park programs.

Consultation and coordination have occurred with numerous agencies for the development of the alternatives and preparation of the EA. The following, organizations, and agencies were contacted for information, which assisted in identifying important issues, developing alternatives, and analyzing impacts:

U. S. Fish and Wildlife Service
Virginia State Historic Preservation Office
Virginia Department of Conservation and Recreation
Virginia Department of Forestry

5.2 Coordination

Coastal Zone Management Act of 1972

Congress enacted the Coastal Zone Management Act to "preserve, protect, develop and, where possible, to restore and enhance the resources of the nation's coastal zone for this and succeeding generations."

The Coastal Zone Management Act (CZMA) of 1972 gives states with federally approved coastal programs the lead in coordinating and strengthening coastal zone management activities of all levels of government. Specifically, the CZMA gives state coastal programs the ability to require federal agencies to carry out their activities within the coastal zone in ways that are consistent with the state coastal program's policies. Federal consistency is the review of federal projects for consistency with state coastal policies.

Federal consistency applies to any activity that is in, or affects land use, water use or any natural resource in the coastal zone, if the activity is conducted by or on behalf of a federal government agency, requires a federal license or permit, receives federal funding, or is a plan for exploration, development or production from any area leased under the Outer Continental Shelf Lands Act. The Virginia Coastal Resources Management Program was established in 1986 to protect and manage an area know as Virginia's "coastal zone." This zone

encompasses 29 counties, 17 cities and 42 incorporated towns in "Tidewater Virginia," including Spotsylvania County, and therefore is required for this project.

Coastal Zone Management Act Consistency Determination

This document provides the Commonwealth of Virginia with the National Park Service's Consistency Determination under the Coastal Zone Management Act, sections 307(c)(1) [or (2)] and 15 CFR Part 930, sub-part C, for the Environmental Assessment for a new Fire Management Plan in Fredericksburg and Spotsylvania National Military Park. This activity includes the work detailed in section 2.1 of the document.

The NPS has determined that the proposed Fire Suppression, Expanded Prescribed Fire, and Non-fire Treatments alternative affects the land or water uses or natural resources of Virginia as detailed in section 1.4.

The Virginia Coastal Resources Management Program contains the following enforceable policies:

- Fisheries Management
- Subaqueous Lands Management
- Wetlands Management
- Dunes Management
- Non-point Source Pollution Control
- Point Source Pollution Control
- Shoreline Sanitation
- Air Pollution Control
- Coastal Lands Management

Based upon the following information, data, and analysis, the NPS finds that the proposed Fire Suppression, Expanded Prescribed Fire, and Non-fire Treatments alternative is consistent to the maximum extent practicable with the enforceable policies of the Virginia Coastal Resources Management Program. The enforceable policies would not be impacted as the proposed action may negligibly impact waters of the United States and wetlands, and have minor and negligible impacts on air pollution.

Pursuant to 15 CFR Section 930.41, the Virginia Coastal Resources Management Program has 60 days from the receipt of this document in which to concur with or object to this Consistency Determination, or to request an extension under 15 CFR Section 930.41(b). Virginia's concurrence will be presumed if its response is not received by the NPS on the 60th day from receipt of this determination. The State's response should be sent to:

Gregg Kneipp
Fredericksburg and Spotsylvania National Military Park
120 Chatham Drive
Fredericksburg, VA 22405

5.3 Public Notice/Public Scoping

In order to give the public and all interested parties a chance to review the EA, it will be noticed for public comment for a minimum of 60 days through local newspapers and on the world-wide-web. During this 60-day period, the EA will be available for review at the Visitor Center of the Fredericksburg and Spotsylvania National Military Park located at 120 Chatham Lane, Fredericksburg, Virginia 22405, on the NPS Planning, Environment, and Public Comment web site (PEPC) at <http://parkplanning.nps.gov/frsp>. Copies of the EA will also be sent to applicable Federal, State, and local agencies for their review and comment.

5.4 Document Review

The following persons, agencies, municipalities, and organizations were solicited to review this Environmental Assessment, or requested and were granted the opportunity to review it:

- James Akerson, Forest Ecologist, Shenandoah National Park
- Doug Wallner, Fire Management Officer, NPS Northeast Region
- Jacki Katzmire, Regional Environmental Coordinator, NPS Northeast Region
- Virginia Department of Conservation and Recreation, Division of Natural Heritage
- Jeff Koenig, Area Fire Management Officer, Shenandoah National Park
- Melissa Forder, Fire Ecologist, Shenandoah National Park

5.5 Preparers

The following persons participated in the preparation of this EA:

- Kelly Ann Gorman, Fire Ecologist, Shenandoah National Park (former)
- Gregg Kneipp, Natural Resources Manager, Fredericksburg and Spotsylvania National Military Park

6 Supplementary References

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6.2 Definitions and Acronyms

Agency – Any federal, state, or county government organization participating with jurisdictional responsibilities.

Appropriate management response – A response to a wildland fire which is based on an evaluation of risks to firefighter and public safety; the circumstances under which the fire occurs, including weather and fuel conditions; natural and cultural resource management objectives; protection priorities; and values to be protected. The evaluation must also include an analysis of the context of the specific fire within the overall local, geographic area, and national wildland fire situation.

Aspect – The compass direction toward which a slope faces.

BAER – Burned Area Rehabilitation team.

Black line – A constructed fire break created by burning vegetation, rather than cutting, digging, scraping, or other method. Also, a verb referring to the process of creating a black line.

Burn out – To use fire to reduce or consume fuel between the edge of the fire and the control line. Also, hyphenated, a noun referring to the black line created by burning out and an adjective to describe the activity of burning out (as in, a difficult burn-out operation).

Burning Index – An estimate of the potential difficulty of fire containment as it relates to the flame length at the most rapidly spreading portion of a fire's perimeter. A general estimate of the flame length may be interpreted by dividing the Burning Index by 10.

CEQ – Council on Environmental Quality; the agency which administers the National Environmental Policy Act (1969).

CFR – Code of Federal Regulations; the general and permanent rules published in the Federal Register by the executive departments and agencies of the Federal Government.

Chain – A unit of distance measurement equal to 66 ft (20 m).

Closure – Legal restriction, but not necessarily elimination of specified activities such as smoking, camping, or entry that might cause fires in a given area.

Consumption strategy – A fire-control strategy, used during the mop-up stage of a fire, in which firefighters allow fuels in the interior of a burned area to continue to burn or smolder and be consumed by the fire, instead of taking positive action to extinguish the burning or smoldering fuels.

Contain – A fire control strategy in which a fuel break is created around a fire; the break may include natural barriers or constructed line.

Cooperating agency – An agency supplying assistance other than direct suppression, rescue, support, or service functions to the incident control effort.

Demobilization – The process of releasing resources – equipment and personnel – and disbanding the incident management organization at the conclusion of an incident.

Detection – The act or system of discovering and locating fires.

Director's Order – Detailed written guidance to help managers make day-to-day decisions, approved by the Director of the National Park Service.

Dispatch – A command decision to move a resource or resources from one place to another.

Dispatcher – A person employed to receive reports of discovery and status of incidents, confirm their locations, take action promptly to provide resources likely to be needed, and send the resources to the proper places.

Duff – The layer of decomposing organic materials lying below the litter layer of freshly fallen twigs, needles, and leaves and immediately above the mineral soil.

EA – See: Environmental Assessment.

Environmental Assessment – A formal process, required by the National Environmental Policy Act, of evaluating and comparing the environmental impacts of several alternative ways of accomplishing some proposed action. An EA ensures that potential problems are foreseen and addressed at an early stage of project planning and design. Also, the document used to record the environmental assessment process.

Fire behavior – The manner in which a fire reacts to the influences of fuel, weather and topography.

Fire break – A natural or constructed barrier used to stop or check fires that may occur, or to provide a control line from which to work.

Fire crew – An organized group of firefighters under the leadership of a crew leader or other designated official.

Fire danger rating – A numerical value representing the likelihood of, the possible severity of, and the potential difficulty of suppressing, an unwanted wildland fire. Shenandoah uses the Burning Index to represent fire danger. The more familiar text headings – low, moderate, high, very high, and extreme fire danger – correspond to ranges of Burning Index values.

Fire line – A linear barrier to fire spread that is scraped or dug to mineral soil.

Fire weather – Weather conditions that influence fire ignition, behavior and suppression.

FMP – See: Fire Management Plan.

Fire Management Plan (FMP) – A document prepared by field office staff with public participation and approved by field office managers that provides working, strategic plan identifying, describing, and integrating all wildland fire and fuels management activities within the context of approved land and resource management plans; a program of action that uses all approved management strategies to meet pre-determined objectives.

Fuel model – A simulated fuel complex (or combination of vegetation types) for which all fuel descriptors required for the solution of a mathematical rate of spread model have been specified.

Fuel moisture (fuel moisture content) – The quantity of moisture in fuel expressed as a percentage of the weight of the fuel when thoroughly dried.

Fuels treatment – Manipulation or removal of wildland fuels to reduce the likelihood that a fire will start, to reduce the potential damage from a fire, and/or to reduce the difficulty of managing a fire. Includes fire treatments, usually prescribed fire, and non-fire treatments.

Fuel type – An identifiable association of fuel elements of a distinctive plant species, form, size, arrangement, or other characteristics that will cause a predictable rate of fire spread or difficulty of control.

General Management Plan – A document prepared by unit management staff with public participation and approved by the unit manager that provides general guidance and direction for management activities at the unit.

Geographic(al) information system (GIS) – A computer system for capturing, storing, integrating, manipulating, analyzing, and displaying data related to positions on the Earth's surface; typically used for handling maps; also an adjective describing digital maps that are included in a GIS.

GIS – See: Geographic information system.

GMP – See: General Management Plan.

Holding – Preventing the spread of fire beyond acceptable boundaries. **Holding actions** are planned actions required to achieve fire management objectives. **Holding resources** are firefighting personnel and equipment assigned to do all required fire suppression work following fireline construction.

I&E – In this document, an abbreviation denoting Shenandoah National Park's Division of Interpretation and Education.

IA – See: initial attack.

IC – See: Incident Commander.

ICS – See: Incident Command System.

IMT – See: Incident Management Team.

Incident – A human-caused or natural occurrence, such as wildland fire, that requires emergency service action to prevent or reduce the loss of life or damage to property or natural resources.

Incident Commander (IC) – The individual responsible for the management of all incident operations at the incident site.

Incident Command System (ICS) – The combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure, with responsibility for the management of assigned resources to effectively accomplish stated objectives on an incident.

Incident Management Team (IMT) – The Incident Commander (IC) and appropriate general staff (operations, planning, logistics, and finance or administration section chiefs) and/or command staff (information, safety, and liaison officers).

Initial attack (IA) – The actions taken by the first resources to arrive at a wildfire to protect lives and property and prevent further extension of the fire.

Jackpot – A large accumulation of fuels, usually large dead fuel such as logs, in a small area such as a pile; a jackpot usually burns hotter than the surrounding area and spotting from a jackpot can cause holding problems if it is close to the fireline.

Litter – The top layer of the forest, scrubland, or grassland floor, directly above the fermentation layer, composed of loose debris of dead sticks, branches, twigs, and recently fallen leaves or needles, little altered in structure by decomposition.

Mechanical fuels treatment – Non-fire fuels treatment (see definition below) involving the physical manipulation of fuels using tools. May include one or any combination of cutting, lopping, crushing, scattering, piling, thinning, pruning, chipping, mulching, or mowing with hand tools, power tools, or heavy equipment. May be used in combination with fire treatments or other non-fire treatments.

Mesic – Characterized by or adapted to a moist environment.

MIST – See: Minimum impact suppression tactics.

Minimum impact suppression tactics (MIST) – Strategy and tactics that effectively meet suppression and resource objectives with the least number of adverse environmental, cultural, and social impacts.

Mobilization – The process and procedures used by all organizations, federal, state and local for activating, assembling, and transporting all resources that have been requested to respond to or support an incident.

Mop-up – Activities to make a fire safe or to reduce residual smoke after the fire has been controlled.

Mutual aid – Cooperation among agencies and/or jurisdictions in which they assist one another upon request, by furnishing personnel and equipment; also an adjective referring to incidents or arrangements during which mutual aid occurs.

NAAQS – See: National Ambient Air Quality Standards.

National Ambient Air Quality Standards (NAAQS) – Officially designated thresholds of pollutants in the air considered harmful to public health and the environment; the standards are set by the Environmental Protection Agency's Office of Air Quality Planning and Standards for six principle pollutants, called criteria pollutants – carbon monoxide, lead, nitrogen dioxide, ozone, sulfur oxides, and particulate matter.

National Environmental Policy Act (NEPA) – A law requiring federal agencies to integrate environmental values into the decision-making processes by considering the environmental impacts of proposed actions and reasonable alternatives to those actions; compliance with the law is recorded in a document such as an Environmental Assessment.

National Interagency Fire Center (NIFC) – A facility located at Boise, Idaho, jointly operated by several federal agencies, dedicated to coordination, logistical support, and improved weather services in support of fire management operations throughout the U.S.

National Wildfire Coordinating Group (NWCG) – A group formed under the direction of the Secretaries of Agriculture and the Interior and comprised of representatives of the U.S. Forest Service, Bureau of Land Management, Bureau of Indian Affairs, National Park Service, U.S. Fish and Wildlife Service, and Association of State Foresters. The group's purpose is to facilitate coordination and effectiveness of wildland fire activities and provide a forum to discuss, make recommendations on, or resolve issues and problems of substantive nature. NWCG is the certifying body for all courses in the National Fire Curriculum.

NCR – In this document, an abbreviation denoting Shenandoah National Park's Division of Natural and Cultural Resources.

NEPA – See: National Environmental Protection Act.

NIFC – See: National Interagency Fire Center.

Non-fire fuels treatment – Any fuels treatment (see definition above) except fire. May include one or any combination of mechanical treatments, herbicides, animal grazing, etc. May be used in combination with fire treatments.

NWCG – See: National Wildfire Coordinating Group

Operational period – The period of time scheduled for execution of a given set of tactical actions as specified in the Incident Action Plan. Operational periods can be of various lengths, although usually not more than 24 hours.

Planning level – An indicator of the demands for resources within a specified area. Values range from I, indicating little to no fire activity in the region, to V, indicating that there are outstanding, unfilled requests for resources to help manage fires in the region.

Preparedness – Condition or degree of being ready to cope with a potential fire situation.

Prescribed fire – Any fire ignited by management actions under specific, predetermined conditions to meet specific resource management objectives. A written, approved prescribed fire plan must exist, and NEPA requirements must be met, prior to ignition.

Prescribed fire plan (burn plan) – This document provides the prescribed fire burn boss information needed to implement an individual prescribed fire project.

Prescription – Measurable criteria that define conditions under which a prescribed fire may be ignited, guide selection of appropriate management responses, and indicate other required actions. Prescription criteria may include safety, economic, public health, environmental, geographic, administrative, social, or legal considerations.

Prevention – Activities directed at reducing the incidence of fires, including public education, law enforcement, personal contact, and reduction of fuel hazards.

RAD – In this document, an abbreviation denoting Shenandoah National Park's Division of Ranger Activities.

Rate of spread – The relative activity of a fire in extending its horizontal dimensions; expressed as a rate of increase of the total perimeter of the fire, as rate of forward spread of the fire front, or as rate of increase in area, depending on the intended use of the information, usually in chains or acres per hour for a specific period in the fire's history.

Resources – Personnel, equipment, services, and supplies available or potentially available for assignment to incidents. Also, the natural resources of an area, such as timber, grass, watershed values, recreation values, and wildlife habitat.

Resource Management Plan (RMP) – A document prepared by field office staff with public participation and approved by field office managers that provides general guidance and direction for land management activities at a field office.

Resource order – An order placed for firefighting or support resources. Also, a verb indicating the process of placing a resource order.

Retardant – A substance or chemical agent which reduces the flammability of fuels.

RMP – See: Resource Management Plan.

SACS – See: Shared Applications Computer System.

Shared Applications Computer System (SACS) – An on-line computer software program used by the Department of the Interior to track many different kinds of fire-related information, including firefighter qualifications and fire occurrence.

Slash - Debris left after logging, pruning, thinning, or brush cutting; includes logs, chips, bark, branches, stumps, and broken understory trees or brush.

Snag – A standing dead tree trunk or tree from which at least the small branches have fallen.

Spotting – Fire behavior that produces sparks or embers that are carried by the wind and start new fires (called **spot fires**) beyond the zone of direct ignition by the main fire.

Staffing class – An indicator of the amount of staffing, or personnel resources available for response to a wildland fire, and of preparedness actions, such as increased detection patrols, necessary to be properly prepared in case wildland fire starts. Staffing classes at Shenandoah range from I to V, corresponding to fire danger ratings of Low to Extreme.

Structure fire (also, structural fire) – Fire burning any part or all of a building, shelter, or other structure.

Suppression – All the work of extinguishing or containing a fire, beginning with its discovery. Also an adjective describing activities or resources related to suppression.

Type – The relative capability of a firefighting resource in comparison to another type. Type 1 usually means the greater capability due to experience, skill, power, size, or capacity.

VA DACS – Virginia Department of Agriculture and Consumer Services.

VA DCR – Virginia Department of Conservation and Recreation.

VA DOF – Virginia Department of Forestry.

Wet water – In firefighting terminology, water with added chemicals, called wetting agents, that increase water's spreading and penetrating properties by reducing surface tension.

Wildland fire – Any non-structure fire, not prescribed fire, that occurs in the wildland.

Wildland Fire Implementation Plan (WFIP) – A progressively developed assessment and operational management plan that documents the analysis and selection of strategies and describes the appropriate management response for a wildland fire being managed for resource benefits.

Wildland Fire Situation Analysis (WFSA) – A decision-making process that evaluates alternative suppression strategies against selected environmental, social, political, and economic criteria. Provides a record of decisions.

Wildland fire use (WFU) – The management of naturally ignited wildland fires to accomplish specific pre-stated resource management objectives in pre-defined geographic areas outlined in Fire Management Plans.

Wildland-urban interface (WUI) – The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland fuels.

WFIP – See: Wildland Fire Implementation Plan

WFSa – See: Wildland Fire Situation Analysis

WFU – See: Wildland fire use

WUI – See: Wildland-urban interface

6.3 Five-year Plan of Proposed and Potential Fire and Fuels Treatment Projects

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Part I: Wildland and Urban Interface (WUI) Projects

Wildland-urban interface is defined as the area or zone where structures and other human development meet or intermingle with undeveloped wildland fuels. Wildland-urban interface projects in this plan are projects with the primary objective of reducing the wildland fire risk to housing developments outside of the park boundary. In order to qualify as a wildland-urban interface project, instead of just a fuel hazard treatment project, the community being projected must be identified in the Federal Register as a community at risk.

Table 4. Wildland-urban interface projects that could be included under each of the two alternatives.

	Alternative 1	Alternative 2
Lake Wilderness WUI	no	yes
Fawn Lake WUI	no	yes
Chancellor WUI	no	yes
Lake of the Woods WUI	no	yes

Figure 6. Wilderness Battlefield Potential WUI and Fuel Hazard Burn Units

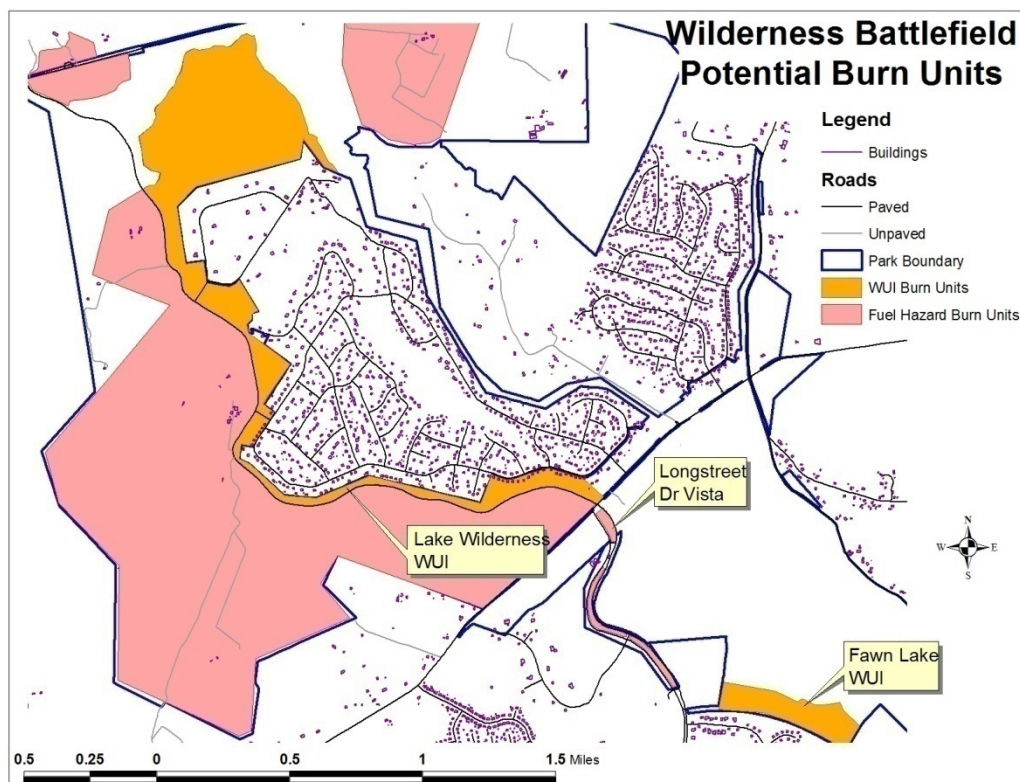


Figure 7. Chancellorsville Battlefield Potential WUI and Fuel Hazard Burn Units

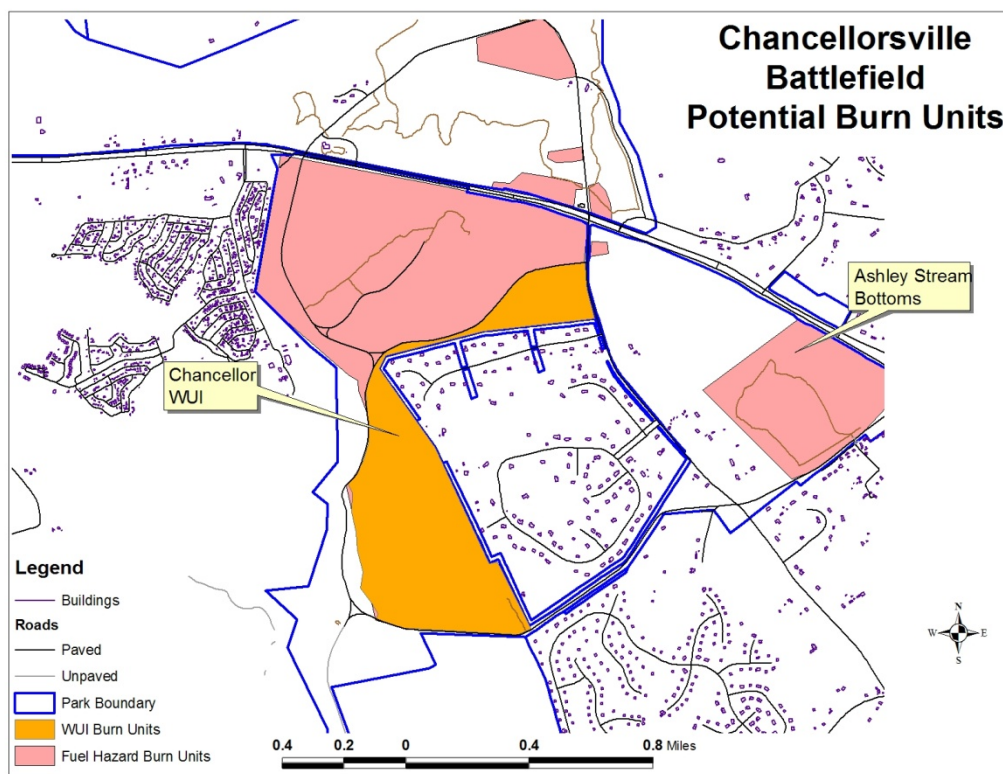
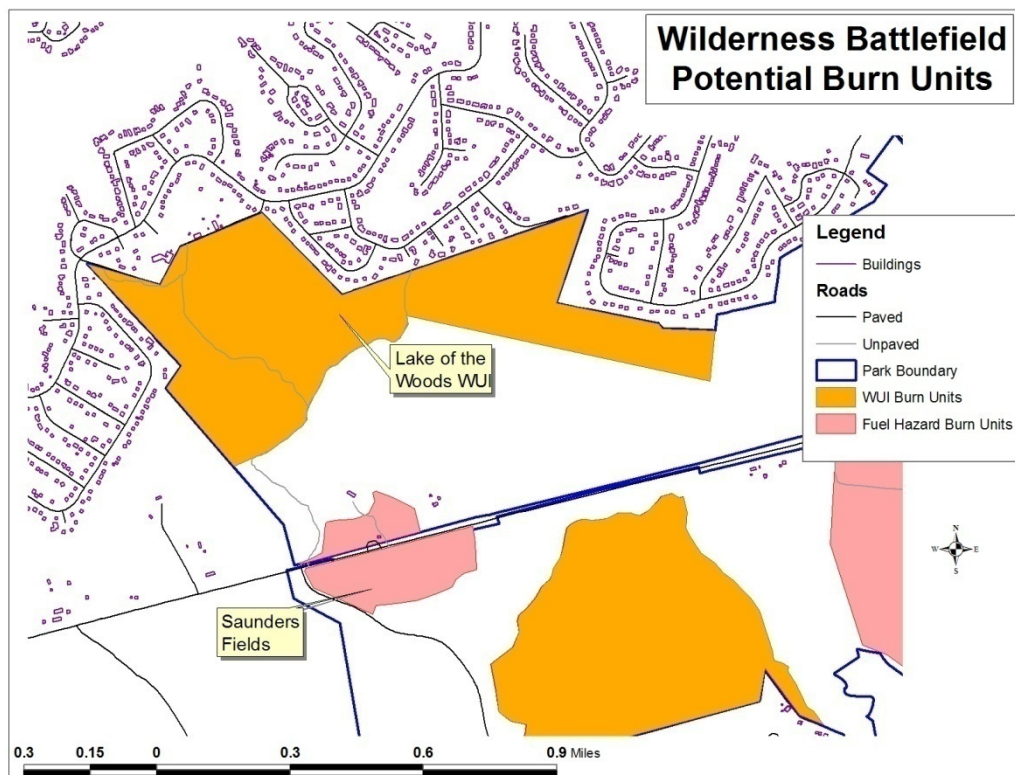


Figure 8. North Wilderness Battlefield Potential WUI and Fuel Hazard Burn Units



Name of Project: Lake Wilderness WUI

Area: 255 acres

Type of Treatment: Prescribed fire treatment – Hand tools and hand-held power tools, primarily chainsaws, will be used. There will be no ground surface line construction. Although some surface litter may be disturbed during movement of branches and small trees, no leaf blowers or rakes will be used and no new fire line will be constructed.

Timeline: (not applicable)

Descriptive Location: area on the south side of the Federal Line Trail, and to the east of Hill-Ewell Drive, up to the park boundary

WUI Community: Lake Wilderness, VA

Fuels: hardwood leaf litter, brush

Purpose(s) of Treatment: reduce the likelihood of wildland fire spreading from park lands into Lake Wilderness subdivision

Resource		Presence in or near treatment unit
Facilities or Structures	yes	
Floodplains or Wetlands	none	
Hazardous Materials	none	
Natural Heritage Area	none	
Riparian Area	none	
Sensitive Fisheries	none	
Smoke Receptors	Yes, houses in subdivision	
Special Concern Species	Animals	none known
	Plants	none known
Water Resources	none	

Name of Project: Fawn Lake WUI

Area: 34 acres

Type of Treatment: Prescribed fire treatment – Hand tools and hand-held power tools, primarily chainsaws and weed whackers, will be used. Blown fire line construction, along with wetline techniques will be used. Although some surface litter may be disturbed during movement of branches and small trees, no rakes will be used.

Timeline: (not applicable)

Descriptive Location: area on the north side of the unfinished railroad, adjacent to the Fawn Lake subdivision.

WUI Community: Fawn Lake, VA

Fuels: hardwood leaf litter, brush

Purpose(s) of Treatment: reduce the likelihood of wildland fire spreading from park lands into Fawn Lake subdivision

Resource		Presence in or near treatment unit
Facilities or Structures	yes	
Floodplains or Wetlands	none	
Hazardous Materials	none	
Natural Heritage Area	none	

Riparian Area	none	
Sensitive Fisheries	none	
Smoke Receptors	Yes, houses in subdivision	
Special Concern Species	Animals	none known
	Plants	none known
Water Resources	none	

Name of Project: Chancellor WUI

Area: 207 acres

Type of Treatment: Prescribed fire treatment – Hand tools and hand-held power tools, primarily chainsaws, will be used. There will be no ground surface line construction. Although some surface litter may be disturbed during movement of branches and small trees, no leaf blowers or rakes will be used and no new fire line will be constructed.

Timeline: (not applicable)

Descriptive Location: area on the south side of Slocum Road, and east of Stuart Drive, adjacent to the Estates of Lee Jackson and Chancellor West subdivisions.

WUI Community: Spotsylvania, VA

Fuels: hardwood leaf litter, brush

Purpose(s) of Treatment: reduce the likelihood of wildland fire spreading from park lands into the two subdivisions

Resource	Presence in or near treatment unit	
Facilities or Structures	yes	
Floodplains or Wetlands	yes	
Hazardous Materials	none	
Natural Heritage Area	none	
Riparian Area	yes	
Sensitive Fisheries	none	
Smoke Receptors	Yes, houses in subdivision	
Special Concern Species	Animals	none known
	Plants	none known
Water Resources	yes	

Name of Project: Lake of the Woods WUI

Area: 193 acres

Type of Treatment: Prescribed fire treatment – Hand tools and hand-held power tools, primarily chainsaws, will be used. Blown fire line construction, along with wetline techniques will be used. Although some surface litter may be disturbed during movement of branches and small trees, no rakes will be used.

Timeline: (not applicable)

Descriptive Location: area on the south side of the Lake of the Woods subdivision, and on the north side of the woods road and the Gordon Flank Attack Trail system.

WUI Community: Lake of the Woods, VA

Fuels: hardwood leaf litter, brush

Purpose(s) of Treatment: reduce the likelihood of wildland fire spreading from park lands into Lake of the Woods subdivision

Resource		Presence in or near treatment unit
Facilities or Structures	yes	
Floodplains or Wetlands	none	
Hazardous Materials	none	
Natural Heritage Area	none	
Riparian Area	none	
Sensitive Fisheries	none	
Smoke Receptors	Yes, houses in subdivision	
Special Concern Species	Animals	none known
	Plants	none known
Water Resources	none	

Part II: Fuel Hazard Treatment Projects

Wildland fuels can pose a risk to structures in the event of an unwanted wildland fire. Fuel Hazard treatment projects are projects with the primary objective of reducing the wildland fire risk to a resource value. Resource values may include cultural or historical resources, cultural landscapes, natural resources such as fire-sensitive plant or animal species, private property, or Park- or privately-owned structures or development inside or outside the Park boundary.

Table 5. Five-year Plan: Fuel hazard treatment projects that will be included under each of the two alternatives.

	Alternative 1	Alternative 2
Spotsy Fields Area	yes	yes
Brygider / Ashley	no	yes
Stream Bottoms		
Longstreet Drive Vista	no	yes
Saunders Field	no	yes
Chancellorsville Fields	no	yes
Meade Monument	no	yes
Fields		

Table 6. Potential Fuel hazard treatment projects that could be included under each of the two alternatives.

	Alternative 1	Alternative 2
Chewning Fields	no	yes
Ellwood Area	no	yes
Chancellorsville Fields	no	yes
Snead Field	no	yes
Bernards Cabin Fields	no	yes
Laurel Hill Fields	yes	yes

Name of Project: Spotsy Fields Area

Area: 160 acres

Type of Treatment: prescribed fire treatment; treatment will be coordinated with chemical treatment of invasive plants

Timeline: (not applicable)

Descriptive Location: core area in Spotsylvania Court House Battlefield – fields and forest

Fuels: annual and perennial grasses, shrubby oaks, sweetgums, and mature hardwood forest

Purpose(s) of Treatment: reduction of fuel hazard in and around Spotsylvania Court House Battlefield, and to maintain historic vistas

Resource		Presence in or near treatment unit
Facilities or Structures	CCC storage barn	
Floodplains or Wetlands	Yes	
Hazardous Materials	none	
Natural Heritage Area	none	
Riparian Area	yes	
Sensitive Fisheries	none	
Smoke Receptors	within 1/2 mi: subdivisions outside of the Battlefield	
Special Concern Species	Animals	none
	Plants	none
Water Resources	yes	

Name of Project: Brygider / Ashley Stream bottoms

Area: 3 acres

Type of Treatment: prescribed fire treatment; treatment will be coordinated with chemical treatment of invasive plants

Timeline: (not applicable)

Descriptive Location: open fields in Chancellorsville Battlefield, adjacent to, and on the north and south sides of Rt. 3 – field wetlands

Fuels: annual and perennial grasses, shrubby obligate wetland plants

Purpose(s) of Treatment: reduction of fuel hazard in open fields, control of plants in wetlands (to keep below approximately 6 feet tall), and to maintain historic vistas

Resource		Presence in or near treatment unit
Facilities or Structures	none	
Floodplains or Wetlands	Yes	
Hazardous Materials	none	
Natural Heritage Area	none	
Riparian Area	yes	
Sensitive Fisheries	none	
Smoke Receptors	within 1/2 mi: subdivisions outside of the Battlefield	
Special Concern Species	Animals	none
	Plants	none

Water Resources yes

Name of Project: Longstreet Drive Vista

Area: 4 acres

Type of Treatment: prescribed fire treatment; treatment will be coordinated with chemical treatment of invasive plants

Timeline: (not applicable)

Descriptive Location: area in Wilderness Battlefield, in between the entrance and exit roads of the Fawn Lake Subdivision **Fuels:** mature hardwood forest

Purpose(s) of Treatment: reduction of fuel hazard in and around the entrance area to Fawn Lake Subdivision

Resource		Presence in or near treatment unit	
Facilities or Structures	None		
Floodplains or Wetlands	None		
Hazardous Materials	None		
Natural Heritage Area	None		
Riparian Area	None		
Sensitive Fisheries	None		
Smoke Receptors	within 1/2 mi: subdivisions outside of the Battlefield		
Special Concern Species	Animals	none	
	Plants	none	
Water Resources	none		

Name of Project: Chewning Fields

Area: 174 acres

Type of Treatment: prescribed fire treatment; treatment will be coordinated with chemical treatment of invasive plants

Timeline: (not applicable)

Descriptive Location: area in Wilderness – fields **Fuels:** annual and perennial grasses, shrubby oaks, sweetgums

Purpose(s) of Treatment: reduction of fuel hazard in and around Chewning Fields – if the is no longer under Farm Special Use Permit - and to maintain historic vistas

Resource		Presence in or near treatment unit	
Facilities or Structures	None		
Floodplains or Wetlands	None		
Hazardous Materials	None		
Natural Heritage Area	None		
Riparian Area	None		
Sensitive Fisheries	None		
Smoke Receptors	within 1/2 mi: subdivisions outside of the Battlefield		

Special Concern Species	Animals	none
	Plants	none
Water Resources	none	

Name of Project: Saunders Field

Area: 37 acres

Type of Treatment: prescribed fire treatment; treatment will be coordinated with chemical treatment of invasive plants

Timeline: (not applicable)

Descriptive Location: area in Wilderness Battlefield, adjacent through and around Rt. 20 – fields **Fuels:** annual and perennial grasses, shrubby oaks, sweetgums

Purpose(s) of Treatment: reduction of fuel hazard in and around Wilderness Battlefield, and to maintain historic vistas

Resource	Presence in or near treatment unit	
Facilities or Structures	CCC storage barn	
Floodplains or Wetlands	Yes	
Hazardous Materials	none	
Natural Heritage Area	none	
Riparian Area	yes	
Sensitive Fisheries	none	
Smoke Receptors	within 1/2 mi: subdivisions outside of the Battlefield	
Special Concern Species	Animals	none
	Plants	none
Water Resources	yes	

Name of Project: Ellwood Fields

Area: 130 acres

Type of Treatment: prescribed fire treatment; treatment will be coordinated with chemical treatment of invasive plants

Timeline: (not applicable)

Descriptive Location: area in Wilderness Battlefield, adjacent to Rt. 20 – fields **Fuels:** annual and perennial grasses, shrubby oaks, sweetgums

Purpose(s) of Treatment: reduction of fuel hazard in and around Wilderness Battlefield, and to maintain historic vistas

Resource	Presence in or near treatment unit	
Facilities or Structures	Historic Lacy House	
Floodplains or Wetlands	Yes	
Hazardous Materials	none	
Natural Heritage Area	none	
Riparian Area	yes	

Sensitive Fisheries	none
Smoke Receptors	within 1/2 mi: subdivisions outside of the Battlefield

Special Concern Species	Animals	none
	Plants	none
Water Resources	yes	

Name of Project: Chancellor Fields

Area: 81 acres

Type of Treatment: prescribed fire treatment; treatment will be coordinated with chemical treatment of invasive plants

Timeline: (not applicable)

Descriptive Location: area in Chancellorsville Battlefield, adjacent through and around Rt. 3 – fields **Fuels:** annual and perennial grasses, shrubby oaks, sweetgums

Purpose(s) of Treatment: reduction of fuel hazard in and around Chancellorsville Battlefield, and to maintain historic vistas

Resource		Presence in or near treatment unit
Facilities or Structures	none	
Floodplains or Wetlands	none	
Hazardous Materials	none	
Natural Heritage Area	none	
Riparian Area	none	
Sensitive Fisheries	none	
Smoke Receptors	within 1/2 mi: subdivisions outside of the Battlefield	
Special Concern Species	Animals	none
	Plants	none
Water Resources	none	

Name of Project: Snead Field

Area: 47 acres

Type of Treatment: prescribed fire treatment; treatment will be coordinated with chemical treatment of invasive plants

Timeline: (not applicable)

Descriptive Location: area in Fredericksburg Battlefield, adjacent to Lansdowne Road and Lee Drive - fields **Fuels:** annual and perennial grasses, shrubby oaks, sweetgums

Purpose(s) of Treatment: reduction of fuel hazard in and around Fredericksburg Battlefield, and to maintain historic vistas

Resource		Presence in or near treatment unit
Facilities or Structures	none	
Floodplains or Wetlands	none	
Hazardous Materials	none	

Natural Heritage Area	none
Riparian Area	none
Sensitive Fisheries	none
Smoke Receptors	within 1/2 mi: subdivisions outside of the Battlefield

Special Concern Species	Animals	none
	Plants	none
Water Resources	none	

Name of Project: Bernards Cabin Field

Area: 25 acres

Type of Treatment: prescribed fire treatment; treatment will be coordinated with chemical treatment of invasive plants

Timeline: (not applicable)

Descriptive Location: area in Fredericksburg Battlefield, near Lee Drive - fields **Fuels:** annual and perennial grasses, shrubby oaks, sweetgums

Purpose(s) of Treatment: reduction of fuel hazard in and around Fredericksburg Battlefield, and to maintain historic vistas

Resource	Presence in or near treatment unit	
Facilities or Structures	none	
Floodplains or Wetlands	none	
Hazardous Materials	none	
Natural Heritage Area	none	
Riparian Area	none	
Sensitive Fisheries	none	
Smoke Receptors	within 1/2 mi: subdivisions outside of the Battlefield	
Special Concern Species	Animals	none
	Plants	none
Water Resources	none	

Name of Project: Meade Monument Fields

Area: 47 acres

Type of Treatment: prescribed fire treatment; treatment will be coordinated with chemical treatment of invasive plants

Timeline: (not applicable)

Descriptive Location: area in Fredericksburg Battlefield, adjacent to Lansdowne Road and Lee Drive - fields **Fuels:** annual and perennial grasses, shrubby oaks, sweetgums

Purpose(s) of Treatment: reduction of fuel hazard in and around Fredericksburg Battlefield, and to maintain historic vistas

Resource	Presence in or near treatment unit	
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Facilities or Structures	none
Floodplains or Wetlands	none
Hazardous Materials	none
Natural Heritage Area	none
Riparian Area	none
Sensitive Fisheries	none
Smoke Receptors	within 1/2 mi: subdivisions outside of the Battlefield

Special Concern Species	Animals	none
	Plants	none
Water Resources	none	

Name of Project: Laurel Hill Fields

Area: 47 acres

Type of Treatment: prescribed fire treatment; treatment will be coordinated with chemical treatment of invasive plants

Timeline: (not applicable)

Descriptive Location: area in Spotsylvania Court House Battlefield, adjacent to Brock Road - fields **Fuels:** annual and perennial grasses, shrubby oaks, sweetgums

Purpose(s) of Treatment: reduction of fuel hazard in and around Spotsylvania Court House Battlefield, and to maintain historic vistas

Resource		Presence in or near treatment unit
Facilities or Structures	none	
Floodplains or Wetlands	none	
Hazardous Materials	none	
Natural Heritage Area	none	
Riparian Area	none	
Sensitive Fisheries	none	
Smoke Receptors	within 1/2 mi: subdivisions outside of the Battlefield	
Special Concern Species	Animals	none
	Plants	none
Water Resources	none	

Part III: Other Projects

This section includes all other projects which the fire program would be conducting to achieve resource management objectives, regardless of the specific objective(s).

Table 7. Five-year Plan: Other projects that would be included under each of the three alternatives.

	Alternative 1	Alternative 2
Fire Roads	no	yes

Name of Project: Fire Roads

Length (miles): approximately 6 miles total

Type of Treatment: mechanical fuel treatment as described in **Specifications** below

Timeline: (not applicable)

Descriptive Location: 3 separate treatment units, as listed below

Fuels: primarily timber and brush, some grass and herbaceous plants

Purpose(s) of Treatment: to maintain fire roads in such a condition that they may be used by light-duty and small medium-duty vehicles such as pick-up trucks and type-6 wildland fire engines for travel to and from fires and other emergencies

Specifications of project work: Woody vegetation shall not encroach on a roadway 12 ft (3.6 m) in width or height without being cut back as staffing and funding permits. Roadways that have these 12 ft (3.6 m) clearances shall not be brushed out. Brush, shrubs, branches and trees will be removed from the rectangular area bordered by the imaginary lines three feet horizontally from both sides of the roadbed and 12 ft (3.6 m) vertically from the road level. The road bed is defined as the flat part of the surfaced road way, up to 12 ft (3.6 m) wide. Where the flat part is more than 12 ft (3.6 m) wide, the road bed will be defined as 6 ft (1.8 m) to either side of the center of the flat part, unless otherwise defined in writing by resource management personnel.

Appropriate tools include hand tools and hand-held power tools such as chainsaws and weed whackers. A mower on an arm, such that the wheels of the equipment operating the mower remain on the road bed at all times, may be used to trim herbaceous and small woody vegetation during the dormant season. During the growing season, approval for the use of such a mower must be obtained in writing from resource management personnel. Heavy equipment may be used to clear out pre-existing water bars and uphill roadside drainage ditches, under the following conditions: all of the wheels or other parts of the equipment remain on the road bed at all times; the water bar or ditch is clearly and obviously pre-existing, and not new construction; the drainage ditch is on the uphill side of the road; clearing of the water bar or drainage ditch will not require shoring up in any way to prevent debris other than that normally carried by water from falling into the ditch from the sides; and all of the debris removed from the water bar or ditch is deposited or (spread) on the roadway itself (usually downhill, so that it doesn't wash back in to the ditch).

Work may be performed during all four seasons; however, vegetation removal is preferred during the summer because of the lessened re-sprouting potential of cleared plants. The

exception is that it is preferable to do mowing of roadside herbaceous and small woody vegetation during the dormant season.

Vegetation and trees shall be cut as close to the ground as possible. Stumps will be flush cut to the surrounding ground level. Logs generated from clearing operations should be left on site after being cut to “manageable and efficient length,” that is, to a size such that each log may be moved comfortably by hand by no more than two persons. Tree stumps or large rocks in the roadway that hinder access or may puncture vehicle tires may be moved or removed.

Disposal of brush and branches may be by chipping, scattering, or piling for decomposition. Chips must not be piled, but trucked off site or scattered widely instead. Brush and branch debris that is scattered shall be placed proximal to where cut and manipulated so as not to be greater than 18 inches (45 cm) above the ground.

Exclusions: Except as permitted above, the following activities and equipment are specifically not approved for use in this project. Use of these activities or equipment must be proposed and approved through the Park’s normal Project Clearance process. The absence of an activity or equipment from this list does not automatically constitute approval for its use.

- Heavy equipment, including grader, dozer, and scraper ; equipment that must be towed behind any kind of tractor, including an ATV, such as a brush hog and sickle-bar mower
- Burning, either of piles or broadcast burning
- Any activity that would move road bed materials off of the road bed
- Clearing the road way wider than the above specifications

Resource		Presence in or near treatment unit
Facilities or Structures	none	
Floodplains or Wetlands	none	
Hazardous Materials	none	
Natural Heritage Area	none	
Riparian Area	none	
Sensitive Fisheries	none	
Smoke Receptors	within 1/2 mi: subdivisions outside of the Battlefield	
Special Concern Species	Animals	none
	Plants	none
Water Resources	none	

Fire roads encompassed by this project are, in alphabetical order:

Fire Road	Length (mi)
FRED – Sewer Line Road	1.27
SPOT – Harbert Road	.55
WILD – Apperson Access Road	3.89