

Manassas National Battlefield Park
Manassas, Virginia

U.S. Department of the Interior
National Park Service



Fire Management Plan

ENVIRONMENTAL ASSESSMENT



December 2014

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Fire Management Plan
Draft Environmental Assessment
Manassas National Battlefield Park

DRAFT ENVIRONMENTAL ASSESSMENT

December 2014

PROJECT SUMMARY

Introduction

On May 10, 1940, the secretary of the interior designated Manassas National Battlefield Park as a national historic site to preserve the sites of the First and Second Battles of Manassas and their significance in the Civil War. Subsequent congressional legislation in 1954, 1980, and 1988 established the present boundaries in order to "...preserve the most important historical lands relating to the two battles of Manassas." Like all national parks, Manassas is to be preserved for the use, inspiration, and benefit of the public.

The wildland fire management policies of the National Park Service support the general management and resource management goals of Manassas National Battlefield Park (the park), provide for firefighter and public safety, protect natural and cultural resources, and protect human developments from unwanted wildland fire. "Wildland" refers to areas where development is low or non-existent, except for roads, power lines, railroads, and similar transportation facilities, and wildland fire is a fire that occurs in these areas.

The Manassas National Battlefield Park proposes to develop an updated Fire Management Plan that would provide strategies for management of wildland fires, use of prescribed fires, and vegetation and fuels management while protecting human life and property, in order to preserve and restore landscapes as they were during the Civil War battles for which the park was established. Prescribed fires are fires intentionally ignited by management personnel to meet specific management objectives. Fuels management is the act or practice of controlling flammability and reducing wildland fire intensity through mechanical, chemical, biological, or manual means, or the use of prescribed fire, in support of land management objectives. It typically involves strategic removal of large amounts of deadwood and other vegetation in the understory that, when dry, can serve as fuel and create higher intensity fires that are harder to control.

The current 2010 fire management plan calls for wildland fire suppression only, does not provide for the strategic integration of any fuels treatments, including prescribed fire use, into fire management goals, and thus does not allow a full range of tools to implement the 2008 Manassas National Battlefield Park General Management Plan /Environmental Impact Statement. This environmental assessment documents the results of a study of the potential environmental impacts of actions proposed in revisions to the Manassas National Battlefield Park fire management plan.

Purpose and Need for the Action

The purpose of this project is to meet the goals of federal policy for fire management at Manassas National Battlefield Park while providing park staff flexibility with fire management tools to meet management objectives, thereby increasing safety for firefighters who are fighting fires as well as public safety in general.

The proposed project is needed in order to update the current 2010 plan so that it considers or includes additional fire management and fuel reduction strategies beyond those currently available to park staff, to determine methods to suppress wildland fires that minimize impacts to both natural and cultural resources and human safety, to strategically integrate vegetation management practices into the fire management plan, and to distinguish between the different management goals for different areas of the park.

Overview of the Alternatives

ALTERNATIVE 1: NO ACTION

This alternative would continue current fire management practices. Under the no action alternative, no specific treatment units would be defined, and prescribed fire would not be used as a management tool. All wildland fires would be suppressed under the conditions of the current fire management plan, and the park would continue its vegetation management practices, which also serve to remove fuels using mechanical means and targeted application of herbicides in a manner consistent with integrated pest management principles of the park.

ALTERNATIVE 2: PRESCRIBED FIRE, FIRE SUPPRESSION, AND MECHANICAL AND CHEMICAL FUELS MANAGEMENT (PREFERRED ALTERNATIVE)

Under alternative 2, prescribed fire, mechanical, and chemical methods would be used where and when appropriate to manage fuels, promote biodiversity and ecosystem health, and maintain and/or restore historic landscapes. Goats may be used to graze some areas in order to maintain vegetation in a low-growing condition. Specific areas where these treatments could be used would be identified. For example, prescribed fire would not be permitted at the edges of the park in the wildland/urban interface. Prescribed fire would also not be permitted in areas that have a higher likelihood of containing unexploded ordnance or other archeological artifacts until archeological investigations have verified the location of such artifacts. All wildland fires would be suppressed, and the park would strategically integrate its vegetation management practices into the fire management plan.

ALTERNATIVE 3: FIRE SUPPRESSION AND MECHANICAL AND CHEMICAL FUELS MANAGEMENT

Under this alternative, the park would identify treatment areas for expanded use of mechanical and chemical methods to reduce and manage fuels. Prescribed fire would not be used as a management tool under this alternative. Treatment areas would likely be similar to those established under alternative 2, but may be configured differently. All wildland fires would be suppressed, and vegetation management practices would be strategically integrated into the fire management plan.

Summary of Impacts

Impacts of the proposed alternatives were assessed in accordance with the National Environmental Policy Act and the National Park Service's Director's Order 12: *Conservation Planning, Environmental Impact Analysis, and Decision-making* (table 2). Several impact topics were dismissed from further analysis because the proposed action would result in no impacts or negligible to minor or short-term impacts to those resources. No major, adverse impacts are anticipated as a result of this project.

TABLE ES-1. SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Impacted Resource	Alternative 1—No Action	Alternative 2—Prescribed fire, fire suppression, and mechanical and chemical fuels management	Alternative 3—Mechanical and Chemical Fuels Management and Fire Suppression
Soils	<p>Short- and long-term, negligible adverse, impacts would result from localized compaction and erosion from mechanical vegetation removal and migration of herbicides into the soil.</p> <p>Short- to long-term, minor to moderate, adverse impacts would result from unplanned wildland fire due to soil erosion and fire damage to organic material in soils.</p> <p>Short- to long-term, negligible, adverse, and mostly localized impacts would result from fire suppression. Minimum impact suppression tactics would be used to reduce impacts on soils, and areas where soils are disturbed would be remediated and stabilized with an NPS-approved seed mix.</p>	<p>Short- and long-term, negligible, adverse impacts would result from localized compaction and erosion from mechanical vegetation removal and migration of herbicides into the soil. Short-term, minor, adverse impacts would result from prescribed burning due to temporary loss of vegetation and associated erosion. Long-term, beneficial impacts would result from the addition of ash and woody debris to the soil.</p> <p>Short- to long-term, minor to moderate, adverse impacts would result from unplanned wildland fire due to soil erosion and fire damage to organic material in soils.</p> <p>Impacts from suppression would be the same as under alternative 1.</p>	<p>Short- and long-term, negligible, adverse impacts would result from localized compaction and erosion from mechanical vegetation removal and migration of herbicides into the soil.</p> <p>Short- to long-term, minor to moderate, adverse impacts would result from unplanned wildland fire due to soil erosion and fire damage to organic material in soils.</p> <p>Impacts from suppression would be the same as under alternative 1.</p>
Vegetation	<p>Short- and long-term, negligible, adverse impacts would result from potential spread of invasive species by mechanical equipment and herbicide damage to non-target plant species.</p> <p>An unplanned high-severity wildland fire would result in localized, short- and long-term, minor to moderate, adverse impacts due to lost soil productivity and changes in vegetative community composition.</p> <p>Short-term, minor adverse impacts would result from suppression. Minimum impact suppression tactics would be used to reduce impacts on vegetation, and areas where soils are disturbed would be remediated and stabilized with an NPS-approved seed mix.</p>	<p>Short- and long-term, negligible, adverse impacts would result from potential spread of invasive species by mechanical equipment and herbicide damage to non-target plant species. Prescribed burning would result in localized, short-term, minor, adverse impacts from temporary loss of vegetation. Prescribed burning would have long-term, beneficial impacts from contribution of nutrients and organic debris to soils and contribution to ecosystem structural complexity and function.</p> <p>An unplanned high-severity wildland fire would result in localized, short- and long-term, minor to moderate, adverse impacts due to lost soil productivity and changes in vegetative community composition.</p> <p>Impacts from suppression would be the same as under alternative 1.</p>	<p>Short- and long-term, negligible, adverse impacts would result from potential spread of invasive species by mechanical equipment and herbicide damage to non-target plant species.</p> <p>An unplanned high-severity wildland fire would result in localized, short- and long-term, minor to moderate, adverse impacts due to lost soil productivity and changes in vegetative community composition.</p> <p>Impacts from suppression would be the same as under alternative 1.</p>

Impacted Resource	Alternative 1—No Action	Alternative 2—Prescribed fire, fire suppression, and mechanical and chemical fuels management	Alternative 3—Mechanical and Chemical Fuels Management and Fire Suppression
		the same as under alternative 1.	
Water Resources	<p>Short- and long-term, negligible, adverse impacts would result from chemical herbicide runoff and increased erosion and turbidity due to bank vegetation removal.</p> <p>An unplanned high intensity wildland fire would result in short- and long-term, minor to moderate, adverse impacts due to increased turbidity, an increase in stream temperature leading to lower dissolved oxygen levels, increased nutrient loading, and channel erosion.</p> <p>Short-term, negligible to minor adverse impacts would result from suppression. Minimum impact suppression tactics would be used to reduce impacts on water resources, including minimizing ground disturbance from firebreaks and use of water diversion devices. Off-road travel would be minimized and damaged stream bank or shoreline vegetation would be immediately rehabilitated.</p>	<p>Short- and long-term, negligible adverse impacts would result from chemical herbicide runoff and increased erosion and turbidity due to bank vegetation removal.</p> <p>Prescribed burning would have short-term, negligible to minor, adverse impacts due to temporary increases in water temperatures, soil erosion, and sedimentation. Long-term, beneficial impacts would result from decreased frequency and intensity of unplanned wildland fire.</p> <p>An unplanned high intensity wildland fire would result in short- and long-term, minor to moderate, adverse impacts due to increased turbidity, an increase in stream temperature leading to lower dissolved oxygen levels, increased nutrient loading, and channel erosion. Impacts from suppression would be the same as under alternative 1.</p>	<p>Short- and long-term, negligible, adverse impacts would result from chemical herbicide runoff and increased erosion and turbidity due to bank vegetation removal.</p> <p>An unplanned high intensity wildland fire would result in short- and long-term, minor to moderate, adverse impacts due to increased turbidity, an increase in stream temperature leading to lower dissolved oxygen levels, increased nutrient loading, and channel erosion.</p> <p>Impacts from suppression would be the same as under alternative 1.</p>
Wildlife and Habitat	<p>Short-term, negligible, adverse impacts would result from temporary habitat disruption due to mechanical and chemical vegetation removal.</p> <p>An unplanned high-severity wildland fire would result in localized, short- and long-term, minor to moderate, adverse impacts due to loss of individuals and habitat and changes in vegetative community composition.</p> <p>Short-term, negligible to minor adverse impacts would result from suppression. Minimum impact suppression</p>	<p>Short-term, negligible, adverse impacts would result from temporary habitat disruption due to mechanical and chemical vegetation removal. Prescribed fire would have short-term, minor, adverse impacts from the localized loss of wildlife and wildlife habitat; beneficial impacts would occur due to contribution of nutrients and organic debris to soils and contribution to habitat complexity and function.</p> <p>An unplanned high-severity wildland fire would result in localized, short- and long-term, minor to moderate, adverse impacts due to loss of individuals and habitat and changes in</p>	<p>Short-term, negligible, adverse impacts would result from temporary habitat disruption due to mechanical and chemical vegetation removal.</p> <p>An unplanned high-severity wildland fire would result in localized, short- and long-term, minor to moderate, adverse impacts due to loss of individuals and habitat and changes in vegetative community composition.</p> <p>Impacts from suppression would be the same as under alternative 1.</p>

Impacted Resource	Alternative 1—No Action	Alternative 2—Prescribed fire, fire suppression, and mechanical and chemical fuels management	Alternative 3—Mechanical and Chemical Fuels Management and Fire Suppression
	tactics used for soils, vegetation, and water resources mitigation would reduce impacts on wildlife and habitat.	vegetative community composition. Impacts from suppression would be the same as under alternative 1.	
Air Quality	Mechanical and chemical vegetation management would have localized, short-term, negligible to minor, adverse impacts to air quality due to emissions and dust from mechanical equipment and spray drift from herbicide application. An unplanned high-severity wildland fire would result in localized, short-term, minor to moderate, adverse impacts due to smoke, dust, and particulate matter. Prompt and aggressive suppression efforts would mitigate these impacts.	Mechanical and chemical vegetation management would have localized, short-term, negligible to minor, adverse impacts to air quality due to emissions and dust from mechanical equipment and spray drift from herbicide application. Prescribed burning would result in localized, short-term, negligible to minor, adverse impacts due to smoke, dust, and particulate matter. An unplanned high-severity wildland fire would result in localized, short-term, minor, adverse impacts due to smoke, dust, and particulate matter.	Mechanical and chemical vegetation management would have localized, short-term, negligible to minor, adverse impacts to air quality due to emissions and dust from mechanical equipment and spray drift from herbicide application. An unplanned high-severity wildland fire would result in localized, short-term minor, adverse impacts due to smoke, dust, and particulate matter.
Visitor Use and Experience	Short-term, negligible to minor, adverse impacts would result from temporary area closures during mechanical and chemical vegetation removal. Localized, short-term, minor, adverse, impacts would result from increased potential for unplanned wildland fires, smoke, changes in the natural environment and scenery, and reduced quality of the visitor experience. Prompt and aggressive suppression efforts would mitigate these impacts.	Short-term, negligible to minor, adverse impacts would result from temporary area closures during mechanical and chemical vegetation removal. Short-term, negligible to minor, adverse impacts would result from prescribed fire due to area closures, fire, smoke, and blackened areas. Long-term, beneficial impacts would result from maintenance of the cultural landscape and native ecosystems. Impacts from unplanned wildland fires would be localized, short term, minor, and adverse due to smoke and visitor restrictions near the fire area.	Short-term, negligible to minor, adverse impacts would result from temporary area closures during mechanical and chemical vegetation removal. Long-term, beneficial impacts would result from maintenance of the cultural landscape and native ecosystems. Impacts from unplanned wildland fires would be localized, short term, minor, and adverse due to smoke and visitor restrictions near the fire area.
Park Management and Operations	Long-term, negligible to minor, adverse impacts are anticipated as a result of mechanical and chemical vegetation removal. Short-term, minor to moderate, adverse impacts would result in the event of unplanned wildland fires and related increased demand on park resources and staff for	No impacts are anticipated as a result of mechanical and chemical vegetation removal. Prescribed burning would have short-term, negligible to minor, adverse impacts from additional demands on park staff and resources, and long-term, beneficial impacts would result from increased ease and efficiency of maintaining the	No impacts are anticipated as a result of mechanical and chemical vegetation removal. Short-term, negligible to minor, adverse impacts to park operations would result from increased planning workload or the redirection of park staff to fuels management or fire response

Impacted Resource	Alternative 1—No Action	Alternative 2—Prescribed fire, fire suppression, and mechanical and chemical fuels management	Alternative 3—Mechanical and Chemical Fuels Management and Fire Suppression
	<p>fire suppression efforts , as well as disruption of park operations.</p> <p>Overall, long-term, negligible, adverse impacts to park management and operations would result from the limitations of current vegetation management practices in maintaining the cultural landscape</p>	<p>cultural landscape and reduced frequency and intensity of unplanned wildland fires</p> <p>Short-term, minor, adverse impacts would result from unplanned wildland fires and related increased demand on park resources and staff and disruption of park operations.</p> <p>Impacts from suppression would the same as under alternative 1.</p>	<p>activities.</p> <p>Long-term, beneficial impacts would result from increased ease and efficiency of maintaining the cultural landscape and reduced frequency and intensity of unplanned wildland fires.</p> <p>Short-term, minor, adverse impacts would result from unplanned wildland fires and related increased demand on park resources and staff and disruption of park operations.</p> <p>Impacts from suppression would the same as under alternative 1.</p>
Public Health and Safety	<p>Due to safety precautions, negligible to no impacts to public health and safety would result from mechanical and chemical vegetation removal.</p> <p>Short-term, minor, adverse impacts would result in the event of unplanned wildland fire and related suppression efforts due to effects on firefighter safety, and health and safety effects from smoke.</p>	<p>Due to safety precautions, negligible to no impacts to public health and safety would result from mechanical and chemical vegetation removal.</p> <p>As a result of planning and safety precautions, short-term health and safety impacts from prescribed burns would be localized, negligible to minor, and adverse. Long-term impacts would be beneficial because prescribed burning would aid in reducing the occurrence and severity of unplanned wildland fire over time.</p> <p>Impacts from suppression would the same as under alternative 1.</p> <p>Short-term, minor to moderate, adverse impacts would result in the event of unplanned wildland fire and related effects on firefighter safety, and health and safety effects from smoke.</p> <p>Archeological investigations at Deep Cut prior to prescribed burns would minimize the potential for firefighters to encounter Civil War UXO.</p>	<p>Due to safety precautions, negligible to no impacts to public health and safety would result from mechanical and chemical vegetation removal.</p> <p>Long-term impacts would be beneficial because fuels management would aid in reducing the occurrence and severity of unplanned wildland fire over time.</p> <p>Short-term, minor to moderate, adverse impacts would result in the event of unplanned wildland fire and related effects on firefighter safety, and health and safety effects from smoke.</p> <p>Impacts from suppression would the same as under alternative 1.</p>
Cultural Resources, including Archeology and Cultural Landscapes	<p>Long-term, minor to moderate, adverse impacts to archeological resources would result from the potential for fire damage as well as damage from vegetation management.</p>	<p>Long-term, negligible to moderate, adverse impacts to archeological resources would result from potential damage to archeological resources during fuels management activities, although archeological</p>	<p>Long-term, minor to moderate, adverse impacts to archeological resources would result from potential damage from mechanical vegetation management activities; long-term,</p>

Impacted Resource	Alternative 1—No Action	Alternative 2—Prescribed fire, fire suppression, and mechanical and chemical fuels management	Alternative 3—Mechanical and Chemical Fuels Management and Fire Suppression
	<p>Long-term, minor to moderate, adverse impacts to cultural landscapes would result from potential for unplanned wildland fire and encroachment of vegetation on historically significant viewsheds and sightlines.</p> <p>Long-term, minor to moderate, adverse impacts to historic structures and districts could result from changes to character defining features due to fire.</p> <p>Suppression would have minor adverse impacts to archaeological resources by compacting soils that contain artifacts; beneficial impacts to cultural landscapes from preservation of important features; and minor adverse impacts to historic structures from tarping or spraying with water.</p>	<p>investigations would occur at Brawner Farm and Deep Cut prior to any prescribed burns to identify resources; long-term, beneficial impacts to archeological resources would result from reduced potential for destructive fires.</p> <p>Short-term, minor to moderate, adverse impacts to cultural landscapes would result from prescribed fire creating unsightly burned vegetation; long-term, beneficial impacts to cultural landscapes would result from restoration of open areas and viewsheds and a reduction in potential for unplanned wildland fire.</p> <p>Long-term, beneficial impacts on historic structures and districts would result from reduced risk of unplanned wildland fire.</p> <p>Impacts from suppression would the same as under alternative 1.</p>	<p>beneficial impacts to archeological resources would result from reduced potential for destructive fires.</p> <p>Short- and long-term, beneficial impacts to cultural landscapes would result from decreased potential for unplanned wildland fire and removal of vegetation in order to restore open areas and historic viewsheds.</p> <p>Long-term, beneficial impacts on historic structures and districts would result from reduced risk of unplanned wildland fire.</p> <p>Impacts from suppression would the same as under alternative 1.</p>

How to comment

Agencies and the public are encouraged to review and comment on the contents of this environmental assessment during the 30-day public review and comment period by any one of several methods. The preferred method of providing comments is through the National Park Service's Planning, Environment, and Public Comment (PEPC) website for the park at:
<http://parkplanning.nps.gov/manassasfiremanagement>.

You may also submit written comments to

Park Superintendent
Attn: Fire Management Plan EA
Manassas National Battlefield Park
6511 Sudley Rd.
Manassas, VA 20109

Only written comments will be accepted. Please submit your comments within 30 days of the posting of the notice of availability on the PEPC website. **Please be aware that your entire comment will become part of the public record. If you wish to remain anonymous, please clearly state that within your correspondence; however, we cannot guarantee that personal information, such as email address, phone number, etc., will be withheld.**

TABLE OF CONTENTS

Project Summary	i
Introduction	i
Purpose and Need for the Action	i
Overview of the Alternatives	ii
Alternative 1: No Action	ii
Alternative 2: Prescribed Fire, Fire Suppression, and Mechanical and Chemical Fuels Management (Preferred Alternative)	ii
Alternative 3: Fire Suppression and Mechanical and Chemical Fuels Management	ii
Summary of Impacts	ii
How to comment	viii
Table of Contents	ix
List of Figures	xiv
List of Tables	xiv
Appendices	xiv
Chapter 1: Purpose of and Need for Action	1
Introduction	1
Park Background	1
Overview of Fire Management	3
Fire History	4
Purpose of and Need for Action	4
The Scoping Process and Public Participation	5
Relationship to Laws, Executive Orders, Policies, and Other Plans	5
Applicable State and Federal Laws	5
Executive Orders	7
State Laws and regulations	7
NPS Policies and Plans	7
NPS Director's Orders	7
Issues and Impact Topics	9
Impact Topics Analyzed in this Environmental Assessment	9
Impact Topics Dismissed from Further Analysis	11
Chapter 2: Alternatives	13
Introduction	13
Descriptions of Alternatives	13
Alternative 1: No Action	13

Alternative 2: Prescribed Fire, Fire Suppression, and Mechanical and Chemical Fuels Management (Preferred Alternative)	13
Mitigation Measures and Required Best Management Practices of the Action Alternatives	16
Alternatives Considered but Dismissed	16
NPS Preferred Alternative	17
Environmentally Preferable Alternative	17
Summary of Environmental Consequences	17
Chapter 3: Affected Environment	25
Soils	25
Vegetation	26
Water Resources	28
Wildlife and Habitat	29
Mammals	29
Birds	29
Reptiles and Amphibians	30
Special Status Species	30
Air Quality	30
Visitor Use and Experience	31
Seasonal Visitation Patterns	31
Visitor Activities	32
Park Management and Operations	33
Park Management and Administration	33
Natural Resource Management	34
Cultural Resources Management, Education and Interpretation	34
Law Enforcement	34
Maintenance	34
Public Health and Safety	35
Cultural Resources	36
Archeological Resources	36
Cultural Landscapes	36
Historic Structures and Districts	37
Chapter 4: Environmental Consequences	39
General Methodology for Establishing Impact Thresholds and Measuring Effects by Resource	39
General Analysis Methods	39
Assumptions	39
Impact Thresholds	40

Cumulative Impacts Analysis Method	40
Soils	43
Methodology	43
Study Area	43
Impact Thresholds and Duration.....	43
Impacts of Alternative 1 (No action) to Soils	43
Impacts of Alternative 2 to Soils.....	45
Impacts of Alternative 3 to Soils.....	46
Vegetation	46
Methodology	46
Study Area	46
Impact Thresholds and Duration.....	46
Impacts of Alternative 1 (No Action) to Vegetation.....	47
Impacts of Alternative 2 to Vegetation	48
Impacts of Alternative 3 to Vegetation	49
Water Resources	50
Methodology	50
Study Area	50
Impact Thresholds and Duration.....	50
Impacts of Alternative 1 (No Action) to Water Resources	50
<i>Conclusion</i>	52
Impacts of Alternative 2 to Water Resources	52
Impacts of Alternative 3 to Water Resources	53
Wildlife and Habitat.....	54
Methodology And Assumptions	54
Study Area	54
Impact Thresholds and Duration.....	54
Impacts of Alternative 1 (No Action) to Wildlife and Habitat	54
Impacts of Alternative 2 to Wildlife and Habitat.....	56
Impacts of Alternative 3 to Wildlife and Habitat.....	57
Air Quality	57
Methodology and Assumptions	57
Study Area	57
Impact Thresholds and Duration.....	57
Impacts of Alternative 1 (No Action) to Air Quality	58
Impacts of Alternative 2 to Air Quality	59

Impacts of Alternative 3 to Air Quality	60
Visitor Use and Experience	60
Methodology	60
Study Area	60
Impact Thresholds and Duration.....	60
Impacts of Alternative 1 (No Action) to Visitor Use and Experience	61
Impacts of Alternative 2 to Visitor Use and Experience.....	62
Impacts of Alternative 3 to Visitor Use and Experience.....	63
Park Management and Operations	64
Methodology And Assumptions	64
Study Area	64
Impact Thresholds and Duration.....	64
Impacts of Alternative 1 (No Action) to Park Management and Operations	65
Impacts of Alternative 2 to Park Management and Operations	66
Impacts of Alternative 3 to Park Management and Operations	67
Public Health and Safety.....	67
Methodology	67
Study Area	67
Impact Thresholds and Duration.....	68
Impacts of Alternative 1 (No Action) to Public Health and Safety	68
Impacts of Alternative 2 to Public Health and Safety	69
Impacts of Alternative 3 to Public Health and Safety	71
Cultural Resources	71
Methodology And Assumptions	71
Study Area	72
Impact Thresholds and Duration.....	73
Archeological Resources.....	73
Cultural Landscapes	76
Historic Structures and Districts	79
Chapter 5: Consultation and Coordination.....	83
Section 7 of the Endangered Species Act	83
Section 106 of the National Historic Preservation Act	83
List of Preparers	85
U.S. Department of the Interior, National Park Service	85
The Louis Berger Group, Inc.	85
Glossary and Acronyms	87

Glossary of Terms.....	87
Acronyms.....	91
References.....	93
Personal Communications	97
Appendix A.....	99
Mitigation Measures	99
Appendix B	107
Consultation Correspondence	107

LIST OF FIGURES

Figure 1. Manassas National Battlefield Park.....	2
Figure 2. Accumulation of fuels from storm damage at Manassas National Battlefield Park.	3
Figure 3. Proposed Vegetation and Fuels Treatment Areas.....	14
Figure 4. Land Cover and Vegetation Types at Manassas National Battlefield Park.....	27

LIST OF TABLES

Table ES-1. Summary of Environmental Consequences	iii
Table 2. Summary of Environmental Consequences	19
Table 3. Soil Map Units	25
Table 4. Annual Visitation at Manassas National Battlefield Park.....	31
Table 6. Visitor Injuries at Manassas National Battlefield Park, 2001–2011	35
Table 7. Employee Injuries at Manassas National Battlefield Park, 2001–2011	35
Table 7. Cumulative Projects.....	41
Table A-1: Mitigation Measures and Required Best Management Practices	101

APPENDICES

Appendix A: List of Mitigations

Appendix B: Consultation Correspondences

CHAPTER 1: PURPOSE OF AND NEED FOR ACTION

Introduction

This chapter explains what the proposed fire management plan for Manassas National Battlefield Park intends to accomplish and why the National Park Service (NPS) is taking action at this time. This environmental assessment (EA) presents two action alternatives for managing wildland fire at Manassas National Battlefield Park (“the battlefield” or “the park”), and assesses the impacts that could result from continuation of the current management framework (no action alternative) or implementation of any of the action alternatives. Upon conclusion of the plan and decision-making process, the alternative that is selected will become the fire management plan for the park, which will guide future actions for a period of at least 10 years.

Park Background

Manassas National Battlefield Park is located in the Piedmont area of northern Virginia, northwest and on the outskirts of the city of Manassas. The park covers 5,071 acres in Fairfax and Prince William Counties, approximately 25 miles west of Washington, D.C. (figure 1). Of the 5,071 acres, the federal government owns approximately 85%, and private landowners hold the remaining 15%. Visitor activities in the park include guided and self-guided battlefield walking tours, bus tours, hiking, horseback riding, and picnicking. Several lanes allow trail access to points of interest from nearby parking lots. The park is heavily used, although visitation to Manassas has declined during the past decade, from 759,953 in 2003 to 538,888 in 2013.

Interstate 66 borders the park to the south, and Pageland Lane (VA 705) borders the park to the west. The park is bisected by Lee Highway (U.S. Route 29) and Sudley Road (Virginia Route 234). These two roads follow the historic road alignments used by Civil War troops. They now provide visitor access to the battlefields. These roads are heavily used by commuters, residents, and trucks from nearby quarries and construction operations. The farms and fields that historically surrounded the park are giving way to suburban Washington, D.C. While areas north and east of the park retain some rural character, those south and west of the park contain denser residential and commercial development.

Manassas National Battlefield Park was established in 1940 to commemorate the scene of two major Civil War battles, the Battle of First Manassas (First Bull Run) and the Battle of Second Manassas (Second Bull Run). During the Civil War, Manassas was a patchwork of open fields and woodlots scattered across gently rolling hills. Situated in the growing Washington, D.C., metropolitan area, the park faces challenges from nearby development that threaten both natural and cultural resources. However, the wartime character of the park is still largely preserved, and the park continues to be a valuable player in telling the story of pivotal events in the nation’s history as well as providing natural space within an increasingly urban area. Within the park are houses dating from the Civil War period, several post-war historic buildings, a Confederate cemetery, the reconstructed Stone Bridge over Bull Run, six miles of historic road traces, and numerous other resources—historic structures, archeological resources, cemeteries, trenches, and earthworks. The park is charged with maintaining the property in historical land use to preserve the views that would have been present at the time of the battles, and to some extent in later periods, when the monuments were erected on the battlefield grounds.

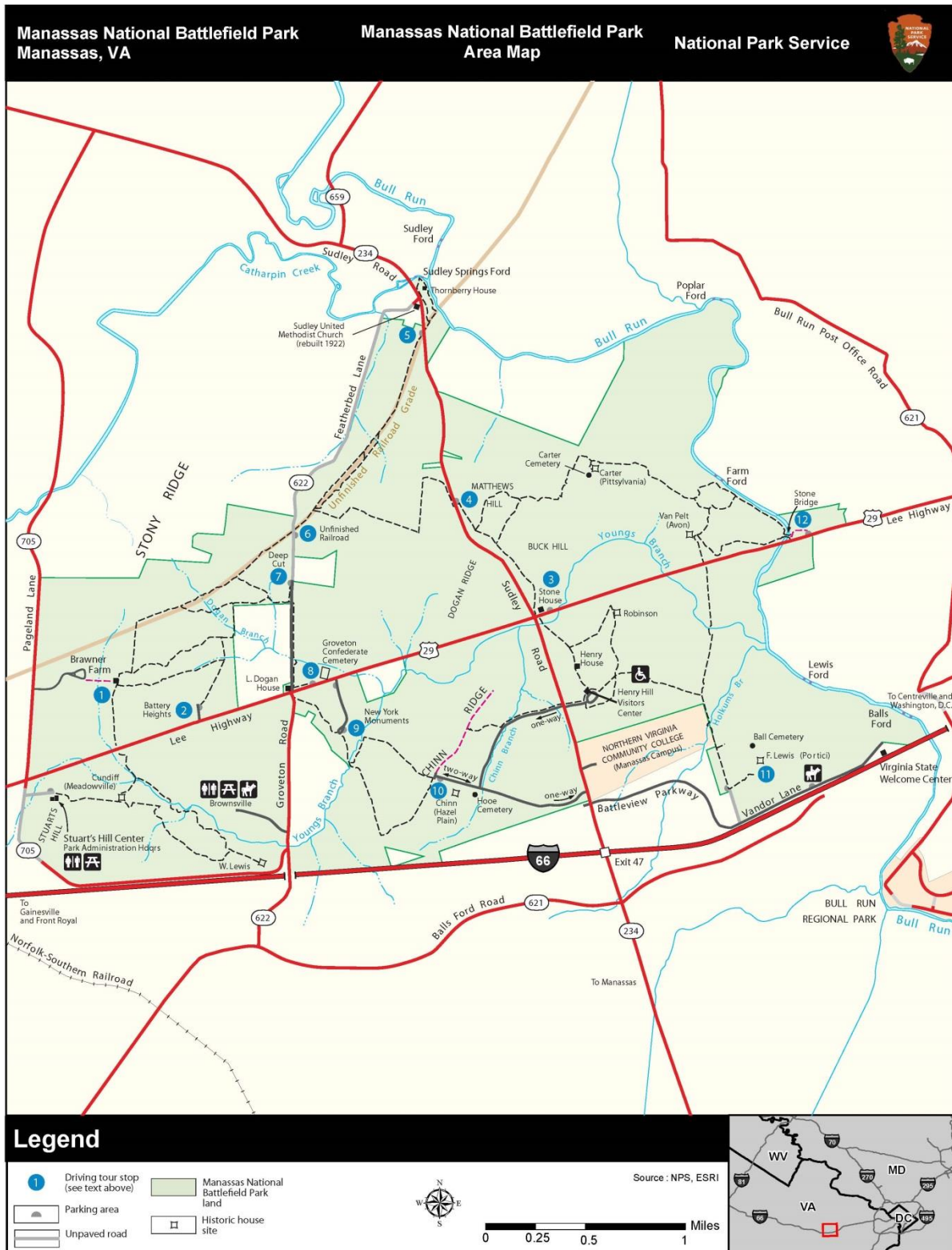


Figure 1. Manassas National Battlefield Park

Overview of Fire Management

Fire management in the National Park Service is critical to protecting life, property, and cultural and natural resources, as well as implementing policies to preserve natural ecosystems. Fire management includes planning, preparedness, prevention, suppression, restoration, rehabilitation, and education. Because Manassas National Battlefield Park has burnable vegetation, the responsibilities and planned actions for management of a wildland fire program must be addressed in an approved fire management plan, per U.S. Department of the Interior Policy (620 Departmental Manual [DM] 1) and Director's Order 18, *Wildland Fire Management* (January 1, 2008) (NPS 2008e). The purpose of fire management planning is to provide strategies for management of wildland fires, prescribed fires, and vegetation and fuels management while protecting human life and property, both public and private.

Suppression is defined as any management action to extinguish or contain the spread of a fire to protect life and property. Safe, aggressive, initial attack is often the best suppression strategy to keep unplanned fires small and costs low; however, fuels (i.e., dense vegetation and debris) management can aid in significantly reducing the frequency with which suppression efforts become necessary. Fuels management helps to prevent unplanned fires and ensures that when unplanned fires occur, they are controllable and do not become too hot or burn out of control. In general, Manassas National Battlefield Park is not considered to be located in a fire maintained ecosystem area that experiences and thrives on frequent fires (Gorsira, pers. comm. 2014). Nonetheless, without fuels management, fire hazards could become elevated due to accumulations of combustible fuels (figure 2).



Figure 2. Accumulation of fuels from storm damage at Manassas National Battlefield Park

Approaches to fuels management may include the physical removal of a certain amount of debris and vegetation through mechanical means, reduction or removal of vegetation using chemical controls, such as the application of herbicides, and construction of fire breaks in key areas to stop spread of fire from one location to another. Fuels management options may also include prescribed fires, which are controlled fires ignited by park management to achieve specific management objectives, such as reducing accumulations of combustible fuels or managing native ecosystems.

Prescribed fire can minimize the amount of fuels available for unplanned fires, but can also serve other purposes, including both ecological and landscape goals. Many of the warm season grasses found at Manassas can derive nutrient benefits from occasional burning, and occasional fire can even help to improve agricultural yields. Prescribed fire can also help maintain open vistas in the landscape, including important cultural landscapes, such as those related to the Civil War battles at Manassas. Prescribed fire can be particularly useful when other means of opening the landscape are not feasible, such as in rocky areas not accessible by mowing equipment.

Fire History

Fire is a natural component of forest and grasslands, and humans have used fire since prehistoric times for managing brush and game. It is likely fire was used by native inhabitants of the region to manage the landscape for hunting purposes (Van Lear and Waldrop 1989). Much of the land within Manassas National Battlefield Park was cleared for farming before records of fire history were kept. Because the land was maintained as farmland following European settlement, fires have usually been excluded and therefore have not played a significant historical role. Most fires today occur along roadways or near power transmission lines; these are considered human-caused fires. Lightning fires are rare.

Manassas National Battlefield Park is composed primarily of open fields and woodlands that represent a variety of fuel types and a wide range of potential fire behavior. The park has two fire seasons. A spring season runs from about February 15 to April 30, and a fall season runs from about October 15 to November 30 (NPS 2010). The fall fire season normally continues from the first killing frost until snow cover. The spring season is from the loss of snow cover until green-up.

Fire regime mapping for the eastern United States in the Cohesive Strategy document (USDA, USDI, 2002) suggests that current habitat in the park falls into two major fire regimes. Fire regimes are the characteristic patterns of fire occurrences, frequency, size, and severity in a given area or ecosystem. Hardwood forests, both upland and bottomland types, are expected to be in Fire Regime III, which is characterized by mixed severity fires with a 35-100+ year fire return interval. Condition classes are depictions of the degree of departure from historical fire regimes and serve as generalized rankings for the risk of loss of key ecosystem components from wildland fires. Class 1 is the lowest risk, while Class 3 is highest-risk. Hardwood forest types are broadly classified in Condition Class 1, meaning the fire regimes are within a historical range and the risk of losing key ecosystem components is low.

Grassland complexes are expected to be in Fire Regime II and Condition Class 2. This indicates stand replacement fires with a frequency of between 0 and 35 years. It also suggests that the fire regime has been moderately altered from its historical range and as a result there is a moderate risk of losing key ecosystem components. Fire frequencies may have departed from historical frequencies by one or more return intervals (either increased or decreased), resulting in moderate changes to fire size, intensity and severity, and burn patterns. Vegetation attributes have been moderately altered from historical ranges.

Purpose of and Need for Action

NPS policy (Director's Order 18: *Wildland Fire Management*) requires that every park unit with burnable vegetation develop a fire management plan approved by the park superintendent. The fire management plan serves as a detailed and comprehensive program of action to implement fire management policy principles and goals, consistent with resource management objectives of the unit. The general purpose of a fire management plan, guided by federal policy and resource management objectives of a park, is to protect life, property, and natural and cultural resources (NPS 2008e). Manassas National Battlefield Park is currently operating under a 2010 fire management plan and proposes updates to that plan.

Fire management planning must occur in a manner consistent with the purpose of the park. Manassas National Battlefield Park was created to "preserve the historic landscape containing historic sites,

building, objects, and views that contribute to the national significance of the Battles of First and Second Manassas, for the use, inspiration, and benefit of the public” (NPS 2008b).

The purpose of this project is to meet the goals of federal policy for fire management at Manassas National Battlefield Park while providing park staff flexibility with fire management tools to meet management objectives, thereby increasing safety for firefighters who are fighting fires as well as public safety in general.

The proposed plan is needed to update the current 2010 fire management plan, so it considers and/or includes additional fire management and fuel reduction strategies beyond those currently available to park staff; to determine methods to suppress wildland fires that minimize impacts to both natural and cultural resources and human safety; to strategically integrate vegetation management practices into the fire management plan; and to distinguish between the different management goals for different areas of the park.

The Scoping Process and Public Participation

In addition to internal and agency scoping, which took place in November 2013, public scoping for the EA began with the issuance of a scoping letter on February 21, 2014, and concluded on March 24, 2014. A public scoping meeting was held at the Visitor Center at Manassas National Battlefield Park on March 4, 2014, from 6:00 p.m. to 8:00 p.m. Notice of the public scoping period was posted on the Planning, Environment, and Public Comment (PEPC) website and sent to the mailing list for the park. During the public scoping period, the National Park Service received five pieces of correspondence from the public; all were received by webmail through the PEPC system. Comments suggested adding language about the ecological purposes of prescribed fires to alternative 2 (see “Chapter 2: Alternatives”), identified areas that would benefit from mechanical fuel removal, and posed questions about forest management and what water sources would be used to suppress wildland fires. Concerns were expressed about additional fire hazards from the planned bypass road around the park related to cigarette littering, etc. Some commenters expressed support for the use of prescribed burns to benefit native warm season grasses and restore cultural landscapes.

Relationship to Laws, Executive Orders, Policies, and Other Plans

APPLICABLE STATE AND FEDERAL LAWS

National Environmental Policy Act, 1969, as Amended

Congress passed the National Environmental Policy Act in 1969 (NEPA), and it took effect on January 1, 1970. This legislation established the 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 significantly affecting the quality of the human environment” along with alternatives to those actions and required that each agency make that information an integral part of its decisions. The National Environmental Policy Act also requires that agencies make a diligent effort to involve the interested members of the public before they make decisions that affect the environment.

The National Environmental Policy Act is implemented through Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] 1500–1508) (CEQ 1978). The National Park Service has, in turn, adopted procedures to comply with NEPA and the CEQ regulations, as found in Director’s Order 12: *Conservation Planning, Environmental Impact Analysis, and Decision-making* (NPS 2001) and its accompanying handbook.

National Park Service Organic Act of 1916

By enacting the NPS's Organic Act of 1916, Congress directed the U.S. Department of Interior and the National Park Service 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 manner and by such means as will leave them unimpaired for the enjoyment of future generations" (16 United States Code [USC] 1). Despite this mandate, the Organic Act and its amendments afford the National Park Service latitude when making resource decisions that balance resource preservation and visitor recreation.

Because conservation remains predominant, the National Park Service seeks to avoid or minimize adverse impacts on park resources and values. However, the National Park Service has discretion to allow impacts on park resources and values when necessary and appropriate to fulfill the purposes of a park (NPS 2006). While some actions and activities cause impacts, the National Park Service cannot allow an adverse impact that would constitute impairment of the affected resources and values (NPS 2006). The Organic Act prohibits actions that permanently impair park resources unless a law directly and specifically allows for the acts (16 USC 1a-1). An action constitutes an impairment when its impacts "...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). To determine impairment, the National Park Service must evaluate "...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" (NPS 2006).

National Historic Preservation Act of 1966, as Amended through 2000 (16 USC 470)

The National Historic Preservation Act protects buildings, sites, districts, structures, and objects that have significant scientific, historic, or cultural value. The National Historic Preservation Act established affirmative responsibilities of federal agencies to preserve historic and prehistoric resources. Effects on properties that are listed on or eligible for the National Register of Historic Places (national register) must be taken into account in planning and operations. Any property that may qualify for listing in the national register must not be inadvertently transferred, sold, demolished, substantially altered, or allowed to deteriorate. 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 a reasonable opportunity to comment. The historic preservation review process mandated by section 106 is outlined in regulations issued by the Advisory Council on Historic Preservation. Revised regulations (Protection of Historic Properties [36 CFR 800]) became effective January 11, 2001.

Historic Sites Act of 1935

This act declares as national policy the preservation for public use of historic sites, buildings, objects, and properties of national significance. It authorizes the secretary of the Interior and NPS Director to restore, reconstruct, rehabilitate, preserve, and maintain historic or prehistoric sites, buildings, objects, and properties of national historical or archeological significance.

National Parks Omnibus Management Act of 1998

The National Parks Omnibus Management Act (16 USC 5901 et seq.) underscores the National Environmental Policy Act and is fundamental to NPS park management decisions. Both acts provide direction for articulating and connecting the ultimate resource management decision to the analysis of impacts, using appropriate technical and scientific information. Both also recognize such data may not be readily available and provide options for resource impact analysis should this be the case.

The National Parks Omnibus Management Act directs the National Park Service to obtain scientific and technical information for analysis. The NPS handbook for Director's Order 12 states if "such information

cannot be obtained due to excessive cost or technical impossibility, the proposed alternative for decision would be modified to eliminate the action causing the unknown or uncertain impact, or other alternatives would be selected” (NPS 2001, section 4.4).

Redwood National Park Act of 1978, as Amended

All national park system units are to be managed and protected as parks, whether established as a recreation area, historic site, or any other designation. The Redwood National Park Act states the National Park Service must conduct its actions in a manner that would ensure no “...derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directed and specifically provided by Congress.”

EXECUTIVE ORDERS

Executive Order 11593, “Protection and Enhancement of the Cultural Environment”

This executive order directs the National Park Service to support the preservation of cultural properties and to identify and nominate to the national register cultural properties in the park and to “exercise caution . . . to assure that any NPS-owned property that might qualify for nomination is not inadvertently transferred, sold, demolished, or substantially altered.”

STATE LAWS AND REGULATIONS

9 VAC 5-130-1 0 through 9 VAC 5-130-60 and 9 VAC 5-130-100

Activities such as prescribed fire, that include the open burning or use of special incineration devices for the disposal of land clearing debris, must meet the requirements of Virginia’s regulations for open burning, and the activities may require a permit. The project proponent must contact Prince William and Fairfax County officials to determine what local requirements, if any, exist. For consistency with the air pollution control enforceable policy of the Virginia Pollution Control Board, the National Park Service must receive all applicable approvals for air emissions from the Virginia Department of Environmental Quality.

NPS POLICIES AND PLANS

National Park Service Management Policies 2006

The NPS *Management Policies 2006* (NPS 2006) 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 secretary of the interior. Actions under this EA are in part guided by these management policies.

NPS DIRECTOR’S ORDERS

Director’s Order 12: Conservation Planning, Environmental Impact Analysis, and Decision Making and Handbook

NPS Director’s Order 12 and its accompanying handbook (NPS 2001) lay the groundwork for how the National Park Service complies with the National Environmental Policy Act. Director’s Order 12 and the handbook set forth a planning process for incorporating scientific and technical information and establishing a solid administrative record for NPS projects.

NPS Director's Order 12 requires impacts to park resources be analyzed in terms of their context, duration, and intensity. It is crucial for the public and decision makers to understand the implications of those impacts in the short term and long term, cumulatively, and within context, based on understanding and interpretation by resource professionals and specialists. Director's Order 12 also requires an analysis of impairment to park resources and values as part of the decision document for the EA, either a finding of no significant impact or a notice of intent to prepare an environmental impact statement.

Director's Order 28: Cultural Resource Management

Director's Order 28 (NPS 1998) calls for the National Park Service to protect and manage cultural resources in its custody through effective research, planning, and stewardship and in accordance with the policies and principles contained in the *NPS Management Policies 2006* (NPS 2006). This order also directs the National Park Service to comply with the substantive and procedural requirements described in the *Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation*, the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Treatment of Cultural Landscapes*, and the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings* (NPS 2005). Additionally, the National Park Service would comply with the 2008 NPS Programmatic Agreement with the Advisory Council on Historic Preservation and the National Conference of State Historic Preservation Officers (NPS 2008a). The accompanying handbook to this order addressed standards and requirements for research, planning, and stewardship of cultural resources as well as the management of archeological resources, cultural landscapes, historic and prehistoric structures, museum objects, and ethnographic resources.

Director's Order 18: Wildland Fire Management and Reference Manual 18

Director's Order 18 (NPS 2008e), effective January 16, 2008, states the basic principles and strategic guidelines governing the management of wildland fire by the National Park Service. Director's Order 18 and the corresponding *Reference Manual 18* (NPS 2014a) require that all parks with vegetation capable of sustaining fire develop a wildland fire management plan. This order identifies fire as the most aggressive natural resource management tool employed by the National Park Service, and further defines all fires as either wildland fires or prescribed fires. Prescribed fires and naturally ignited wildland fire use may be permitted with an approved wildland fire management plan if they contribute to resource management objectives of a park. Human-caused wildland fires are unplanned events and will not be allowed to burn to achieve resource management objectives. Director's Order 18 identifies three paramount considerations for each park fire management program:

- Protect human life and property both within and adjacent to park areas;
- Perpetuate, restore, replace, or replicate natural processes to the greatest extent practicable; and
- Protect natural and cultural resources and intrinsic values from unacceptable impacts attributable to fire and fire management activities.

Natural Resource Management Reference Manual 77

The purpose of this document is to provide guidance to park managers for all planned and ongoing natural resource management activities. Managers must follow all federal laws, regulations, and policies. This document provides the guidance for park management to design, implement, and evaluate a comprehensive natural resource management program (NPS 2004a).

Issues and Impact Topics

Issues describe problems or concerns associated with current impacts from environmental conditions or current operations as well as problems that may arise from the implementation of any of the alternatives.

Park staff identified potential issues associated with the proposed fire management plan during internal scoping. The issues and concerns identified during scoping were grouped into impact topics that are discussed in “Chapter 3: Affected Environment” and analyzed in “Chapter 4: Environmental Consequences.”

IMPACT TOPICS ANALYZED IN THIS ENVIRONMENTAL ASSESSMENT

Soils

Low- and moderate-severity fires, including prescribed burning, can benefit soils through a fertilization effect, while high-intensity fires can damage soils. Fire management activities can therefore protect soils, but some fire management activities, such as hazardous fuels reduction, can also damage soils because vegetation removal can expose soils to increased risk of erosion. In addition, herbicides can also migrate into the soil and cause damage. Therefore, soils are analyzed in this EA.

Vegetation

The vegetative communities found within the park consist primarily of open fields and woodlands, which represent a variety of fuel types and a wide range of potential fire behavior. Removing vegetation for maintenance of cultural landscapes, fuels reduction, and fire suppression efforts through the use of mechanical removal, chemical treatment, and prescribed fire can affect vegetation communities and rare plant species both beneficially and adversely. Therefore, vegetation issues are analyzed in this EA.

Water Resources

NPS policies require protection of water resources consistent with the Clean Water Act. Vegetation management efforts, including suppression, mechanical removal, chemical treatment, and prescribed fires, have the potential to adversely affect water quality through increases in sedimentation and turbidity or the introduction of chemicals such as herbicides. Therefore, impacts to water resources are analyzed in this EA.

Wildlife and Habitat

There are resident populations of reptiles, amphibians, birds, mammals, fish, and invertebrates that could be adversely and/or beneficially affected by wildland fire suppression efforts, mechanical and chemical vegetation treatments, and prescribed fires. Therefore, wildlife and habitat-related issues are analyzed in this EA.

Air Quality

The Clean Air Act stipulates federal agencies have an affirmative responsibility to protect air quality of a park from adverse air pollution impacts. In addition, the Clean Air Act sets forth National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment (referred to as “criteria pollutants”). Areas where levels of criteria pollutants exceed NAAQS are said to be in non-attainment, and those that comply with NAAQS are considered to be in attainment.

All types of fires generate smoke and particulate matter, which impact air quality within the park and surrounding region. Manassas National Battlefield Park is in Virginia Air Quality Control Region VII, which is in marginal non-attainment for the criteria pollutant ozone (O₃), and a non-attainment area for

particulate matter less than 2.5 micrometers (PM_{2.5}). The region is in attainment for other pollutants (EPA 2013). Air quality-related values include visibility, plants, animals, water quality, historic and cultural resources, and other resources that could be affected by air pollution. In light of these considerations, air quality is analyzed in this EA.

Visitor Use and Experience

The 1916 NPS Organic Act directs the National Park Service 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 management activities, including mechanical and chemical vegetation treatments and prescribed fire, can result in the temporary closure of certain areas and/or result in visual impacts that may affect the visitor use and experience of the park. As a result of potential impacts to visitor use and experience that could occur under both the no action and action alternatives, visitor use and experience are addressed as an impact topic in this EA.

Park Management and Operations

Wildland fires, both human caused and naturally ignited, affect park operations, particularly in developed sites like visitor centers and administrative and maintenance facilities. These impacts can occur directly from the threat to facilities or indirectly from smoke and the diversion of personnel to firefighting. Fires can cause the closure of facilities. Fire treatment activities could require the closure of areas of the park and other modifications to park operations, potentially impacting park management and operations. Therefore, park management and operations are analyzed in this EA.

Public Health and Safety

Wildland fires can be extremely hazardous, even life threatening, to humans. Federal fire management policies emphasize firefighter and public safety is the first priority (NIFC 1998). Smoke from wildland fire and prescribed burning can create visibility and air quality-related safety hazards for park staff and visitors, travelers on public roads adjacent to the park, and planes approaching and departing Washington Dulles International Airport, located approximately 13 miles to the northeast. The slightly increased potential for the presence of unexploded ordnance (UXO) from the Civil War in certain areas of the park represents an additional public safety concern. Areas, such as Deep Cut, where intense fighting occurred and artillery lines were located have not been tilled or otherwise disturbed, so there is a slight chance that undiscovered UXO may be present in these areas compared to the rest of the park. Specific planning and mitigation measures would be needed for both fuels management and fire suppression activities. Due to the above concerns, human health and safety is addressed as an impact topic in this EA.

Cultural Resources (Archeological Resources, Cultural Landscapes, and Historic Structures and Districts)

The National Historic Preservation Act (16 USC 470 et seq.), National Environmental Policy Act, Organic Act, NPS *Management Policies 2006* (NPS 2006), Director’s Order 12 (*Conservation Planning, Environmental Impact Analysis and Decision-making*), and NPS–28 (*Cultural Resources Management Guideline*), require the consideration of impacts on any cultural resources that might be affected. The National Historic Preservation Act, in particular, requires the consideration of impacts on cultural resources either listed in, or eligible to be listed in, the national register. Cultural resources include archeological resources, cultural landscapes, historic structures and districts, ethnographic resources, and museum collections (prehistoric and historic objects, artifacts, works of art, archival documents, and natural history specimens). Impacts to archeological resources, cultural landscapes, and historic structures and districts are the cultural resource topics carried forward for analysis in this EA.

IMPACT TOPICS DISMISSED FROM FURTHER ANALYSIS

The following impact topics were eliminated from further analysis in this EA. A brief rationale for dismissal is provided for each topic. Potential impacts on these resources would be none or negligible, localized, and/or short term.

Noise

Noise is defined as unwanted sound. Fuels reduction activities and fire suppression efforts can all involve the use of noise-generating mechanical tools and devices with engines, such as chain saws and trucks. While chain saws at close range are loud (in excess of 100 decibels), their use would be infrequent (on the order of hours or days). Occurrences of noise would not be enough to substantially interfere with human activities in the area or with wildlife behavior, and such infrequent bursts of noise would not chronically impair the solitude and tranquility associated with park. Therefore, this impact topic was dismissed from further analysis in this EA.

Transportation

None of the alternatives would substantively affect road, railroad, water-based, or aerial transportation in and around the park. In a large fire event, there may be temporary closures of nearby roads during fire suppression activities or from heavy smoke. Such closures would not be expected to impact local traffic because they would be very infrequent, and, in the case of prescribed fire, short in duration (on the magnitude of 1 to 2 hours). Prescribed burns would be coordinated to ensure smoke would be blown away from roads and not affect the flight paths for Dulles International Airport, which is nearby. Therefore, this topic was dismissed from further analysis in this EA.

Land Use

The existing land uses within the park would not change as a result of implementation of the proposed action. Fire management activities would not affect land uses within the park or in areas adjacent to it. Therefore, this impact topic was dismissed from further analysis in this EA.

Rare, Threatened, or Endangered Species

Although there are state-listed species of concern, there are no federally listed rare, threatened, or endangered species found in the park. State-listed wildlife species of concern are identified and discussed in the wildlife and wildlife habitat section, and plant species considered rare in Virginia are discussed in the vegetation section. Therefore, this topic was dismissed from further analysis in this EA.

Socioeconomics

The National Environmental Policy Act requires an analysis of impacts to the “human environment,” which includes economic, social, and demographic elements in the affected area. Fire management activities may bring a short-term need for additional personnel in the park, but this addition would be minimal and would not affect the neighboring communities’ overall population, income, or employment base. Therefore, this impact topic was dismissed from further analysis in this EA.

Environmental Justice

On February 11, 1994, President Clinton issued Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. This order directs agencies to address environmental and human health conditions in minority and low-income communities to avoid the disproportionate placement of any adverse effects from federal policies and actions on these

populations. The area around the park may include low-income and minority populations, but these populations would not be particularly or disproportionately adversely affected by the activities associated with the implementation of a fire management plan. It is likely that reduction of fire risk from implementation of the plan would provide benefits to those populations surrounding the park. Therefore, environmental justice was dismissed from further analysis in this EA.

CHAPTER 2: ALTERNATIVES

Introduction

The National Environmental Policy Act requires federal agencies to explore a range of reasonable alternatives aimed at addressing the purpose of and need for the proposed action. The alternatives under consideration must include the “no action” alternative as prescribed by CEQ regulations for implementing the National Environmental Policy Act (40 CFR 1502.14).

The action alternatives analyzed in this document, in accordance with the National Environmental Policy Act, are based on the result of internal scoping and public scoping and meet the overall purpose of and need for the proposed action. The National Park Service explored and objectively evaluated three alternatives in this EA, including the no action alternative.

Descriptions of Alternatives

ALTERNATIVE 1: NO ACTION

This alternative would continue current fire management practices, which are described by the current Fire Management Plan as “suppression only” (NPS 2010). Under the no action alternative, no specific treatment units would be defined, and prescribed fire would not be used as a management tool. All fires would be suppressed under the conditions of the park’s current fire management plan, which defines all fires as wildland fires and mandates that all fires are fully and aggressively suppressed (NPS 2010). The park would also continue its vegetation management practices, which utilize both mechanical vegetation removal and chemical vegetation management techniques in a manner consistent with the park’s integrated pest management principles. Mechanical vegetation management includes vegetation removal using hand tools such as axes, rakes, and chainsaws, as well as machines such as brush hogs (rotary mower attached to a tractor) and chippers.

These vegetation management practices serve to remove fuels, but are not strategically integrated into the existing fire management plan. Rather, they are primarily focused on maintenance of the cultural landscape. Therefore, they may not remove fuels in areas that would benefit most from fuels management.

ALTERNATIVE 2: PRESCRIBED FIRE, FIRE SUPPRESSION, AND MECHANICAL AND CHEMICAL FUELS MANAGEMENT (PREFERRED ALTERNATIVE)

Under alternative 2, mechanical and chemical methods and prescribed fire would be used to manage fuels, promote biodiversity and ecosystem health, restore historic landscapes, and/or to replace agricultural mowing and haying if park farming leases are unable to be let (figure 3). Specific areas where different types of treatments could be used would be identified. For example, mechanical and chemical treatments would be used near all trails, roads, and firebreaks. Mechanical and chemical treatments would also be used in fuels reduction priority areas. Prescribed fire would be used in farmed grasslands and viewshed restoration units. Prescribed fire would not be allowed in areas at the edges of the park in the wildland/urban interface, or in certain forested areas.

The Deep Cut and Brawner Farm areas have different fuels conditions and archeological sensitivity than other units identified for prescribed burns. Prescribed fire would not be considered as a management option in Deep Cut, where the presence of UXO is suspected, or at Brawner Farm until additional archeological investigations are completed to identify and evaluate the archeological resources present. Goat grazing would be used as a tool to maintain vegetation in a low-growing condition at Deep Cut and could be used as a management option in other areas as necessary. All unplanned wildland fires would be suppressed. The park would strategically integrate these vegetation management practices into its fire management plan, in addition to vegetation management that the park currently undertakes for other reasons.

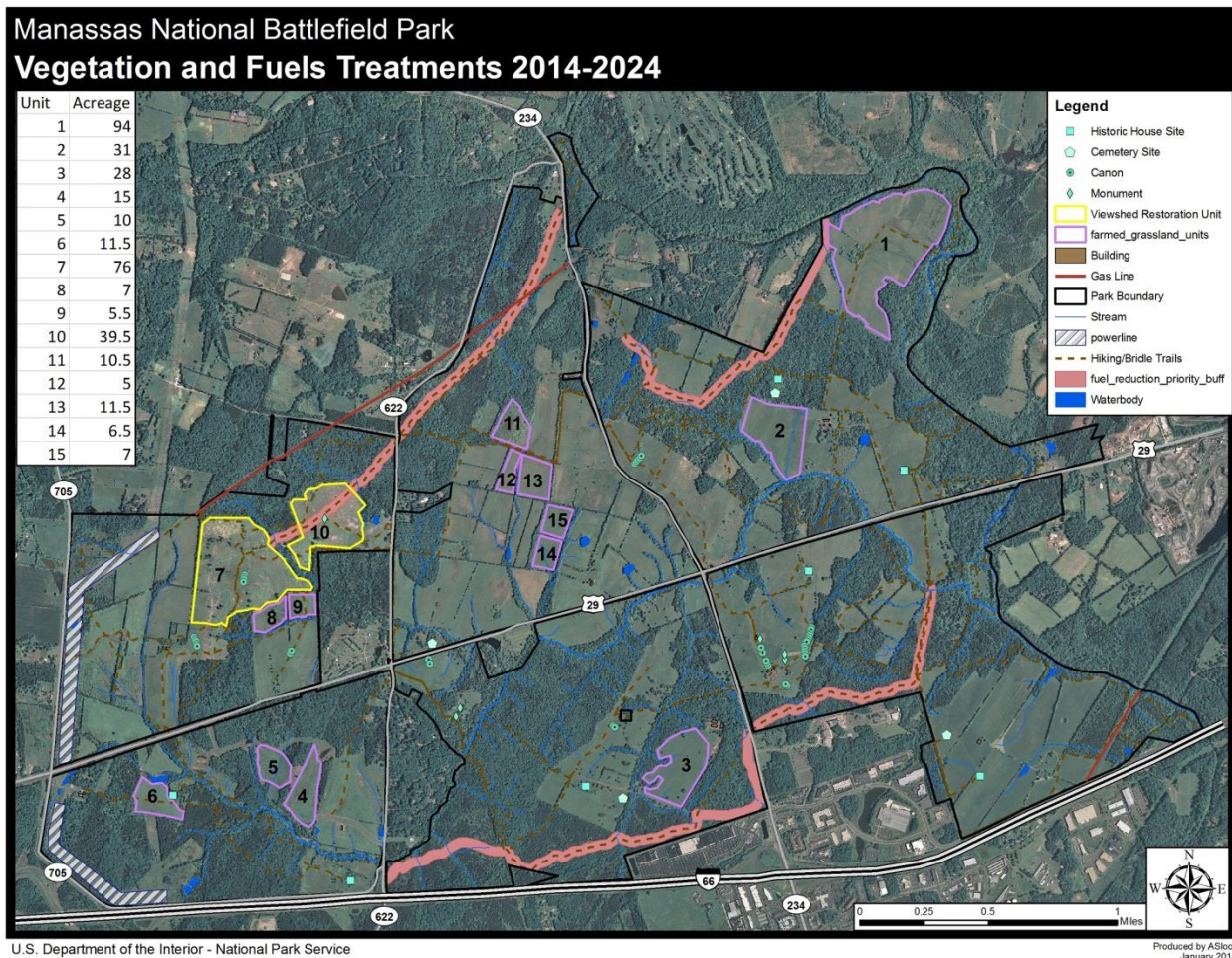


Figure 3. Proposed Vegetation and Fuels Treatment Areas

Prescribed fires are low-intensity fires used as a management tool to meet specific objectives. Within the park, these fires would be small, consisting of 10- to 20-acre areas, in some instances covering only a portion of a fuels treatment unit. When prescribed fires are implemented, each treatment would follow a burn plan approved by the park superintendent. Treatment boundaries would be made in areas where fires can be contained and controlled, such as natural fuel breaks or areas with reduced fuels/vegetation densities. Such treatment unit boundaries could be augmented by mechanical means to improve firefighter safety during fire operations by reducing fire intensity along the edge. Each prescribed fire would be managed and monitored by qualified personnel prior to and during all operations until the fire is declared to be extinguished. Each burn plan would specify ignition tools and patterns, all of which would be ground-based and could include use of mixed gasoline and diesel fuel in drip torches, railroad-type flares, flare fire from hand-held pistols, lasers, and matches. This list does not preclude the use of new ground-based ignition tools developed during the life of this plan. Prescribed fire would not be used in these areas or anywhere near the park boundary and urban interface.

Seeding of burned areas with an NPS-approved seed mix that emphasizes regeneration of native species would be considered when this would increase the probability of achieving resource objectives. This seeding may allow native plants to effectively compete with non-native ones.

Under this alternative, prescribed fires would be used in the viewshed restoration units shown in figure 3, in combination with targeted mechanical or chemical methods to remove some fuels prior to the burn to minimize the potential heat of the prescribed burns. Prescribed burns are under consideration in these

areas because large-scale mechanical removal of vegetation currently affecting the historic viewshed is extremely difficult.

Farm and grassland units shown in figure 3 are also candidates for prescribed burns to promote biodiversity and ecosystem health and to improve crops. Prescribed burns could also be useful in these areas, if it is necessary to replace the mowing and hay cutting that currently occurs within the park.

Fuels reduction in the “fuels reduction priority” areas shown in figure 3 would be achieved by mechanical and chemical removal of fuels. These areas are primarily located along existing trails that form fire breaks, but they are also located in the viewshed restoration areas, particularly at Deep Cut and Brawner Farm (Areas 7 and 10 in figure 3). Some storms in recent years have caused a large number of trees and branches in these areas to blow down, noticeably increasing available fuels in these areas.

Mechanical fuel removal techniques are similar to those described under the no action alternative. Chemical fuel removal refers to the removal of vegetation fuel sources using targeted application of herbicides. Herbicides could be used to reduce and remove existing species that are prone to creating fuels buildup, or they could be used to prevent plant seeds from germinating. These applications can be used as the sole treatment, with no additional management strategies, but are likely to be applied in combination with other management treatments, for example, to prevent regrowth of vegetation following mechanical removal. Chemical fuel removal would most likely be used in areas where non-native plants dominate, or along the park boundary near the wildland urban interface. Herbicides would be used in a manner consistent with integrated pest management practices at the park.

Another method of fuels management and removal at the Deep Cut area would be to use small goat herds. The goats would be trailered to the site and allowed to graze in small sections in portable enclosures fenced with electric wire, then moved to the next section as vegetation is reduced.

In the Deep Cut and Brawner Farm viewshed restoration units, prescribed burns would be used, but only after archeological investigations have been completed and all archeological artifacts have been documented and catalogued. Until that time, mechanical and chemical means of fuels removal and viewshed restoration would be used instead.

As with the no action alternative, unplanned wildland fires would be suppressed. Prescribed burns that begin to exceed the scope of the burn plan would also be immediately suppressed. Water used to suppress unplanned wildland fires or to extinguish prescribed burns would be brought in from outside the park, likely by tanker truck, or hydrants along the boundary of the park would be used. Existing roads and trails would be used as firebreaks to the greatest extent possible and fire lines would consist only of raked up debris and not ground/soil disturbance.

ALTERNATIVE 3: FIRE SUPPRESSION AND MECHANICAL AND CHEMICAL FUELS MANAGEMENT

Under this alternative, the park would identify treatment areas where expanded use of mechanical and chemical methods would be employed to reduce and manage fuels. These methods would include the use of goats, similar to alternative 2. Prescribed fire would not be used as a management tool under this alternative.

Treatment areas would likely be similar to those shown in figure 3. The viewshed restoration units under this alternative could receive some combination of mechanical and chemical fuels reduction, use of goats to graze the landscape, and other non-fire approaches to viewshed restoration as applicable. The grass units would continue to be mowed or hayed.

The focus of this alternative would be on reducing fuels along the trails in the fuels reduction priority buffer areas shown in figure 3. This alternative would seek to reduce the risk of fire from the downed woody debris in these areas and to improve the firebreaks in the park and buffer properties. Under alternative 3, all unplanned wildland fires would be suppressed as described in alternatives 1 and 2.

MITIGATION MEASURES AND REQUIRED BEST MANAGEMENT PRACTICES OF THE ACTION ALTERNATIVES

The National Park Service places a strong emphasis on avoiding, minimizing, and mitigating potentially adverse environmental impacts. To help ensure the protection of natural and cultural resources, protect the safety of firefighters and the public, and promote biodiversity and ecosystem health, the impacts of fire management operations would be mitigated by following the measures listed in agency fire policy, such as NPS Director's Order 18 and Reference Manual 18 (NPS 2008e; NPS 2014a). Archeological investigations would occur at Deep Cut and Brawner Farm to identify resources before prescribed burns would take place. Specific mitigation measures that may be implemented as part of the selected action alternative are listed in Appendix A. The National Park Service would implement an appropriate level of monitoring to help ensure that protective measures are being properly implemented and achieving their intended results.

The fire management staff of the park would work with the resource management staff to ensure that natural and cultural resource management issues and concerns are considered on all fire suppression activities and on all planned fire management actions at the park. The superintendent has overall responsibility and oversight for all park activities and staff and sets goals, approves park restrictions and closures, coordinates relations with neighbors and partner agencies, and approves the fire management plan and other major fire documents and plans. The fire management officer and incident commanders assigned by the park superintendent have direct responsibility for public, resident, and staff safety. They would coordinate evacuations and other actions with the appropriate park ranger staff, park supervisors, and local emergency management agencies.

ALTERNATIVES CONSIDERED BUT DISMISSED

CEQ regulations for implementing the National Environmental Policy Act require federal agencies to explore and objectively evaluate all reasonable alternatives to the preferred alternative, and to briefly discuss the rationale for eliminating any alternatives that were not considered in detail. This section describes those alternatives that were eliminated from further study and documents the rationale for their elimination.

During the course of scoping, several alternatives were considered but deemed to be unreasonable and were not carried forward for analysis in this EA. Justification for eliminating these options from further analysis was based on the following factors:

- Technical or economic feasibility.
- Inability to meet project objectives or resolve need.
- Duplication with other, less environmentally damaging or less expensive alternatives.
- Conflict with an up-to-date and valid park plan, statement of purpose and significance, or other policy, such that a major change in the plan or policy would be needed to implement.
- Too great an environmental impact.

The following two additional alternatives were considered but dismissed for the listed reasons.

Dismissed alternative 4 would authorize the use of mechanical and manual vegetation removal only, in addition to fire suppression. No prescribed burning or herbicide applications would be used in a strategic fashion to manage fuels.

This alternative was dismissed because vegetation types, landscapes, fuels hazards, and cultural resources vary in character throughout the park. To effectively maintain cultural landscapes, reduce fuel hazard, and promote ecosystem health and biodiversity, the National Park Service requires a suite of potential fire and fuels management options. Alternative 4 would create unacceptable risk to visitors, residents, and firefighters and would potentially damage or destroy NPS infrastructure, NPS cultural and natural

resources, and adjacent private lands and structures. This alternative would not be in keeping with the purpose of and need for the fire management plan and therefore was dismissed from consideration.

Dismissed alternative 5 would authorize the use of prescribed burning in addition to fire suppression, but would not include strategic incorporation of fuels reduction using either chemical or mechanical means, and specific treatment units would not be defined.

Similar to dismissed alternative 4, this alternative would limit the range of options available for NPS staff to manage fuels and fire at the park. Prescribed fire is not appropriate for all areas of the park, and the inability to draw on a variety of strategically integrated management tools could result in increased and unacceptable risks similar to those described for alternative 4 above. This alternative would not be in keeping with the purpose of and need for the fire management plan and therefore was dismissed from consideration.

NPS PREFERRED ALTERNATIVE

The National Park Service must identify a preferred alternative for proposed actions. CEQ guidance states:

the agency's "preferred alternative" is the alternative which the agency believes would fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical and other factors.

The preferred alternative for the Fire Management Plan EA for Manassas National Battlefield Park is alternative 2 because it would best fulfill the NPS's statutory mission and responsibilities to protect important natural and cultural resources in the park, particularly if appropriate mitigations or preparations are undertaken prior to prescribed burning activities to minimize the intensity of the burns in areas in which there might be archeological impacts, and to minimize the likelihood that UXO would be encountered.

ENVIRONMENTALLY PREFERABLE ALTERNATIVE

The National Park Service is required to identify the environmentally preferable alternative in its NEPA documents for public review and comment. The National Park Service, in accordance with the U.S. Department of the Interior policies contained in the Departmental Manual (516 DM 4.10) and the Council on Environmental Quality's *NEPA's Forty Most Asked Questions*, defines the environmentally preferable alternative (or alternatives) as the alternative that best promotes the national environmental policy expressed in the National Environmental Policy Act (section 101(b) (516 DM 4.10). In its *Forty Most Asked Questions*, the Council on Environmental Quality further clarifies the identification of the environmentally preferable alternative, stating: "Ordinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources" (Q6a).

After completing the environmental analysis, the National Park Service identified alternative 2 as the environmentally preferable alternative in this EA because it best meets the definition established by the Council on Environmental Quality and provides the most benefits and protections to park resources.

Summary of Environmental Consequences

The plan/EA has been prepared in accordance with the National Environmental Policy Act of 1969, as amended; implementing regulations, 40 CFR Parts 1500-1508; NPS Director's Orders 12, 28 and 18; and the handbook, *Conservation Planning, Environmental Impact Analysis, and Decision-making* (Director's Order 12). Compliance with section 106 of the National Historic Preservation Act has occurred in parallel with the NEPA process.

Impacts of the proposed alternatives were assessed in accordance with the National Environmental Policy Act and the NPS Director's Order 12: *Conservation Planning, Environmental Impact Analysis, and*

Decision-making (table 2). Several impacts topics were dismissed from further analysis because the proposed action would result in no impacts or negligible to minor or short-term impacts to those resources. No major, adverse impacts are anticipated as a result of this project.

TABLE 2. SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Impacted Resource	Alternative 1—No Action	Alternative 2—Prescribed Fire, Fire Suppression, and Mechanical and Chemical Fuels Management	Alternative 3—Mechanical and Chemical Fuels Management and Fire Suppression
Soils	<p>Short- and long-term, negligible adverse impacts would result from localized compaction and erosion from mechanical vegetation removal and migration of herbicides into the soil.</p> <p>Short- to long-term, minor to moderate, adverse impacts would result from unplanned wildland fire due to soil erosion and fire damage to organic material in soils.</p> <p>Short- to long-term, negligible, adverse, and mostly localized impacts would result from fire suppression. Minimum impact suppression tactics would be used to reduce impacts on soils, and areas where soils are disturbed would be remediated and stabilized with an NPS-approved seed mix.</p>	<p>Short- and long-term, negligible, adverse impacts would result from localized compaction and erosion from mechanical vegetation removal and migration of herbicides into the soil.</p> <p>Short-term, minor, adverse impacts would result from prescribed burning due to temporary loss of vegetation and associated erosion. Long-term, beneficial impacts would result from the addition of ash and woody debris to the soil.</p> <p>Short- to long-term, minor to moderate, adverse impacts would result from unplanned wildland fire due to soil erosion and fire damage to organic material in soils.</p> <p>Impacts from suppression would be the same as under alternative 1.</p>	<p>Short- and long-term, negligible, adverse impacts would result from localized compaction and erosion from mechanical vegetation removal and migration of herbicides into the soil.</p> <p>Short- to long-term, minor to moderate, adverse impacts would result from unplanned wildland fire due to soil erosion and fire damage to organic material in soils.</p> <p>Impacts from suppression would be the same as under alternative 1.</p>
Vegetation	<p>Short- and long-term, negligible, adverse impacts would result from potential spread of invasive species by mechanical equipment and herbicide damage to non-target plant species.</p> <p>An unplanned high-severity wildland fire would result in localized, short- and long-term, minor to moderate, adverse impacts due to lost soil productivity and changes in vegetative community composition.</p> <p>Short-term, minor adverse impacts would result from suppression. Minimum impact suppression tactics would be used to reduce impacts on vegetation, and areas where soils are disturbed would be remediated and stabilized with an NPS-approved seed mix.</p>	<p>Short- and long-term, negligible, adverse impacts would result from potential spread of invasive species by mechanical equipment and herbicide damage to non-target plant species.</p> <p>Prescribed burning would result in localized, short-term, minor, adverse impacts from temporary loss of vegetation. Prescribed burning would have long-term, beneficial impacts from contribution of nutrients and organic debris to soils and contribution to ecosystem structural complexity and function.</p> <p>An unplanned high-severity wildland fire would result in localized, short- and long-term, minor to moderate, adverse impacts due to lost soil productivity and changes in vegetative community composition.</p>	<p>Short- and long-term, negligible, adverse impacts would result from potential spread of invasive species by mechanical equipment and herbicide damage to non-target plant species.</p> <p>An unplanned high-severity wildland fire would result in localized, short- and long-term, minor to moderate, adverse impacts due to lost soil productivity and changes in vegetative community composition.</p> <p>Impacts from suppression would be the same as under alternative 1.</p>

Impacted Resource	Alternative 1—No Action	Alternative 2—Prescribed Fire, Fire Suppression, and Mechanical and Chemical Fuels Management	Alternative 3—Mechanical and Chemical Fuels Management and Fire Suppression
	mix.	composition. Impacts from suppression would be the same as under alternative 1.	
Water Resources	<p>Short- and long-term, negligible, adverse impacts would result from chemical herbicide runoff and increased erosion and turbidity due to bank vegetation removal.</p> <p>An unplanned high intensity wildland fire would result in short- and long-term, minor to moderate, adverse impacts due to increased turbidity, an increase in stream temperature leading to lower dissolved oxygen levels, increased nutrient loading, and channel erosion.</p> <p>Short-term, negligible to minor adverse impacts would result from suppression. Minimum impact suppression tactics would be used to reduce impacts on water resources, including minimizing ground disturbance from firebreaks and use of water diversion devices. Off-road travel would be minimized and damaged stream bank or shoreline vegetation would be immediately rehabilitated.</p>	<p>Short- and long-term, negligible adverse impacts would result from chemical herbicide runoff and increased erosion and turbidity due to bank vegetation removal.</p> <p>Prescribed burning would have short-term, negligible to minor, adverse impacts due to temporary increases in water temperatures, soil erosion, and sedimentation. Long-term, beneficial impacts would result from decreased frequency and intensity of unplanned wildland fire.</p> <p>An unplanned high intensity wildland fire would result in short- and long-term, minor to moderate, adverse impacts due to increased turbidity, an increase in stream temperature leading to lower dissolved oxygen levels, increased nutrient loading, and channel erosion.</p> <p>Impacts from suppression would be the same as under alternative 1.</p>	<p>Short- and long-term, negligible, adverse impacts would result from chemical herbicide runoff and increased erosion and turbidity due to bank vegetation removal.</p> <p>An unplanned high intensity wildland fire would result in short- and long-term, minor to moderate, adverse impacts due to increased turbidity, an increase in stream temperature leading to lower dissolved oxygen levels, increased nutrient loading, and channel erosion.</p> <p>Impacts from suppression would be the same as under alternative 1.</p>
Wildlife and Habitat	<p>Short-term, negligible, adverse impacts would result from temporary habitat disruption due to mechanical and chemical vegetation removal.</p> <p>An unplanned high-severity wildland fire would result in localized, short- and long-term, minor to moderate, adverse impacts due to loss of individuals and habitat and changes in vegetative community composition.</p> <p>Short-term, negligible to minor adverse</p>	<p>Short-term, negligible, adverse impacts would result from temporary habitat disruption due to mechanical and chemical vegetation removal.</p> <p>Prescribed fire would have short-term, minor, adverse impacts from the localized loss of wildlife and wildlife habitat; beneficial impacts would occur due to contribution of nutrients and organic debris to soils and contribution to habitat complexity and function.</p> <p>An unplanned high-severity wildland</p>	<p>Short-term, negligible, adverse impacts would result from temporary habitat disruption due to mechanical and chemical vegetation removal.</p> <p>An unplanned high-severity wildland fire would result in localized, short- and long-term, minor to moderate, adverse impacts due to loss of individuals and habitat and changes in vegetative community composition.</p> <p>Impacts from suppression would be the</p>

Impacted Resource	Alternative 1—No Action	Alternative 2—Prescribed Fire, Fire Suppression, and Mechanical and Chemical Fuels Management	Alternative 3—Mechanical and Chemical Fuels Management and Fire Suppression
	impacts would result from suppression. Minimum impact suppression tactics used for soils, vegetation, and water resources mitigation would reduce impacts on wildlife and habitat.	fire would result in localized, short- and long-term, minor to moderate, adverse impacts due to loss of individuals and habitat and changes in vegetative community composition. Impacts from suppression would be the same as under alternative 1.	same as under alternative 1.
Air Quality	Mechanical and chemical vegetation management would have localized, short-term, negligible to minor, adverse impacts to air quality due to emissions and dust from mechanical equipment and spray drift from herbicide application. An unplanned high-severity wildland fire would result in localized, short-term, minor to moderate, adverse impacts due to smoke, dust, and particulate matter. Prompt and aggressive suppression efforts would mitigate these impacts.	Mechanical and chemical vegetation management would have localized, short-term, negligible to minor, adverse impacts to air quality due to emissions and dust from mechanical equipment and spray drift from herbicide application. Prescribed burning would result in localized, short-term, negligible to minor, adverse impacts due to smoke, dust, and particulate matter. An unplanned high-severity wildland fire and associated fire suppression activities would result in localized, short-term, minor, adverse impacts due to smoke, dust, and particulate matter.	Mechanical and chemical vegetation management would have localized, short-term, negligible to minor, adverse impacts to air quality due to emissions and dust from mechanical equipment and spray drift from herbicide application. An unplanned high-severity wildland fire and associated fire suppression activities would result in localized, short-term minor, adverse impacts due to smoke, dust, and particulate matter.
Visitor Use and Experience	Short-term, negligible to minor, adverse impacts would result from temporary area closures during mechanical and chemical vegetation removal. Localized, short-term, minor, adverse, impacts would result from increased potential for unplanned wildland fires, smoke, changes in the natural environment and scenery, and reduced quality of the visitor experience. Prompt and aggressive suppression efforts would mitigate these impacts.	Short-term, negligible to minor, adverse impacts would result from temporary area closures during mechanical and chemical vegetation removal. Short-term, negligible to minor, adverse impacts would result from prescribed fire due to area closures, fire, smoke, and blackened areas. Long-term, beneficial impacts would result from maintenance of the cultural landscape and native ecosystems. Impacts from unplanned wildland fires	Short-term, negligible to minor, adverse impacts would result from temporary area closures during mechanical and chemical vegetation removal. Long-term, beneficial impacts would result from maintenance of the cultural landscape and native ecosystems. Impacts from unplanned wildland fires would be localized, short term, minor, and adverse due to smoke and visitor restrictions near the fire area.

Impacted Resource	Alternative 1—No Action	Alternative 2—Prescribed Fire, Fire Suppression, and Mechanical and Chemical Fuels Management	Alternative 3—Mechanical and Chemical Fuels Management and Fire Suppression
		would be localized, short term, minor, and adverse due to smoke and visitor restrictions near the fire area.	
Park Management and Operations	<p>Long-term, negligible to minor, adverse impacts are anticipated as a result of mechanical and chemical vegetation removal.</p> <p>Short-term, minor to moderate, adverse impacts would result in the event of unplanned wildland fires and related increased demand on park resources and staff for fire suppression efforts as well as disruption of park operations.</p> <p>Overall, long-term, negligible, adverse impacts to park management and operations would result from the limitations of current vegetation management practices in maintaining the cultural landscape</p>	<p>No impacts are anticipated as a result of mechanical and chemical vegetation removal.</p> <p>Prescribed burning would have short-term, negligible to minor, adverse impacts from additional demands on park staff and resources, and long-term, beneficial impacts would result from increased ease and efficiency of maintaining the cultural landscape and reduced frequency and intensity of unplanned wildland fires</p> <p>Short-term, minor, adverse impacts would result from unplanned wildland fires and related increased demand on park resources and staff and disruption of park operations.</p> <p>Impacts from suppression would be the same as under alternative 1.</p>	<p>No impacts are anticipated as a result of mechanical and chemical vegetation removal.</p> <p>Short-term, negligible to minor, adverse impacts to park operations would result from increased planning workload or the redirection of park staff to fuels management or fire response activities.</p> <p>Long-term, beneficial impacts would result from increased ease and efficiency of maintaining the cultural landscape and reduced frequency and intensity of unplanned wildland fires.</p> <p>Short-term, minor, adverse impacts would result from unplanned wildland fires and related increased demand on park resources and staff and disruption of park operations.</p> <p>Impacts from suppression would be the same as under alternative 1.</p>
Public Health and Safety	<p>Due to safety precautions, negligible to no impacts to public health and safety would result from mechanical and chemical vegetation removal.</p> <p>Short-term, minor, adverse impacts would result in the event of unplanned wildland fire and related suppression efforts due to effects on firefighter safety, and health and safety effects from smoke.</p>	<p>Due to safety precautions, negligible to no impacts to public health and safety would result from mechanical and chemical vegetation removal.</p> <p>As a result of planning and safety precautions, short-term health and safety impacts from prescribed burns would be localized, negligible to minor, and adverse. Long-term impacts would be beneficial because prescribed burning would aid in reducing the occurrence and severity of unplanned wildland fire over time.</p> <p>Impacts from suppression would be the same as under alternative 1.</p>	<p>Due to safety precautions, negligible to no impacts to public health and safety would result from mechanical and chemical vegetation removal.</p> <p>Long-term impacts would be beneficial because fuels management would aid in reducing the occurrence and severity of unplanned wildland fire over time.</p> <p>Short-term, minor to moderate, adverse impacts would result in the event of unplanned wildland fire and related effects on firefighter safety, and health and safety effects from smoke.</p>

Impacted Resource	Alternative 1—No Action	Alternative 2—Prescribed Fire, Fire Suppression, and Mechanical and Chemical Fuels Management	Alternative 3—Mechanical and Chemical Fuels Management and Fire Suppression
		<p>same as under alternative 1.</p> <p>Short-term, minor to moderate, adverse impacts would result in the event of unplanned wildland fire and related effects on firefighter safety, and health and safety effects from smoke.</p> <p>Archeological investigations at Deep Cut prior to prescribed burns would minimize the potential for firefighters to encounter Civil War UXO.</p>	<p>Impacts from suppression would be the same as under alternative 1.</p>
<p>Cultural Resources, including Archeology and Cultural Landscapes</p>	<p>Long-term, minor to moderate, adverse impacts to archeological resources would result from the potential for fire damage as well as damage from vegetation management.</p> <p>Long-term, minor to moderate, adverse impacts to cultural landscapes would result from potential for unplanned wildland fire and encroachment of vegetation on historically significant viewsheds and sightlines.</p> <p>Long-term, minor to moderate, adverse impacts to historic structures and districts could result from changes to character defining features due to fire.</p> <p>Suppression would have minor adverse impacts to archaeological resources by compacting soils that contain artifacts; beneficial impacts to cultural landscapes from preservation of important features; and minor adverse impacts to historic structures from tarping or spraying with water.</p>	<p>Long-term, negligible to moderate, adverse impacts to archeological resources would result from potential damage to archeological resources during fuels management activities, although archeological investigations would occur at Brawner Farm and Deep Cut prior to any prescribed burns to identify resources; long-term, beneficial impacts to archeological resources would result from reduced potential for destructive fires.</p> <p>Short-term, minor to moderate, adverse impacts to cultural landscapes would result from prescribed fire creating unsightly burned vegetation; long-term, beneficial impacts to cultural landscapes would result from restoration of open areas and viewsheds and a reduction in potential for unplanned wildland fire.</p> <p>Long-term, beneficial impacts on historic structures and districts would result from reduced risk of unplanned wildland fire.</p> <p>Impacts from suppression would be the same as under alternative 1.</p>	<p>Long-term, minor to moderate, adverse impacts to archeological resources would result from potential damage from mechanical vegetation management activities; long-term, beneficial impacts to archeological resources would result from reduced potential for destructive fires.</p> <p>Short- and long-term, beneficial impacts to cultural landscapes would result from decreased potential for unplanned wildland fire and removal of vegetation in order to restore open areas and historic viewsheds.</p> <p>Long-term, beneficial impacts on historic structures and districts would result from reduced risk of unplanned wildland fire.</p> <p>Impacts from suppression would be the same as under alternative 1.</p>

CHAPTER 3: AFFECTED ENVIRONMENT

This chapter describes existing environmental conditions in the areas potentially affected by the alternatives evaluated. This section describes the following resource areas: soils; vegetation; water resources; wildlife and habitat; air quality; visitor use and experience; park management and operations; public health and safety; and cultural resources (including archeology, cultural landscapes, and historic structures and districts). Potential impacts are discussed in “Chapter 4: Environmental Consequences” in the same order.

Soils

The park is within the northern Virginia piedmont. Like the region, the park is characterized by gently rolling hills with broad ridges; a patchwork of open fields and forests; and shallow, sluggish drainages. Park elevations range between 230 and 350 feet above sea level.

The park is underlain by sedimentary, meta-sedimentary, and igneous rocks. Siltstone constitutes the parent material of almost all soils in the eastern half of the park (Leavy et al. 1983, Lee 1977). The western half of the park contains substantial areas underlain by diabase (hard igneous rock that produces soils that do not transmit water very readily and support unique plant communities). Soils derived from diabase are located in the vicinity of Stuarts Hill, south of Battery Heights, on the ridge east of Brawner Farm, and in the vicinity of Bald Hill (Leavy et al. 1983).

The soil surveys for Prince William and Fairfax Counties indicate that there are more than 50 soil mapping units within the park; 10 of these comprise the vast majority of soils. Most of these soils are various types of silt loam that generally are deep, derived from shale and siltstone, and support crops and pasture when cleared or mixed hardwood forest when uncleared (USDA, NRCS 2013).

The most prevalent soil types present within the park, along with their erodibility and potential for fire damage, are summarized in table 3. Table 2 indicates the potential for erosion and for damage to nutrient, physical, and biotic soil characteristics by fire. The ratings for fire damage potential involve an evaluation of the potential impact of prescribed fires or wildland fires that are intense enough to remove the duff layer and consume organic matter in the surface layer. The ratings are based on texture of the surface layer, content of rock fragments and organic matter in the surface layer, thickness of the surface layer, and slope. A rating of "low" indicates that fire damage is unlikely, and soil productivity can be expected to withstand the effects of most fires (USDA, NRCS 2013).

TABLE 3. SOIL MAP UNITS

Map Unit	Acres	Percent	Erodibility	Organic Matter (%)	Fire Damage Potential
Albano silt loam, 0 to 4 percent slopes	208.1	3.90%	High	1-2 Low	Low
Arcola silt loam, 2 to 7 percent slopes	1,115.50	20.80%	High	0.5-2 Low	Low
Arcola-Nestoria complex, 7 to 15 percent slopes	1,050.20	19.60%	High	0.5-2 Low	Low
Bermudian silt loam, 0 to 2 percent slopes	194.8	3.60%	Moderate	2-3 Low/Mod	Low
Dulles silt loam, 0 to 4 percent slopes	306.5	5.70%	High	0.5-2 Low	Low
Manassas silt loam, 2 to 7 percent slopes	352	6.60%	Moderate	2-4 Mod	Low

Map Unit	Acres	Percent	Erodibility	Organic Matter (%)	Fire Damage Potential
Panorama silt loam, 2 to 7 percent slopes	289.9	5.40%	High	0.1-2 Low	Low
Reaville silt loam, 0 to 4 percent slopes	177.7	3.30%	High	2-3 Low/Mod	Low
Waxpool silt loam, 0 to 2 percent slopes	263.4	4.90%	High	1-3 Low/Mod	Low
Rowland silt loam, 0 to 2 percent slopes, frequently flooded	228.4	4.30%	High	2-4 Mod	Low

Source: USDA, NRCS 2013

Vegetation

The vegetation at Manassas is generally characterized by an assortment of open fields and forest in a range of successional stages and ecological conditions, as well as some riparian and wetland areas (figure 4). Many of the fields and grasslands are maintained by agricultural lease holders, and park personnel also mow some of these areas. Many of the fields and grasslands contain native grass communities (Indian grass [*Sorghastrum nutans*] and little bluestem [*Schizachyrium scoparium*]) and cover about 35 percent of the park or 1,500 acres. In Virginia, grasslands have decreased by 55 percent since 1945; as such, an emphasis has been placed on restoring warm season grasses throughout the park. The park has restored more than 1,000 acres of native warm season grasses that provide wildlife habitat, prevent erosion, help to filter nitrates through their roots, and serve as a riparian buffer along streams and wetlands (NPS 2011a; Gorsira, pers. comm. 2012b).

Throughout the park, more than 700 taxa of vascular plants can be found, six of which are considered rare in Virginia and 128 of which are classified as nonnative species (Fleming and Belden 2004). In March 2001, the Virginia Department of Conservation and Recreation, Division of Natural Heritage completed a vascular plant inventory of Manassas. Stands of coniferous forest, developed from previously open fields, are characterized by Virginia pine (*Pinus virginiana*), eastern red cedar (*Juniperus virginiana*), and shortleaf pine (*Pinus echinata*) and are in the successional stage of growth. The mixed forest is in a transitional stage that occurs in comparatively small, scattered stands. Oak-hickory dominates the deciduous forest in upland areas and represents the climax growth stage in the park (NPS 2008b). Stands are often more than 100 years old and commonly consist of white oak (*Quercus alba*), northern red oak, black oak (*Quercus velutina*), white ash (*Fraxinus americana*), and hickory (NPS 2008b). Floodplain bottomland forests, found primarily along Bull Run, represent old, undisturbed forests with many mature floodplain trees. Tree species include pin oak (*Quercus palustris*), swamp white oak (*Quercus bicolor*), green ash (*Fraxinus pennsylvanica*), and American elm (*Ulmus americana*). Various bottomland hardwoods also occur along the riparian fringe of tributary streams. Small patches of loblolly pine (*Pinus taeda*) and eastern white pine occur on somewhat drier slopes and bluffs (NPS 2008b). Commonly found shrubs in the park include flowering dogwood, blackhaw (*Viburnum prunifolium*), and deerberry (*Vaccinium stamineum*); these plants can be found along the forest floor.

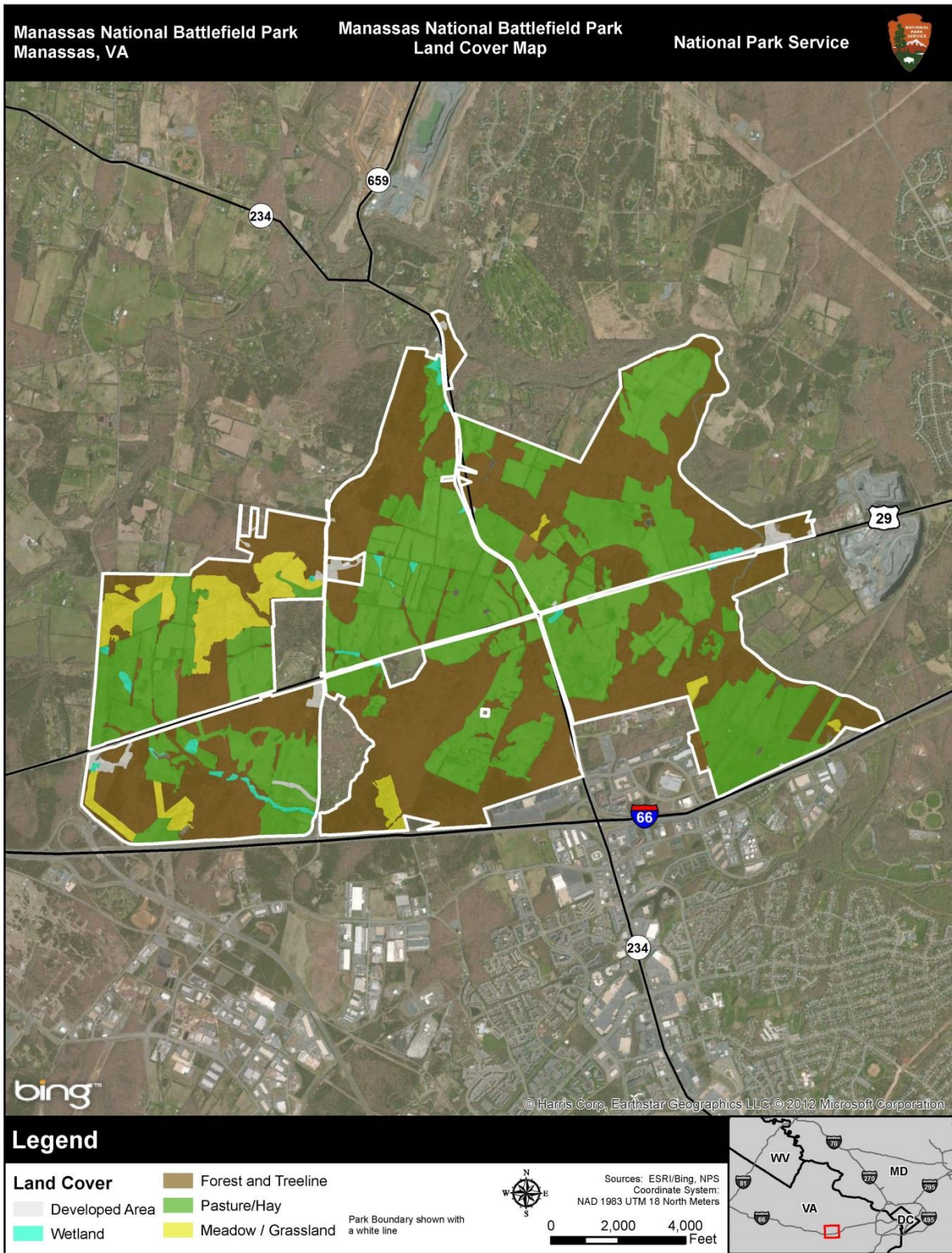


Figure 4. Land Cover and Vegetation Types at Manassas National Battlefield Park

The Virginia Department of Conservation and Recreation's Heritage Program has designated a number of diabase conservation areas throughout Manassas, Virginia, including one within the park. Diabase soils are volcanic soils found throughout the park that have diabase, a hard igneous rock as a parent material, and the surrounding soils are rich in calcium and magnesium that weather easily. When exposed by erosion, diabase and metasiltstone form soils that can create the habitat for rare, drought-tolerant plant communities called diabase glades. The conservation areas are not afforded special protection, however. The Manassas Diabase Conservation Area within the park is known to support two state listed rare species: the marsh hedgesnail (*Stachys pilosa* var. *arenicola*), and purple milkweed (*Asclepias purpurascens*). According to the Virginia Department of Conservation and Recreation, there is potential for a number of additional rare plant species to occur in diabase conservation areas, including earleaf foxglove (*Agalinis auriculata*), blue-hearts (*Buchnera americana*), downy phlox (*Phlox pilosa*), and stiff goldenrod (*Oligoneuron rigidum*) (NPS 2008b).

In 1997 and 1998, the Virginia Department of Conservation and Recreation's Division of Natural Heritage inventoried Manassas National Battlefield Park for rare, threatened, and endangered species and significant natural communities. According to their report, Manassas National Battlefield Park is "one of the region's most unspoiled areas" (Belden et al. 1998). The study found no federally- or state-listed threatened or endangered species; likewise, a 1997 vascular plant inventory found no federal or state endangered species. The Division of Natural Heritage survey did find rare and significant natural communities: three stands of oak-hickory forest covering approximately 72 acres in the western portion of the park on diabase uplands (threatened elsewhere in Virginia by development); 3 acres of upland depression swamp in seasonally flooded wetlands south of Battery Heights (also threatened elsewhere); and a 10- to 15- acre stand of mixed eastern white pine, eastern hemlock, and oaks on a steep bluff overlooking Bull Run. This forest type is rare in the Piedmont region. The Division of Natural Heritage studies identified 13 occurrences of state-listed rare plants associated with diabase or meta-siltstone substrates.

Water Resources

The park is in the Chesapeake Bay watershed, and specifically in the Potomac River watershed. Bull Run forms most of the park's eastern boundary. Bull Run has a primarily wooded, asymmetrical 100-year floodplain bounded by adjacent bluffs. The other primary stream within the park is Youngs Branch, which meanders south and east through the park, eventually draining into Bull Run. The Youngs Branch watershed is approximately 3,000 acres. The park also contains 10 farm ponds that were formed by installation of earthen dams on small streams. Wetlands are found throughout the park, and include vernal pools, wetland meadows, and seeps. Streams, including adjacent riparian and bottomlands as well as ponds, are classified as various types of wetlands. Palustrine forested wetlands in the park include floodplain bottomland forests, found primarily along Bull Run. Two forested wetland systems worthy of special consideration have been identified at the park, including an upland depression swamp and Piedmont/mountain swamp forest. The upland depression swamp comprises about three acres of seasonally flooded wetland south of Battery Heights. The Piedmont/mountain swamp forest covers about 40 acres on the alluvial floodplain of Bull Run (NPS 2008b). Various bottomland hardwoods also occur along the riparian fringe of tributary streams. Small palustrine emergent wetlands also exist sporadically around the park, and they are generally associated near the small ponds or swales at the lower elevations. Water quality monitoring, conducted when possible by the regional water resources division, collects a large amount of data, including water temperature, air temperature, depth of stream, flow rate, specific conductance, oxygen dissolved, pH, salinity, alkalinity, nitrite, phosphorus, ammonia, carbon dioxide, and chloride. This water chemistry data along with macroinvertebrate information allows the park to better evaluate stream health (NPS 2008b). Bull Run is the only water body within the park that is currently listed as impaired by the Commonwealth of Virginia. Portions of Bull Run are considered impaired for the purposes of fish consumption due to high polychlorinated biphenyl levels in fish tissue.

The Virginia Department of Environmental Quality has therefore determined that a Total Maximum Daily Load study is required for this water body (VDEQ 2014).

Wildlife and Habitat

There are 168 bird species, 25 mammal species, 23 reptile species, and 19 amphibian species documented within the park. The Service maintains a current list of species known or likely to use park habitat. Detailed information can be found on the park website (NPS 2008b).

No federally listed, proposed, or candidate threatened or endangered species have been found in the park. The General Management Plan Appendix E (NPS 2008b) contains information provided by the U.S. Fish and Wildlife Service (USFWS) about threatened, endangered, and rare species and communities in Fairfax and Prince William Counties.

MAMMALS

Twenty-five different species of mammals have been known to occur at Manassas. The fragmented forests interspersed with shrubs and meadows provide habitat for small mammals, including eastern chipmunk (*Tamias striatus*), northern short-tailed shrew (*Blarina brevicauda*), the meadow vole (*Microtus pennsylvanicus*), eastern mole (*Scalopus aquaticus*), and white-footed mouse (*Peromyscus leucopus*) (NPS 2011b). Other small- and medium-sized mammals commonly observed include the eastern cottontail (*Sylvilagus floridanus*), gray squirrel (*Sciurus carolinensis*), red fox (*Vulpes vulpes*), woodchuck (*Marmota monax*), and raccoon (*Procyon lotor*) (NPS 2011b). White-tailed deer (*Odocoileus virginianus*) are among the most prominent mammals and are over-abundant. The deer's foraging activity disrupts natural forest succession processes in the park and removes woody vegetation cover needed for ground-nesting birds.

BIRDS

Manassas National Battlefield Park supports one of the best grassland and scrubland species suites in the region, with healthy populations of several state bird species of conservation concern. Of the 168 species of birds that have been documented to occur at Manassas (NPS 2008c), there are 54 confirmed breeding bird species. Many of the bird species found at Manassas nest on or near the ground, using grasses and other low-growing vegetation for building nests and concealment. These include the brown thrasher (*Toxostoma rufum*), savannah sparrow (*Passerculus sandwichensis*), mallard (*Anas platyrhynchos*), killdeer (*Charadrius vociferus*), spotted sandpiper (*Actitis macularius*), vesper sparrow (*Pooecetes gramineus*), field sparrow (*Spizella pusilla*), Henslow's sparrow (*Ammodramus henslowii*), eastern meadowlark (*Sturnella magna*), and wild turkey (*Meleagris gallopavo*) (NPS 2008c).

Birds that nest in the upper understory or canopy include the red-eyed vireo (*Vireo olivaceus*), wood thrush (*Hylocichla mustelina*), Acadian flycatcher (*Empidonax vireescens*), northern cardinal (*Cardinalis cardinalis*), and yellow-throated vireo (*Vireo flavifrons*) (NPS 2008c). The upper canopy also supports cavity-nesting birds such as various woodpeckers, brown creeper (*Certhia americana*), Carolina chickadee (*Parus carolinensis*), and tufted titmouse (*Baeolophus bicolor*) (NPS 2008c). Many of these birds depend on older trees that have natural cavities or weakened sections that can be hollowed out for nesting.

The barred owl (*Strix varia*) and barn owl (*Tyto alba*), and raptors such as red-tailed hawk (*Buteo jamaicensis*), red-shouldered hawk (*Buteo lineatus*), Cooper's hawk (*Accipiter cooperii*), and American kestrel (*Falco sparverius*), depend on other birds and mammals for food. Scavengers like the crow (*Corvus brachyrhynchos*) and turkey vulture (*Cathartes aura*) rely on the remains of other animals, including deer, for food. The park has installed nest boxes for barn owl, American kestrel, and eastern bluebird (*Sialia sialis*) (NPS 2008c).

Avian species include those known to inhabit edge areas near potential landscape treatments and others that are adapted to the forest interior and primarily nest away from edges in the deep forest. Many of these forest interior species require large (greater than 375 acres), contiguous tracts of forest for breeding, and few are found in forest stands of less than 25 acres (NPS 2008b). Only a few forest interior species are known to occur in the areas of potential landscape modification. Details on specific species are given in the park's General Management Plan (NPS 2008b).

REPTILES AND AMPHIBIANS

Manassas provides diverse habitat for reptiles and amphibians. Reptiles can be found in moist floodplains or shaded woodlands, as well as within open grassland and agricultural fields. Twenty-three species of reptiles have been documented at the battlefield including broad-headed skink (*Eumeces laticeps*), eastern garter snake (*Thamnophis sirtalis sirtalis*), eastern box turtle (*Terrapene carolina carolina*), eastern snapping turtle (*Chelydra serpentina serpentina*), northern copperhead (*Agkistrodon contortrix mokasen*), and redbellied snake (*Storeria occipitomaculata*) (NPS 2011c).

Habitats for amphibians are typically associated with aquatic environments and nearby upland areas. Important amphibian habitat at Manassas includes ephemeral pools that provide breeding habitat for spring peepers (*Pseudacris crucifer*) and wood frogs (*Lithobates sylvaticus*) as well as spotted (*Ambystoma maculatum*) and marbled salamanders (*Ambystoma opacum*) (NPS 2008d).

SPECIAL STATUS SPECIES

The National Park Service is required under the Endangered Species Act to ensure that federally listed species and their designated critical habitats are protected on lands within the agency's jurisdiction. In addition, the National Park Service considers state-listed or other rare species similarly in taking actions that may affect these species. No federally listed or candidate species are known to occur within the battlefield; therefore, this section only addresses state special status species.

Migratory bird species listed by U.S. Fish and Wildlife Service as birds of conservation concern are considered because prescribed burns could affect their habitats. Nine state-listed birds could occur at Manassas. In addition, seven migratory bird species at Manassas are on the USFWS's 2008 list of Birds of Conservation Concern for the Piedmont. These species include the bald eagle (*Haliaeetus leucocephalus*), cerulean warbler (*Setophaga cerulean*), Henslow's sparrow (*Ammodramus henslowii*), wood thrush, blue-winged warbler (*Vermivora cyanoptera*), Kentucky warbler, and prairie warbler (*Dendroica discolor*) (NPS n.d.; USFWS 2008b).

A number of rare invertebrate species are known to exist in Prince William County and may potentially occur in the park. Three of these species are state or federal species of concern or are state-listed. They include two mussels, the state-endangered brook floater (*Alasmidonta vericosa*) and the yellow lance (*Elliptio lanceolata*), and a butterfly species of concern, the regal fritillary (*Speyeria idalia*). Other potential rare invertebrates include several aquatic species of amphipods, clubtails, and a stonefly (NPS 2008b).

Air Quality

The 1963 Clean Air Act as amended in 1977 (42 USC 7401 et seq.) requires federal land managers to follow policies that protect park air quality. The act also assigns the federal land manager (park superintendent) an affirmative responsibility to protect the park's air quality related values – including visibility, plants, animals, soils, water quality, cultural and historic resources and objects, and visitors – from adverse air pollution impacts. Section 118 of the Clean Air Act requires the park to meet all federal, state, and local air pollution standards.

Fairfax, Loudoun, and Prince William Counties (the park is in Prince William County, adjacent to Fairfax County), are part of the Washington DC-MD-VA airshed. The U.S. Environmental Protection Agency has

designated the airshed as a marginal non-attainment area for the criteria pollutant ozone (O₃) (2008 8-hour standard), and as a non-attainment area for particulate matter less than 2.5 micrometers (PM_{2.5}). The counties are in attainment for the remaining National Ambient Air Quality Standards criteria pollutants, including particulate matter less than 10 micrometers (PM₁₀), sulfur dioxide (SO₂), nitrogen dioxide (NO₂), carbon monoxide (CO) and lead (Pb) (EPA 2013).

Visitor Use and Experience

SEASONAL VISITATION PATTERNS

The visitor use and patterns of use described in this section provide background for understanding levels of use and impacts of this use on the park's resources. Recreational visits for the last 16 years are depicted in table 4. Monthly visitation numbers for 2012 are listed in table 5, and are indicative of the normal park visitation patterns at Manassas (NPS 2012b).

Annual visitor use figures are presented in table 4. Annual visitor use at the park fluctuates from year to year. While it has increased slightly at times, visitation has experienced a 3.33% average annual decrease from 1998-2012. A similar trend is expected in the future (NPS 2008b).

TABLE 4. ANNUAL VISITATION AT MANASSAS NATIONAL BATTLEFIELD PARK

Year	Annual Visitors	Percent Change from Previous Year
1998	972,709	—
1999	815,338	-16.18
2000	692,006	-15.13
2001	822,684	18.88
2002	779,147	-5.29
2003	759,953	-2.46
2004	722,132	-4.98
2005	715,622	-0.90
2006	674,851	-5.70
2007	584,926	-13.33
2008	594,992	1.72
2009	578,383	-2.79
2010	612,490	5.90
2011	659,740	7.71
2012	600,354	-9.00
2013	538,888	-10.24
Average	695,263	-3.33

TABLE 5. MANASSAS NATIONAL BATTLEFIELD PARK 2012 MONTHLY VISITATION

Month	Visitation
January	34,765
February	37,858
March	38,191
April	93,196
May	63,934
June	46,903
July	63,320
August	71,294
September	47,134
October	48,014
November	31,891
December	23,854
2012 Total	600,354

Summer visitation is considerably higher than winter visitation. However, pleasant weather, combined with spring blossoms or autumn foliage, create peak visitation during spring and fall weekends (NPS 2008b).

Seasonal variations in visitor use are as follows:

- Spring: heaviest use occurs on weekends and is usually concentrated around Stone Bridge, the visitor center, and the surrounding area. Increased use by seniors and school groups occurs, as well as more use by hikers, joggers, and picnickers.
- Summer: family groups on extended vacations dominate the park. Peak daily use occurs between the hours of 11:00 a.m. and 4:00 p.m. The heaviest use is on the weekends.
- Fall: senior citizen and organized tour use increases, especially in October. Use is concentrated on weekends. Area residents make increased use of the park for recreational activities.
- Winter: visitation is the lightest of any season. Area residents and business commuters predominate during this period. Heaviest use occurs during periods of snowfall, when cross-country skiing, sledding, and snow play are the main attractions (NPS 2008b).

VISITOR ACTIVITIES

Resources available for visitor use include one visitor center, one visitor contact station, a picnic area, 5,071 acres of battlefield park, 12 miles of tour road, 150 interpretive park signs, 21 miles of hiking trails, and 23 miles of bridle trails (NPS 2008b).

The battles, location, historic resources, and historic significance of Manassas make it unique among the many parks and recreational areas of the surrounding region. The Henry Hill walking tour is the primary way that visitors experience the Battle of First Manassas; whereas, the park's driving tour is the primary way for people to experience the Battle of Second Manassas. The park also features walking, hiking, and horseback riding facilities (NPS 2008b). There is also a picnic area and shelter at Brownsville, and fishing in the park ponds.

Picnicking and hiking are available at the 400-acre Conway Robinson Memorial State Forest, which is 0.25-mile west of the park. In addition, numerous other parks and recreation facilities within the local area provide a wide variety of public recreational opportunities (NPS 2008b).

Bull Run Regional Park, operated by the Northern Virginia Regional Park Authority, is approximately 4 miles east of the Henry Hill visitor center. This facility features a broad range of recreational activities, and accommodates large groups' special events (NPS 2008b).

A visitor survey from 1995 revealed that common visitor activities include visiting the visitor center museum (83% of total respondents), using the information desk (74%), viewing the battle map (74%) and watching the slide program (67%). The least common activity was using the horseback riding trails (1%). Other activities mentioned by visitors included walking for exercise, watching history presentation at Stone House, picnicking and taking photographs (NPS 1995). The same study found that the most commonly visited sites at Manassas were Henry Hill (82%), Stone House (69%) and Stone Bridge (64%). The least visited site was Hazel Plain (30%) (NPS 1995).

Park Management and Operations

Fire management actions, even the dissemination of information about fire and its effects on the environment, require time and money, and all alternatives considered would have effects on staffing and operating budget of the battlefield.

Manassas had a base operating budget of approximately \$3,157,000 in fiscal year 2010 and a work force of 27 permanent positions and 19 seasonal or temporary positions, for a full-time equivalent of 33.69 employees annually (NPS 2011d). Management staff includes the superintendent and cultural and natural resources managers. Staff is organized into six operating divisions: Park Management and Administration, Natural Resource Management, Cultural Resources Management, Education and Interpretation, Law Enforcement, and Maintenance (Gorsira, pers. comm. 2012a). Staff expertise and specialties include one museum curator, one historian, one natural resource program manager/ geographic information system specialist, one computer specialist, and two exhibit specialists. This staff is supplemented and/or supported using special project funds, contracts, and/or the assistance or expertise of various NPS entities and other organizations, as available.

PARK MANAGEMENT AND ADMINISTRATION

There are 6 full-time employees within this division, consisting of the park superintendent, an administrative assistant, the administrative officer, and other support staff. The primary responsibility of the superintendents is the day-to-day management of the overall park operations. The administrative officer oversees purchasing, budget, contract administration, and property management (Gorsira, pers. comm. 2012a).

Park administration structures include:

- one visitor center
- one visitor contact station
- one central maintenance facility
- park headquarters
- one law enforcement office building
- one horse barn
- one hay barn/fire cache building
- one tack building

- one resource management building
- three employee housing units

The park includes 4.65 miles of paved and 7.6 miles of unpaved roadways and two picnic areas.

NATURAL RESOURCE MANAGEMENT

Manassas currently has one full-time employee and one 6-month subject to furlough full time biological technician with duties solely in natural resource management. Duties of the natural resource management staff include water quality monitoring and mitigation of problems affecting these resources, park wildlife management and population monitoring, deer management activities, vegetation management including control of invasive plants, integrated pest management (of natural and cultural resources and administrative offices), geographic information system and global positioning system duties, park coordination for NEPA compliance; agricultural leasing management; and hazardous tree management. Geographic information system management is also included in this department.

The NPS National Capital Region Natural Resources Science group assists park resource management staff by providing technical assistance on park programs including water quality monitoring, deer monitoring, vegetation monitoring, air quality monitoring, invasive plant control, wildlife management, integrated pest management of natural and cultural resources, and administrative offices, cultural resource management, and education (Gorsira, pers. comm. 2012a).

CULTURAL RESOURCES MANAGEMENT, EDUCATION AND INTERPRETATION

The park has five full-time employees with duties solely devoted to cultural resource management, education and interpretation. The park manages many properties that are listed on the national register as well as several sites that are eligible for listing. This division is also responsible for managing the park's collections.

Education and interpretation are a large part of the visitor services offered by this division. The staff provides many educational and interpretive programs focused on the park's cultural history. These programs are focused on school groups, families, and adults. At this time there are no programs that focus on natural resource topics.

The park manages three main visitor contact points: The Visitor Center, The Stone House, and the Brawner Farm Contact Station. The park is an integral part of the Bridging the Watershed Program which educates local school groups on the importance and function of the watersheds in the Washington, D.C., metro area (Gorsira, pers. comm. 2012a).

LAW ENFORCEMENT

There are 4 full time employees in the law enforcement division. They provide law enforcement on all lands administered by Manassas. The law enforcement division is responsible for implementation of fire management planning. The division also provides for visitor safety, responds to emergencies, enforces traffic laws, enforces the CFR, and preserves the natural and cultural resources entrusted to the National Park Service (Gorsira, pers. comm. 2012a).

MAINTENANCE

There are currently nine full-time maintenance positions. The primary responsibility of the Maintenance Division is to provide for the general upkeep and maintenance of all park buildings and infrastructure. Park maintenance is also responsible for maintaining all utilities that service park buildings and other park facilities.

The Maintenance Division is divided up into several areas of responsibility. The tree crew manages hazardous trees and trees that are storm damaged or have fallen across roads, trails, or waterways causing

obstruction. The roads and trails crew perform maintenance on park roads and trails to include road surface repair, culvert cleaning and stabilization, construction/rehabilitation of all park trails, sign maintenance, and snow removal. The grounds crew is responsible for litter removal, landscaping bed maintenance, and general grounds maintenance. The building and utilities crew maintains buildings include plumbing, painting, electrical, and heating/air conditioner maintenance. The Maintenance Division also has a mechanic to service vehicles and equipment.

Public Health and Safety

Manassas is committed to providing appropriate, high-quality opportunities for visitors and employees to enjoy the park in a safe and healthful environment and strives to provide for injury-free visits and a safe work environment. Human health and safety concerns associated with the proposed project include the safety of park staff and visitors during fire management activities. Visitor injuries at Manassas from 2001 to 2011 are presented in table 5, with the majority of visitor injuries being attributable to horseback riding.

TABLE 6. VISITOR INJURIES AT MANASSAS NATIONAL BATTLEFIELD PARK, 2001–2011

Year	Visitor Injuries
2001	3
2002	1
2003	0
2004	2
2005	3
2006	2
2007	1
2008	4
2009	2
2010	3
2011	2

Source: Gorsira, pers. comm. 2012a.

Reported employee injuries that resulted in lost time from 2001 to 2010 are listed in table 6. Of all employee injuries, none have been reported to have been caused directly by fire or while suppressing fires.

TABLE 7. EMPLOYEE INJURIES AT MANASSAS NATIONAL BATTLEFIELD PARK, 2001–2011

Year	Employee Injuries
2001	9
2002	2
2003	0
2004	1
2005	1
2006	3
2007	1
2008	1
2009	2
2010	3
2011	8

Source: Gorsira, pers. comm. 2012a.

Cultural Resources

The park is listed on the national register in its entirety. It contains multiple archeological sites relating to the Civil War battles that occurred in and near the park. There are a number of historic buildings, monuments, and cemeteries, and cultural landscapes.

Prince William County was much fought over during the Civil War. As a key transportation node for the region, Manassas was the site of two major Civil War battles. In 1861 the war's first major land battle, known to confederates as Manassas and the Union as Bull Run, was fought here. A second battle occurred at the same site 13 months later. Both battles were won by the Confederacy, and the second, bloodier battle, was one of Confederate General Robert E. Lee's greatest successes in the war and paved the way for his first invasion of the North. Possible prescribed burn areas, particularly for viewshed restoration (figure 3), are in areas where fighting took place during the second battle. These areas include the Deep Cut area along the Unfinished Railroad. While most of the areas where prescribed burns are planned are old agricultural fields that have long been grown up in grass, the Deep Cut area and parts of the Brawner Farm are rugged and rocky. Parts may never have been plowed, and the vegetation is currently described as "brush."

ARCHEOLOGICAL RESOURCES

Archeological resources consist of buried and above-ground prehistoric and historic remains and artifacts significant to study of the past. The archeological resources of the park include ancient Native American camps, historic houses and farms, the bed of the Unfinished Railroad, and the remains of the two battles. Extensive excavations have been carried out around several of the farms on the property, including Portici (Parker and Hernigle 1990), the Robinson House (Parsons 2001), the Stone House (Reeves 2001), and the Brawner Farm (Bedell 2006). The archeological record of the battle has been compromised by amateur artifact collection, which began immediately after both battles and continued until recent times. However, the potential of surviving Civil War artifacts to provide data on the Manassas battles was amply confirmed by studies around the Brawner Farm (Bedell 2006; Potter et al. 2001). Metal detecting by park personnel in a small portion of the Deep Cut area that had been disturbed by maintenance activity produced 24 battle-related artifacts, showing the great potential of that area (Burgess 2010).

Information concerning site location, type, age and national register eligibility provides an essential understanding of not only known sites, but, based on certain environmental factors, such as proximity to water and slope of ground, where potential undocumented archeological resources sites may be found. The Manassas battlefield has a rich archeological record, including ancient Native American camps, historic farms, and the remains of the two battles. Most of the areas where prescribed burns are being considered are old agricultural fields that were plowed for centuries. In these areas, the collection of artifacts by amateurs began immediately after the battle.

CULTURAL LANDSCAPES

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

In order for a cultural landscape to be listed in the national register, it must possess significance (the meaning or value ascribed to the landscape) and retain the integrity of those features necessary to convey its significance as well as meet one or more of the national register criteria (36 CFR 63). The character-defining features of a cultural landscape include spatial organization and land patterns; topography;

vegetation; circulation patterns; water features; and structures/buildings, site furnishings, and objects. Individual features of the landscape are never examined alone but only in relationship to the overall landscape. The arrangement and interrelationships of a cultural landscape's organizational elements and character-defining features provide the key to determining the potential impacts and effects of proposed undertakings on a cultural landscape (Weeks and Grimmer 1995; Birnbaum 1996).

Cultural landscape reports have been prepared for the park's fences and forests, for the Unfinished Railroad, and for Brawner Farm, which was the site where the second battle of Manassas opened. A cultural landscape inventory was prepared for Groveton Confederate Cemetery and Brawner Farm. The cultural landscape reports investigate and record the site's historic and existing conditions, assess the integrity of the current landscape, and make treatment recommendations for future development and interpretation. A cultural landscape inventory is an evaluated inventory of the cultural landscape, identifying and documenting the landscape's location, size, physical development, condition, landscape characteristics, character-defining features, and other information but does not include management recommendations or treatment guidelines.

What is now known as the Unfinished Railroad was constructed by the Manassas Gap Railroad Company. The new line forever branded the rural landscape in 1854, when the company began constructing a 35-mile railroad embankment that was to continue the line from Gainesville to Bull Run at Sudley Mill. An expansion route was ultimately abandoned by the railroad company with no ties set and no rails laid. This man-made feature, located about one-half mile north of the intersection of today's Route 234 and Interstate 66, proved to be one of most significant landscape features in the Second Battle of Manassas by providing ready-made fortifications. At the time of the battle, the grade was overgrown, with its straight-engineered lines largely obscured by grass, cedars, and brush. Furthermore, farm fences had encroached upon the right-of-way and ran along the top of the embankment (Schaible 2013; Louis Berger Group and Quinn Evans Architects 2014).

The Brawner Farm cultural landscape inventory determined that the site retains a large amount of evidence of its historic agricultural use, including fields and fencerows. The house and its farmyard, the most prominent landmarks on the site and the location of the Battle of Brawner Farm is intact, though the dwelling dates from 1905 with a late 18th or early 19th century structure incorporated into its northern block. The farm is located within the Manassas National Battlefield Park Historic District and is significant under Criterion A with a period of significance beginning in 1800 and ending in 1905. The report identified seven landscape character areas: the Historic Core (farmyard and barn, Brawner Woods, the south end of Stony Ridge, and South Field); South Woods; the Confederate Staging Area; the Unfinished Railroad; the West Fields; and Warrenton Turnpike/Route 29 and Pageland Road (Earley and Fanning 2005).

The Groveton Confederate Cemetery was established in 1867 as part of an effort to remove Confederate remains from the battlefield. The cemetery, established by the Groveton and Bull Run Memorial Association, was left neglected until taken over by the Bull Run Chapter of the Daughters of the Confederacy in 1897. When the chapter disbanded in 1943 it was taken over by a sister chapter in Manassas and later a board of trustees appointed by Prince William County Circuit Court in 1955, until the property was acquired by Manassas National Battlefield in 1973. The cemetery is eligible under national register Criteria A, B, and D, with a period of significance of 1863–1943. The cultural landscape inventory found that Groveton Cemetery retains integrity for its period of significance though there have been changes to the landscape such as the construction of Lee Highway and loss of historic vegetation (King 2011).

HISTORIC STRUCTURES AND DISTRICTS

The term "historic resources" refers to historic properties that are buildings, structures, objects, and districts listed in or eligible for inclusion in the national register. In order for an historic resource to be listed in the national register, a particular resource must meet one or more of the national register criteria

(36 CFR 63). The resource must be associated with an important historic context. In other words, it must possess significance—the meaning or value ascribed to the historic resource—and retain the integrity of those character-defining features necessary to convey its significance (i.e., location, design, setting, workmanship, Criteria for Evaluation; NPS 1995). Impact analyses under the National Environmental Policy Act and section 106 examine the manner and degree to which the proposed alternatives may impact or affect the qualities and integrity of an individual historic resource’s character-defining features, significance, and national register eligibility.

The following information is excerpted from the 2004 official national register nomination of the Manassas Battlefield Historic District (NPS 2004b). The historic district contains approximately 6,469.54 acres of Virginia landscape historically significant for its association with the First Battle of Manassas on July 21, 1861, and the Second Battle of Manassas on August 28–30, 1862. Prior to the military conflicts, the property was agricultural in nature with scattered eighteenth- and nineteenth-century plantations and rural farms. By the end of the war, however, nearly all of the eighteenth century houses had been destroyed by troops passing through the region; several of the nineteenth century dwellings were severely damaged or destroyed during the fighting; and the agricultural landscape was scarred. In the Reconstruction decades following the war, commemorative markers, cemeteries, and historical monuments began to grace the land that had only partially returned to its agricultural roots. Preservation and commemoration of this hallowed ground became a priority; ultimately the battlefield was established as a park by Congress in 1940. The land outside the boundaries of the NPS reserve, property that was historically associated with the battles, largely remained rural in nature, with a limited number of late-twentieth-century housing developments and commercial ventures. Today, the battleground is sufficiently intact to allow vistas not unlike those observed by the commanding generals and the thousands of soldiers who fought there. The battlefield retains integrity of location, setting, feeling, and association with the historic events that occurred on the property during the Civil War. With reference to the man-made resources, such as the dwellings, military embattlements, and the Unfinished Railroad, Manassas Battlefield has integrity of design, workmanship, and material. The Manassas Battlefield Historic District has 126 contributing buildings, sites, and objects dating from the period between 1820 and 1942, and 254 non-contributing buildings and sites. Of these 380 resources, 231 buildings, sites, and objects are located within the boundaries of the Manassas National Battlefield Park Historic District, originally designated in 1981.

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

This “Environmental Consequences” chapter analyzes both beneficial and adverse impacts that could result from implementing any of the alternatives considered in this EA. This chapter also includes definitions of impact thresholds (e.g., negligible, minor, moderate, and major), methods used to analyze impacts, and the analysis methods used for determining cumulative impacts. As required by the CEQ regulations implementing the National Environmental Policy Act, a summary of the environmental consequences for each alternative is provided in table 1, which can be found in “Chapter 2: Alternatives.” The resource topics presented in this chapter, and the organization of the topics, correspond to the resource discussions contained in “Chapter 3: Affected Environment.”

General Methodology for Establishing Impact Thresholds and Measuring Effects by Resource

The following elements were used in the general approach for establishing impact thresholds and measuring the effects of the alternatives on each resource category:

- general analysis methods as described in guiding regulations, including the context and duration of environmental effects;
- basic assumptions used to formulate the specific methods used in this analysis;
- thresholds used to define the level of impact resulting from each alternative;
- methods used to evaluate the cumulative impacts of each alternative in combination with unrelated factors or actions affecting park resources; and
- methods and thresholds used to determine if impairment of specific resources would occur under any alternative

These elements are described in the following sections.

GENERAL ANALYSIS METHODS

The analysis of impacts follows CEQ guidelines and Director’s Order 12 procedures (NPS 2001) and is based on the underlying goals of managing fuels, promoting biodiversity and ecosystem health, promoting public safety, and providing for long-term protection, conservation, and restoration of native species and cultural landscapes at the park. This analysis incorporates the best available scientific literature applicable to the region and setting, the species being evaluated, and the actions being considered in the alternatives.

The effects of each alternative are assessed for adverse, beneficial, and cumulative effects for each resource topic selected. Cumulative impacts are the impacts of the alternatives in combination with other past, present, and reasonably foreseeable future actions. For each resource topic addressed in this chapter, the applicable analysis methods are discussed, including assumptions and impact intensity thresholds. Potential impacts are described in terms of type, context, duration, and intensity.

ASSUMPTIONS

Several guiding assumptions were made to provide context for this analysis. These assumptions are described below.

Analysis Period

The Fire Management Plan establishes goals, objectives, and specific implementation actions needed to manage fire at the park for the next 10 years, although its implementation could extend over a longer time

period. Therefore, the period of analysis varies by resource topic, but is generally considered to extend to 10 years from the date of implementation of the fire management plan.

Geographic Area Evaluated for Impacts (Area of Analysis)

The geographic study area (or area of analysis) for this plan varies by impact topic (e.g. air quality impacts related to prescribed fire), but primarily includes the area within the boundaries of the park. The area of analysis may also extend beyond the park's boundaries for some cumulative impact assessments, such as air quality and public health and safety. The specific area of analysis for each impact topic is defined at the beginning of each topic discussion.

IMPACT THRESHOLDS

Determining impact thresholds is a key component in applying NPS *Management Policies* and Director's Order 12. These thresholds provide the reader with an idea of the intensity of a given impact on a specific topic. The impact threshold is determined primarily by comparing the effect to a relevant standard based on applicable or relevant/appropriate regulations or guidance, scientific literature and research, or best professional judgment. Because definitions of intensity vary by impact topic, intensity definitions are provided separately for each impact topic analyzed in this document. Intensity definitions are provided throughout the analysis for negligible, minor, moderate, and major impacts. In all cases, the impact thresholds are defined for adverse impacts. Beneficial impacts are addressed qualitatively.

Potential impacts of all alternatives are described in terms of type (beneficial or adverse); context; duration (short or long term); and intensity (negligible, minor, moderate, major). Definitions of these descriptors include:

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

Adverse: A change that declines, degrades, and/or moves the resource away from a desired condition or detracts from its appearance or condition.

Context: Context is the affected environment within which an impact would occur, such as local, park-wide, regional, global, affected interests, society as whole, or any combination of these. Context is variable and depends on the circumstances involved with each impact topic. As such, the impact analysis determines the context, not vice versa.

Duration: The duration of the impact is described as short term or long term. Duration can vary by impact topic, but is generally thought to have impacts that last for one to three years, or have transient impacts during fire events (planned or unplanned).

Intensity: Because definitions of impact intensity (negligible, minor, moderate, and major) vary by impact topic, intensity definitions are provided separately for each impact topic analyzed. Intensity is only evaluated for adverse impacts.

CUMULATIVE IMPACTS ANALYSIS METHOD

The CEQ regulations to implement the National Environmental Policy Act require the assessment of cumulative impacts in the decision making process for federal projects. Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions" (40 CFR 1508.7). As stated in the CEQ handbook, *Considering Cumulative Effects* (CEQ 1997), cumulative impacts need to be analyzed in terms of the specific resource, ecosystem, and human community being affected and should focus on effects that are truly meaningful. Cumulative impacts are considered for all alternatives, including the no action alternative.

Cumulative impacts were determined by combining the impacts of the alternative being considered with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other ongoing or reasonably foreseeable future projects and plans at the park and, if applicable, the surrounding area. Table 7 summarizes these actions that could affect the various resources at the battlefield, along with the plans and policies of both the battlefield and surrounding jurisdictions, which were discussed in chapter 1. Additional explanation for most of these actions is provided in the narrative following the table.

The analysis of cumulative impacts was accomplished using four steps:

Step 1 — Identify Resources Affected - Fully identify resources affected by any of the alternatives. These include the resources addressed as impact topics in chapters 3 and 4 of the document.

Step 2 — Set Boundaries - Identify an appropriate spatial and temporal boundary for each resource. The temporal boundaries for each resource topic are listed under each topic.

Step 3 — Identify Cumulative Action Scenario - Determine which past, present, and reasonably foreseeable future actions to include with each resource. These are listed in table 7 and described below.

Step 4 — Cumulative Impact Analysis - Summarize impacts of these other actions (x) plus impacts of the proposed action (y), to arrive at the total cumulative impact (z). This analysis is included for each resource.

TABLE 7. CUMULATIVE PROJECTS

Impact Topic	Study Area	Past Actions	Present Actions	Future Actions
Soils	Within park boundaries	Existing and ongoing development in surrounding region	Existing and ongoing development in surrounding region	Development in surrounding region; Deer management plan implementation; Proposed bypass
Vegetation	Within park boundaries	Existing and ongoing development in surrounding region	Existing and ongoing development in surrounding region	Development in surrounding region; Deer management plan implementation; Proposed bypass
Water Resources	Within and adjacent to park boundaries and upstream areas which may contribute to runoff, sediment, or nutrient loading in Bull Run	Existing and ongoing development in surrounding region; Prescribed burning at Conway Robinson State Forest	Existing and ongoing development in surrounding region; Prescribed burning at Conway Robinson State Forest	Development in surrounding region; Proposed bypass; Prescribed burning at Conway Robinson State Forest
Wildlife and Habitat	Within park boundaries	Existing and ongoing development in surrounding region	Existing and ongoing development in surrounding region	Development in surrounding region; Deer management plan implementation; Proposed bypass
Air Quality	Within and adjacent to park boundaries	Existing and ongoing development in surrounding region; Prescribed burning at Conway Robinson State Forest	Existing and ongoing development in surrounding region; Prescribed burning at Conway Robinson State Forest	Development in surrounding region; Proposed bypass; Prescribed burning at Conway Robinson State Forest

Impact Topic	Study Area	Past Actions	Present Actions	Future Actions
Visitor Use and Experience	Within park boundaries	Prescribed burning at Conway Robinson State Forest	Prescribed burning at Conway Robinson State Forest	Deer management plan implementation; Proposed bypass; Prescribed burning at Conway Robinson State Forest
Park Management and Operations	Within park boundaries	None identified	None identified	Deer management plan implementation; Proposed bypass;
Public Health and Safety	Within and adjacent to park boundaries	Prescribed burning at Conway Robinson State Forest	Prescribed burning at Conway Robinson State Forest	Deer management plan implementation; Proposed bypass; Prescribed burning at Conway Robinson State Forest
Cultural Resources	Within park boundaries	None identified	None identified	Deer management plan implementation; Proposed bypass

Similar to the impacts of each alternative to the affected resources, the spatial boundary for cumulative impacts varies by resource topic but is generally confined to areas within and adjacent to the park. Past and present actions with the potential to affect each resource topic include the following:

- **Existing and ongoing development in the surrounding region.** The Manassas area continues to experience suburban growth all around the park, as it has become a prime commuter location for Washington, D.C. workers. There are estimates that approximately 9,000 acres were developed within 3 miles of the boundary of Manassas National Battlefield Park between 2000 and 2010 (Gorsira, pers. comm. 2010). Land development is expected to continue into the future at a similar pace.
- **Prescribed burning at Conway Robinson State Forest.** Conway Robinson State Forest has implemented prescribed burning as a component of the vegetation management activities undertaken by the forest. Prescribed burning is expected to continue as forest management personnel deem necessary for the remainder of the life of the proposed fire management plan for Manassas National Battlefield Park.

Reasonably foreseeable future actions with the potential to cumulatively impact the affected resources described in Chapter 3 include ongoing development in the region and future prescribed burning at Conway Robinson State Forest, in addition to the following:

- **Implementation of the park's proposed deer management plan.** The proposed deer management plan for Antietam National Battlefield, Monocacy National Battlefield, and Manassas National Battlefield Park was developed to respond to continually increasing deer herd size and deer population density at all three battlefields, in order to support preservation of the cultural landscapes through the protection and restoration of native vegetation and other natural and cultural resources.
- **Construction of the Manassas National Battlefield Park Bypass.** The proposed bypass project would close the portions of U.S. Route 29 and Virginia Route 234 traversing the park and construct a new bypass highway around the park.

Soils

METHODOLOGY

To analyze the impacts on soil resources, all readily available information on soil resources in the park and surrounding region was reviewed, along with available information on the impacts of fire on soil resources. Best professional judgment was used to assess the potential intensity of impacts to soil resources from the alternative considered.

STUDY AREA

The study area for soil resources includes all soils within the boundaries of the park.

IMPACT THRESHOLDS AND DURATION

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

Negligible: The action would not result in discernible alteration to soils. The ability of soils to sustain biota, water quality, and hydrology would not be affected, and reclamation would not be necessary.

Minor: The action would result in localized or limited alteration to soils. Alteration to soils would affect their ability to sustain biota, water quality, and hydrology, such that reclamation would be achievable within 2 years. Mitigation measures, if necessary to offset adverse effects, would be simple and successful.

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

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

Short-term: Soil resources would recover in three years or less.

Long-term: Soil resources would require more than three years to recover.

IMPACTS OF ALTERNATIVE 1 (NO ACTION) TO SOILS

Analysis

Under the no action alternative, the battlefield's fire management program would be limited to wildland fire suppression actions using the appropriate response for conditions. The battlefield's current vegetation management practices, which are used to maintain the cultural landscape but are not strategically integrated into existing fire management, would continue. Mechanical and manual vegetation removal would have the potential to impact small, localized areas due to increased erosion resulting from vegetation removal or compaction of soils from equipment; however, based on the equipment likely to be used, it is anticipated that adverse impacts would be short term and negligible. Targeted herbicide application, such as hand application, could result in herbicide migration into the soil; however, the National Park Service would use herbicides that do not have short- or long-term residual implications for soil, water, or humans, consistent with integrated pest management practices. If fire suppression activities become necessary, minimum impact suppression tactics (e.g., selection of procedures, tools, and

equipment that least impact the environment; and use of water diversion devices to reduce erosion risk) would be used to reduce potential adverse impacts to soils during suppression actions. Any areas where soil may be disturbed would be remediated and planted with an NPS-approved seed mix. To the extent possible, fire suppression would use water only to avoid contaminating soils with fire retardants.

Generally, it is anticipated that the no action alternative would have short-term and long-term, negligible, adverse impacts to soils. Because all fires would be suppressed under the no action alternative, potential beneficial impacts related to the release of ash, organic matter, and associated nutrients into the soil would typically not be realized.

As noted in “Chapter 1: Purpose and Need,” Manassas National Battlefield Park is not generally considered to be located in a fire maintained ecosystem that experiences and thrives on frequent fires (Gorsira, pers. comm. 2014). However, the use of wildland fire suppression tactics alone, without strategically integrated fuels management measures, would have the potential to lead to fuels buildup that could slightly increase the likelihood of larger and more intense wildland fires that are more difficult to suppress and manage. Higher-intensity fires would have the potential to destroy all vegetation in a burned area, exposing soils to erosion from wind and water. High-intensity fires also have the potential to damage soils through destruction of organic material in the soil. Combined with exposure to wind and water erosion, this could compromise the productivity of soils in burned areas and their capacity to sustain vegetation, prolonging the time necessary for post-fire recovery and therefore leading to localized, long-term, minor to moderate, adverse impacts.

Because severe wildland fires are infrequent, and it is likely that most fires would be easily suppressed, impacts to soil resources from wildland fire and fire suppression tactics under the no action alternative are generally expected to be short term to long term, negligible, adverse, and mostly localized, unless there is an intense fire that burns a much larger area.

Cumulative Impacts

Past, present, and reasonably foreseeable future projects that could impact soils include ongoing development in the region surrounding the park and the construction of the new bypass. Ongoing development has increased the amount of impervious surfaces in the region, and continued development is expected to contribute short-term, adverse impacts from construction and earth moving activities and long-term, adverse impacts related to the further loss of productive soils and the addition of impervious surface. Construction of the bypass could contribute short-term, adverse impacts from construction and earth moving activities and long-term, adverse impacts related to the loss of productive soils and the addition of impervious surface. The no action alternative would contribute short- to long-term, negligible, adverse impacts to soils. Therefore, cumulative impacts to soil resources would be long term, minor, and adverse.

Conclusion

The no action alternative would generally result in short- and long-term, negligible, adverse impacts to soils. Because of the chance of severe uncontrolled wildland fire may be slightly increased under the no action alternative, the loss of vegetative cover and exposure of soils to wind and water erosion that could result from high intensity fires would have long-term, minor to moderate, adverse impacts in the event of a severe fire that could not be quickly suppressed. Cumulative effects to soils would be long term, minor, and adverse.

IMPACTS OF ALTERNATIVE 2 TO SOILS

Analysis

Potential impacts to soils from mechanical and chemical vegetation treatments under alternative 2 would be similar to those described for the no action alternative. Likewise, the potential impacts to soils from suppression of uncontrolled wildland fire would be similar to those described for the no action alternative. The addition of prescribed fire as a strategically integrated fuels management tool could potentially lead to some short-term increases in erosion due to loss of vegetative cover. Regrowth of herbaceous cover is expected to occur rapidly, however, because prescribed fires would be low-intensity and would be immediately and aggressively suppressed if they begin to exceed the scope of the burn plan. The potential for substantial vegetation loss and soil damage from prescribed burning would thereby be reduced. Increased erosion potential in burned areas would result in mostly localized, short-term, minor, adverse impacts to soils.

Impacts to soils from the use of goats to reduce vegetation would not be expected to affect soils. The goats would contribute some nutrients to the soils with their manure, and they would be moved to a new grazing area before they could cause soil compaction.

The fertilization effects of ash from prescribed burning would provide an important source of nutrients for surviving and regrowth vegetation in a burned area. In addition to recycling nutrients back into the soils, raising pH, and increasing minerals and salt concentrations in the soil, the ash and charcoal residue resulting from incomplete combustion aids in soil buildup and soil enrichment by increasing the amount of organic matter to the soil profile. The added material works in combination with dead and dying root systems to make the soil more porous, better able to retain water, and less compact while increasing needed sites and surface areas for essential microorganisms, mycorrhiza, and roots (Vogl 1979; Wright and Bailey 1982). Prescribed fire would therefore have long-term, beneficial impacts to soils.

Strategic integration of prescribed burns, mechanical treatments, and targeted herbicide application into fire management goals would have the result of decreasing the potential intensity, frequency, and size of wildland fires over the long term. The use of these additional, targeted fuels management actions would reduce the timeframe needed to decrease accumulations of hazardous fuels in treated landscape units, thus reducing the intensity and potential erosion impacts of wildland fires. As with the no action alternative, a severe fire could have localized, long-term, minor to moderate, adverse impacts; however, under alternative 2, the already-low potential for such a fire to occur would be further reduced with the inclusion of fuels management.

Cumulative Impacts

Impacts from cumulative actions would be similar to those described under the no action alternative. Fire management activities under alternative 2 would contribute short-term, minor, adverse impacts and long-term, beneficial impacts to soil resources. Overall, cumulative impacts to soil resources would be long term, minor, and adverse.

Conclusion

Alternative 2 would result in short-term, minor, adverse impacts to soils because of the temporary loss of vegetative cover and exposure of soils to wind and water erosion. Potential impacts to soils from suppression of uncontrolled wildland fire would be similar to those described for the no action alternative. This alternative would also result in long-term, beneficial impacts because ash and charcoal resulting from prescribed fires and wildland fire would contribute additional organic matter and nutrients to the soil. Cumulative effects to soils would be long term, minor, and adverse.

IMPACTS OF ALTERNATIVE 3 TO SOILS

Analysis

Under alternative 3, mechanical, manual, and chemical vegetation management would result in soils impacts similar to those described under alternative 2. Impacts to soils from suppression of uncontrolled wildland fire would be similar to those described for the no action alternative. Because no prescribed fire would occur under alternative 3, potential negative impacts to soils from erosion and fire damage associated with prescribed burning would not occur. Potential beneficial impacts from the addition of ash and organic matter would also not occur. Use of mechanical, manual, and chemical fuels management alone may not prove as effective in reducing the frequency and intensity of uncontrolled wildland fire as the combination of these methods with prescribed fire as described for alternative 2; therefore, the potential for soil damage from uncontrolled wildland fire may be marginally higher under alternative 3. Overall, the anticipated impacts of alternative 3 on soils would be similar to alternative 2 and would be localized, minor, and adverse, as well as short term and long term and beneficial.

Cumulative Impacts

Impacts from cumulative actions under alternative 3 would be similar to those described under the no action alternative and alternative 2. Because no prescribed burning would be used, alternative 3 would contribute short-term, minor, and adverse impacts and long-term, beneficial impacts to soil resources. Overall, cumulative impacts to soil resources would be long term, minor, and adverse.

Conclusion

The impacts to soils from alternative 3 would be similar to those described for alternative 2 and would be short term, minor, and adverse and long term and beneficial. Cumulative impacts to soil resources would be long term, minor, and adverse.

Vegetation

METHODOLOGY

The methodology used for assessing vegetation impacts included using literature reviews and best professional judgment to identify the plant communities present and the potential impacts to plant populations (e.g., composition, diversity, abundance) from the action alternatives.

STUDY AREA

The study area for vegetation includes all plant communities within the boundaries of the park.

IMPACT THRESHOLDS AND DURATION

The following thresholds were used to determine the magnitude of impacts on vegetation:

Negligible: Some individual native plants could be affected as a result of the alternative, but measurable or perceptible changes in plant community size, integrity, or continuity would not occur. The impacts would be on a small scale.

Minor: The alternative would affect some individual native plants and would also affect a relatively minor portion of those species' population. The viability of the plant community would not be affected and the community, if left alone, would recover. Mitigation could be needed to offset adverse impacts, would be relatively simple to implement, and would likely be successful.

Moderate: The alternative would affect some individual native plants and a relatively large area in the native plant community that would be readily measurable in terms of abundance,

distribution, quantity, or quality. Mitigation needed to offset adverse impacts could be extensive and would likely be successful.

Major: The alternative would have a considerable effect on native plant communities that would be readily apparent, and would substantially change vegetation community types over a large area inside and outside the park. Mitigation measures to offset the adverse impacts would be required, the measures required would be extensive, and the success of these mitigation measures would not be guaranteed.

Short-term: Vegetation would recover in two or fewer growing seasons.

Long-term: Vegetation would require three or more growing seasons to recover.

IMPACTS OF ALTERNATIVE 1 (NO ACTION) TO VEGETATION

Analysis

Under the no action alternative, fire management would be limited to wildland fire suppression only. The park's current vegetation management practices, which are not strategically integrated into existing fire management, would continue. Prescribed fire would not be used. Mechanical and manual vegetation management work and the use of herbicides to slow the return of brush after vegetation removal would continue. Equipment used for mechanical vegetation removal, as well as equipment used by fire crews for wildland fire suppression efforts, would have the potential to contribute to the spread of invasive plants within the park. Mitigation measures consistent with NPS Director's Order 18 and Reference Manual 18 (NPS 2008e; NPS 2014a), such as inspecting and cleaning equipment after use as necessary, would be implemented to reduce these potential impacts, and the appropriate areas would be monitored and treated as necessary to prevent weed establishment or spread. Chemical treatments could have potential adverse impacts on non-target plant species; however, targeted herbicide application would minimize chances for overspray and application to non-target plants. Limited use, and application of herbicide to specific basal or foliar plant areas, would minimize chances for overspray and impacts to non-target plants. The long-term, adverse impacts would thus be negligible. Overall, it is anticipated that mechanical and chemical vegetation management under the no action alternative would have short- and long-term, negligible, adverse impacts. Continuation of suppression-only fire management measures without the option to use prescribed burning would preclude any beneficial impacts to vegetation that may result from the addition of ash, organic matter, and nutrients to the soil.

A lack of strategic integration of vegetation management with fire management goals could limit the efficiency and effectiveness of preventing hazardous fuels buildup, increasing the potential for uncharacteristic wildland fires that would be more difficult to control. As noted above for soils, the park is not in a high fire frequency area and high-severity fires are expected to be extremely rare. If a high-intensity unplanned wildland fire occurred, it could cause soil sterilization, remove soil organic matter, lower soil pH and nitrogen content, kill rhizomes and mycorrhiza, or cause soil to repel water, and potentially result in short and long-term changes in vegetation community structure, composition, and function and increased susceptibility to spread of invasive plants. A high-severity wildland fire would result in localized, short- and long-term, minor to potentially moderate, adverse impacts.

Uncontrolled wildland fires would be immediately and aggressively suppressed, which could lead to potential adverse impacts from trampling or removal of vegetation or the colonization of burned areas by invasive species. Fire personnel would use minimum impact suppression tactics such as avoiding the removal of live vegetation unless it poses a risk of significant fire spread or danger to human life and safety. Burned or otherwise heavily disturbed areas would be remediated and planted with an NPS-approved seed mix. Impacts from suppression would therefore be short-term, minor and adverse.

Cumulative Impacts

Ongoing and future projects that could impact vegetation include ongoing development in the region surrounding the park and the construction of the new bypass. Ongoing development in the region and the construction of the bypass would each contribute long-term, adverse impacts due to the permanent removal of vegetated area, the potential for spread of invasive species, and the addition of impervious surface. The no action alternative would contribute short- and long-term, negligible, adverse impacts to vegetation. Overall, cumulative impacts to vegetation would be long term, minor, and adverse.

Conclusion

Impacts to vegetation under the no action alternative could be minor, short term and long term, adverse, and localized due to increased potential for future severe wildland fires resulting from fuel buildup. There could be localized, long-term, minor, adverse impacts due to soil damage from larger and more intense fire behavior. Impacts from suppression would therefore be short-term, minor and adverse. Cumulative impacts to vegetation under the no action alternative would be long term, minor, and adverse.

IMPACTS OF ALTERNATIVE 2 TO VEGETATION

Analysis

Potential impacts to vegetation under alternative 2 would be similar to those described for the no action alternative above; however, these measures would be strategically integrated into fire management goals. Mechanical and manual treatments would include removal of undesirable vegetation near buildings and structures to create and maintain defensible space; treatments would also include roadside or trail mowing to reduce the potential for vehicle-caused fires along park roads, and to make these features more viable as firebreaks in the event of a wildland fire. Potential spread of invasive plants could occur from equipment used by fire crews both on prescribed fire and wildland fire suppression efforts. Following fire management activities (e.g., prescribed burns, hazardous fuels reduction), treatment areas would be monitored and invasive vegetation may be removed by manual, mechanical or chemical treatments. Impacts from the spread of invasive weed species would be long term and adverse if viable seeds are transported and become established. However, because of the mitigation measures that would be used, adverse impacts would be negligible.

Targeted herbicide application would minimize chances for overspray and application to non-target plants. Limited use, and application of herbicide to specific basal or foliar plant areas, would minimize chances for overspray and impacts to non-target plants. The long-term adverse impacts would thus be negligible.

The use of goat grazing for fuel reduction would have negligible effects on vegetation. Goats would be moved from each area once they graze the vegetation to the desired height. Vegetation would not be affected in the long term.

The use of prescribed fire could result in the temporary loss of individuals and communities of plants immediately following prescribed fires, thereby resulting in short-term, minor, localized, adverse impacts. Prescribed fire would benefit plant communities in the long term by contributing nutrients and organic debris to soils; reducing dense trees and brush; and maintaining the structure, composition, function, and complexity of the native ecosystem. Prescribed fire would therefore have long-term, beneficial impacts on vegetation.

Impacts to vegetation in the relatively unlikely scenario of a large, unplanned wildland fire, as well as the impacts from suppression of unplanned wildland fires, would be similar to those discussed for the no action alternative. The implementation of mechanical and manual treatments, targeted herbicide application, and prescribed burns is expected to more effectively limit the potential frequency and

intensity of unplanned wildland fires; therefore, adverse impacts from wildland fire would be diminished relative to the no action alternative.

Cumulative Impacts

Impacts from cumulative actions under alternative 2 would be similar to those described under the no action alternative. Alternative 2 would contribute short-term, minor, adverse impacts, as well as long-term, beneficial impacts to vegetation. Overall, cumulative impacts to vegetation would be long term, minor, and adverse.

Conclusion

Alternative 2 would result in localized, short-term, minor, adverse impacts from prescribed burns and associated activities. Impacts from suppression would therefore be short-term, minor and adverse. Long-term impacts would be beneficial. Cumulative effects to vegetation under this alternative would long term, minor, and adverse.

IMPACTS OF ALTERNATIVE 3 TO VEGETATION

Analysis

Under this alternative, park staff would identify treatment areas for the use of mechanical and chemical methods to reduce and manage fuels, reducing the risk of severe uncontrolled wildland fires compared to the no action alternative. Impacts to vegetation due to mechanical methods used for the removal of fuels would be the same as those described under alternative 2, and could be adverse, localized, short-term, and negligible. Impacts to vegetation due to chemical methods of fuel removal and management would be the same as those described under alternative 2. Beneficial impacts associated with prescribed fire under alternative 2 would not occur under alternative 3 because no prescribed burning would take place under this alternative; however, some long-term, beneficial impacts would result from the decreased potential for severe wildland fire due to mechanical and chemical fuel reduction. Impacts to vegetation from unplanned wildland fires under alternative 3 would be similar to those described for alternative 2, and impacts from the suppression of unplanned wildfires would be similar to those described for the no action alternative.

Cumulative Impacts

Impacts from cumulative actions under alternative 3 would be similar to those described under the no action alternative and alternative 2. Alternative 3 would contribute short-term, negligible, adverse impacts as well as long-term, beneficial impacts to vegetation. Overall, cumulative impacts to vegetation would be long term, minor, and adverse.

Conclusion

Alternative 3 would result in localized, short-term, negligible to minor, adverse impacts from mechanical, manual, and chemical vegetation treatments. Impacts from suppression would therefore be short-term, minor and adverse. Long-term impacts of fuels reduction would be beneficial. Cumulative effects to vegetation under this alternative would be long term, minor, and adverse.

Water Resources

METHODOLOGY

To analyze the impacts of the action alternatives on water resources, all readily available information on water resources in the park and surrounding region was reviewed, along with available information on the impacts of fire management on water resources. Spatial data were used to identify water resources in and around the park and their proximity to potential fire suppression or fire management practices. Best professional judgment based on literature review was used to assess the potential impacts to water resources from the alternatives considered.

STUDY AREA

The study area for water resources includes all water resources within the park, in addition to Bull Run, which lies adjacent to the park.

IMPACT THRESHOLDS AND DURATION

The methodology used for assessing water resource impacts included using available geographic information systems data and literature to identify the water resources present and identifying the potential effects to water resources (i.e., surface and ground water) by the action alternatives. The thresholds of change for the intensity of an impact are defined as follows:

Negligible: Neither water quality nor hydrology would be affected, or the changes would be either non-detectable or if detected, would have effects that would be considered slight and non-measurable.

Minor: The action would change hydrology or water quality, but the change would be small, localized, and of little consequence. Mitigation measures, if needed to offset adverse effects, would be simple and successful.

Moderate: The action would change hydrology or water quality; the change would be measurable and of consequence. Mitigation measures, if needed to offset adverse effects, could be extensive, but would likely be successful.

Major: The action would noticeably change hydrology or water quality; the change would be measurable and result in a severely adverse impact with regional consequences. Extensive mitigation measures would be needed to offset any adverse effects, and their success would not be guaranteed.

Short-term: Water resources would recover in one year or less.

Long-term: Water resources would require more than one year to recover.

IMPACTS OF ALTERNATIVE 1 (NO ACTION) TO WATER RESOURCES

Analysis

Under this alternative, the battlefield's current fire management plan would remain in place which is limited to wildland fire suppression activities. Prescribed burning would not be used. Under the current fire management plan, removal of vegetation by manual, mechanical, and chemical methods is conducted to maintain cultural landscapes but not as a means of controlling potential fuel sources. Lack of active fuel management tools would reduce defensible space options. This would allow the retention and continued buildup of hazardous fuels. Adverse impacts to water quality due to chemical runoff and increased erosion and turbidity due to bank vegetation removal are possible but would be minimized by

using strategic herbicide application and vegetation removal techniques. Therefore, impacts to water quality due to vegetation removal techniques would be negligible in the short and long term.

Although the park is not in a high risk area for wildland fires and the occurrence of high severity fires that cannot be quickly suppressed is not expected to be frequent, continued implementation of the existing fire management plan under the no action alternative could lead to a buildup of hazardous fuels, which could contribute to more intense wildland fires during dry conditions where fires are more difficult to suppress/manage. More intense wildland fires could also increase soil erosion due to soils becoming hydrophobic and due to the removal of most vegetation during intense, hot fires and during fire suppression activities. Potential increased erosion could result in increased turbidity, sedimentation (including from ash), and debris flushes, with reduced water quality. Removal of vegetation along banks could result in increased water temperatures due to limited shading and increased nutrient cycling, therefore decreasing the availability of oxygen to fish and other aquatic organisms. The amount of runoff would likely increase stream or river flows, changing the hydrologic regime and possibly increasing channel erosion in the short term. The degree of impacts would depend on the severity and extent of the wildland fire and rain events, and success of suppression near streams or water bodies. Localized, short- to long-term, minor to moderate, adverse impacts would occur due to increased soil erosion, turbidity, sedimentation, and reduced water quality. Minimum impact suppression techniques would be employed to mitigate these impacts.

In wildland fire suppression efforts, it is anticipated that existing roads and trails would be used as firebreaks to the greatest extent possible. Fire lines would consist only of raked up debris and avoid ground/soil disturbance. Water diversion devices may be used as applicable to reduce the risk of erosion and runoff into water bodies. Therefore, it is not anticipated that these actions would contribute to soil erosion and delivery of sediment into waterbodies. The adverse effect of fire suppression efforts would be negligible unless water was pumped from park surface freshwater sources for firefighting, which is possible but not likely, as firefighters would rely first on hydrants in the area, or on water tanks. If pumping from surface freshwater sources occurred, the adverse effects of reduced flow would be localized, short-term (hours), and minor. Adverse effects could include destabilizing stream banks or pond shores due to shoreline trampling, equipment use, or nearby off-road travel with fire engines and other equipment. These impacts would be mitigated by minimizing off-road travel and prompt rehabilitation of any damaged shorelines or stream banks. The watershed could recover quickly, or could take several years to a decade to recover following a substantial wildland fire. After the fire event, there could be continued loss of soils and sedimentation into streams, which could carry downstream. Long-term, adverse impacts from wildland fire would generally be minor, depending on the location, severity, and duration of the fire.

Cumulative Impacts

Cumulative impacts to water resources from the no action alternative include those associated with current and reasonably foreseeable future actions. Past, present, and reasonably foreseeable actions include ongoing development in the region surrounding the park, construction of the new bypass, and prescribed burns at Conway Robinson State Forest. Ongoing development has increased the amount of impervious surfaces in the region surrounding the park, and construction of the bypass will increase the amount of impervious surface within the park. The resulting increases runoff of stormwater and pollutants will result in long-term, minor to moderate, adverse impacts to water resources. Prescribed burns at Conway Robinson State Forest will result in short-term minor adverse impacts to water resources due to potential increased turbidity resulting from increased erosion following prescribed burns. The no action alternative would contribute long-term, minor, adverse impacts. Overall, cumulative impacts to water resources would be long term, minor, and adverse.

Conclusion

The no action alternative would result in long-term, minor, adverse impacts to water quality because of the increased chance of severe uncontrolled wildland fire, resulting in increased turbidity due to runoff of soil and deposition of ash into streams, an increase in stream temperature leading to lower dissolved oxygen levels, and higher temporary nutrient loading. Impacts from suppression activities on water resources would be a potential increase in channel erosion with locally long-term, minor to moderate, adverse, effects expected in case of more extreme and/or widespread fire. Cumulative effects would be long term, minor, and adverse.

IMPACTS OF ALTERNATIVE 2 TO WATER RESOURCES

Analysis

Impacts to water resources under alternative 2 would be similar to the no action alternative for wildland fire suppression. The strategic integration of a greater variety of vegetation treatment tools into fire management activities would increase the ability and efficiency to reduce hazardous fuel loads, including removing dead trees and debris clogging streams and to create and/or maintain defensible space, reducing the potential for an uncharacteristically intense wildland fire. The reduction of fuels would benefit water resources because it would contribute to lower intensity ground fires with fewer tendencies to cause soil erosion and runoff when compared to more intense wildland fires, and are easier to manage/suppress. Therefore, alternative 2 would have beneficial long-term impacts to water resources by decreasing the risk of large unplanned wildland fires and increasing the potential for lower intensity ground fires.

There are several places where fuel reduction units cross streams, and mechanical fuel removal could occur near streams. Impacts from mechanical and manual fuel reduction treatments to water resources could be adverse, localized, short-term, and negligible due to soil or vegetation compaction along stream banks or similar disturbances caused by the removal of debris. However, mechanical fuel reduction projects would generally not occur within 50 feet of streams or surface waters. Although some fuels may be manually removed from the areas adjacent to streams and waterbodies, or potentially made easier to remove using chainsaws or hand held tools, use of heavier equipment such as chippers or all-terrain vehicles to remove the fuels to other areas for disposal would not take place immediately adjacent to stream banks. Impacts would be mitigated by avoidance or buffering where possible, and immediate rehabilitation using the appropriate mitigation measures. Impacts to water resources from slightly increased streamflow would be localized, short-term, and negligible adverse due to a reduction in vegetation on the treated area.

Chemical treatment of vegetation to reduce fuels would be applied according to integrated pest management principles, so the likelihood of impacts to water resources and aquatic life would be minimized, as the integrated pest management principles are intended to keep chemicals out of water bodies. Impacts would therefore be localized, short-term, negligible, and adverse.

Several of the farmed grassland units that are candidates for prescribed fire are near or adjacent to water resources, and the prescribed fires would be managed to maintain buffers. However, prescribed fire could result in a reduction of vegetation along the stream banks, temporarily increasing stream temperature, potential for soil erosion, and sediment yield. This could lead to turbidity and sedimentation of surface water resources in the park. Turbidity and sedimentation can alter the hydrologic regime of surface waters and adversely affect aquatic habitats, invertebrates, and fish. The potential for an increase in turbidity and sediment delivery in water bodies within the park as a result of soil erosion following prescribed fire activities could occur. However, burn plans would not allow for the use of prescribed fire adjacent to a waterbody, and any prescribed burns which begin to exceed the scope of the burn plan would be immediately and aggressively suppressed. Impacts from soil erosion would therefore be uncommon,

localized, and would only be minor, adverse, and short-term. In addition, impacts following a prescribed fire would be reduced and/or eliminated during the “green-up” as new herbaceous cover develops.

Although a large unplanned wildland fire event that cannot be quickly suppressed is considered unlikely, impacts to water resources would be similar to those discussed for the no action alternative. Likewise, impacts to water resources from suppression of unplanned wildland fires would be similar to those described for the no action alternative. The implementation of mechanical and manual treatments, targeted herbicide application, and prescribed burns are expected to more effectively limit the potential frequency and intensity of unplanned wildland fires. Therefore, adverse impacts from unplanned wildland fire would be reduced in comparison to the no action alternative.

Cumulative Impacts

Current and reasonably foreseeable future actions with the potential to impact water resources under alternative 2 would be the same as those described under the no action alternative. Alternative 2 would contribute short-term, negligible to minor, adverse impacts and long-term, beneficial impacts. Overall, cumulative impacts to water resources would be long term, minor, and adverse.

Conclusion

Alternative 2 would result in localized, short-term, minor, adverse impacts as well as long-term, beneficial impacts from fire management activities. Impacts to water resources from unplanned wildland fires and fire suppression under alternative 3 would be the same as those described under the no action alternative. Cumulative effects under this alternative would be long term, minor, and adverse.

IMPACTS OF ALTERNATIVE 3 TO WATER RESOURCES

Analysis

Under this alternative, park staff would identify treatment areas where expanded use of mechanical and chemical methods to reduce and manage fuels would take place, reducing the risk of severe uncontrolled wildland fires compared to the no action alternative. Impacts to water resources due to mechanical and chemical methods used for the removal of fuels would be the same as those described under alternative 2, and could be adverse, localized, short-term, and negligible. Impacts to water resources from unplanned wildland fires and fire suppression under alternative 3 would be the same as those described under the no action alternative.

Cumulative Impacts

Impacts from cumulative actions would be the same as those described under the no action alternative, resulting in short- and long-term, minor, adverse impacts to water resources. Fire management activities under alternative 3 would contribute short-term, minor, and adverse impact as well as long-term, beneficial impacts to water resources. Overall, cumulative impacts to water resources would be long term, minor, and adverse.

Conclusion

Impacts to water resources under alternative 3 would be the same as under alternative 2—mostly short-term, minor, adverse impacts related to increased potential for erosion and sedimentation and turbidity in the streams, lower dissolved oxygen levels, and higher nutrient loadings in the event of an unplanned high intensity wildland fire, but with potential for longer-term benefits as a result of using manual, mechanical and chemical fuels reduction to reduce risk of severe fires and associated impacts. There would be no prescribed fires, but the strategic use of mechanical and chemical removal of fuels would result in

reduced risk of severe uncontrolled wildland fires than under the no action alternative. Impacts to water resources from unplanned wildland fires and fire suppression under alternative 3 would be the same as those described under the no action alternative. There could also be a potential increase in channel erosion with locally long-term, minor to moderate, adverse effects expected in case of more extreme and/or widespread fire. Cumulative effects would be long term, minor, and adverse.

Wildlife and Habitat

METHODOLOGY AND ASSUMPTIONS

The methodology used for assessing wildlife impacts included using available literature to identify the wildlife species and habitat present and identifying the potential effects to wildlife populations (e.g., composition, diversity, abundance) by the action alternatives.

STUDY AREA

The study area for wildlife and wildlife habitat includes all areas within the boundaries of the park considered to be wildlife habitat.

IMPACT THRESHOLDS AND DURATION

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

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

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

Moderate: Some wildlife species and/or wildlife habitat would be affected and a sizeable part of the species' population and/or wildlife habitat area would be affected as a result of the alternative. Mitigation measures, if needed, would be extensive and successful.

Major: A considerable effect on wildlife individuals and/or wildlife habitat on a sizeable segment of the species' population and/or wildlife habitat area would occur as a result of the alternative. Extensive mitigation measures would be needed to offset any adverse effects and may not be successful.

Short-term: Individual species or habitat would recover in less than one year; population impacts would last less than three years.

Long-term: Individual species or habitat would require more than one year to recover; populations would require more than three years to recover.

IMPACTS OF ALTERNATIVE 1 (NO ACTION) TO WILDLIFE AND HABITAT

Analysis

Under the no action alternative, fire management would be limited to wildland fire suppression only. Prescribed fire would not be used. Mechanical and manual vegetation removal and the use of herbicides to slow the return of brush after vegetation removal would continue, but a lack of strategic integration with fire management goals could potentially limit the efficiency and effectiveness of ecological restoration actions.

Mechanical and manual vegetation treatments would be used under the no action alternative, including removal of undesirable vegetation or excess woody debris to maintain the cultural landscape. These activities could be disruptive to wildlife, including bird species that nest in grassland areas or in snags. When sensitive species locations, breeding seasons, unique habitat, nesting areas, or other parameters are potentially involved with a vegetation management project, additional consultation with resource management and/or specific wildlife experts would occur. Written directions specifying appropriate and reasonable actions and/or mitigations would then be used by park staff to minimize disturbance effects or maximize benefits to those species. At a minimum, mechanical vegetation removal would not take place prior to mid-July to minimize potential disturbance to ground-nesting birds. As a result, the anticipated impacts of alternative 1 to wildlife and habitat would be short term, negligible, and adverse.

The use of mechanical equipment, such as brush hogs and mowers, and hand tools, such as chainsaws, axes, and shovels, can result in minor soil and vegetation disturbance. Seeds and plant parts may become attached to equipment and tools and transported into the park from offsite. This creates potential for the spread of spread of invasive plants, which could degrade the quality of wildlife habitat. Impacts to wildlife and wildlife habitat from the spread of invasive weed species would be long term and adverse if viable seeds are transported and become established. However, because of mitigation measures that would be used (e.g., cleaning of equipment before and after use), short-term and long-term adverse impacts would be negligible.

Targeted herbicide application under the no action alternative would minimize chances for overspray which could impact wildlife habitat. Limited use and application of NPS-approved herbicides in accordance with Integrated Pest Management guidance and label instructions would also minimize chances for overspray into aquatic environments which could result in impacts to wildlife and wildlife habitat. The long-term, adverse impacts to wildlife and wildlife habitat would thus be negligible. Because the no action alternative would not strategically integrate vegetation management practices into fire management goals, there could be increased potential for wildland fires that would be more difficult to control and quickly suppress. Although unlikely, high intensity wildland fire could result in substantial immediate losses of wildlife and wildlife habitat. While some species, such as deer and birds, would be able to flee large wildland fires, many populations of less mobile species, such as small mammals, reptiles and amphibians within the park, could be greatly reduced. High intensity wildland fires could also result in long-term changes to soils and vegetation and, therefore, to wildlife habitat. In the event that a locally severe fire occurs, impacts would be localized, short term to long term, minor to potentially moderate, and adverse, depending on the severity of the fire. Suppression of unplanned wildland fires would have the potential to result in adverse impacts to wildlife and habitat related to impacts on soils, vegetation, and water resources. Because suppression efforts would incorporate mitigation measures to minimize the impacts to these resources, it is anticipated that the impacts of suppression activities on wildlife and habitat would be short-term, negligible to minor, and adverse.

Cumulative Impacts

Past, present and reasonably foreseeable future projects that could impact wildlife and wildlife habitat include ongoing development surrounding the park, construction of the new bypass around the park, and prescribed burning at Conway Robinson State Forest. Ongoing development has encroached upon a substantial portion of the available habitat surrounding the park, and this trend can be expected to continue into the future. Ongoing and future prescribed burns at Conway Robinson State Forest could result in short-term minor adverse impacts outside of the State Forest if wildlife populations flee the area of prescribed burning to areas outside of the forest. Construction of the bypass would contribute long-term, moderate, adverse impacts due to the permanent removal of wildlife habitat and the addition of infrastructure that may act as barriers to mobility for some species of wildlife. The no action alternative would generally contribute short- and long-term, negligible, adverse impacts to wildlife and wildlife habitat as a result of vegetation removal activities. Since vegetation removal would not be strategically

integrated into fire management goals under alternative 2, impacts could become slightly more substantial in the event of a wildland fire that could not be quickly suppressed. Overall, cumulative impacts to wildlife and wildlife habitat would be long term, minor, and adverse.

Conclusion

Impacts to wildlife and wildlife habitat under the no action alternative would generally be negligible, but could be long term, minor, and adverse if the effectiveness of ecological restoration efforts is shown to be affected. Impacts could be localized, short term and long term, minor to potentially moderate, and adverse if severe wildland fires result from potential fuel buildup. Because suppression efforts would incorporate mitigation measures to minimize the impacts to these resources, it is anticipated that the impacts of suppression activities on wildlife and habitat would be short-term, negligible to minor, and adverse. The cumulative impacts of the no action alternative would be long term, minor, and adverse.

IMPACTS OF ALTERNATIVE 2 TO WILDLIFE AND HABITAT

Analysis

Potential impacts to wildlife and wildlife habitat for mechanical, manual, and chemical vegetation treatments under alternative 2 would be similar to those described for the no action alternative. These techniques would be strategically integrated into fire management goals, however, and would thus have greater potential to protect wildlife habitat that may be at risk from fuels buildup, which would result in long-term, beneficial impacts. The use of prescribed fire could result in the localized loss of wildlife and wildlife habitat in the short-term, resulting in short-term, minor, localized adverse impacts. Prescribed fire is lower in intensity than unplanned fires, more controlled, and therefore unlikely to have widespread or long-term, adverse effects on wildlife, including less mobile wildlife species. There would be long-term, beneficial impacts to wildlife and wildlife habitat in prescribed fire treatment areas resulting from enhanced complexity of vegetation structure, composition, diversity, and function; contribution of nutrients to the soil; and the maintenance of early successional habitat. Alternative 2 would therefore have long-term, beneficial impacts to wildlife habitat and wildlife populations.

The strategically integrated use of prescribed burns, mechanical and manual treatments, and targeted herbicide application would also be expected to limit the frequency and intensity of unplanned wildland fires relative to the no action alternative. Therefore, adverse impacts to wildlife and habitat associated with unplanned wildland fire as well as the suppression of unplanned wildland fire would be similar to, but less than, the no action alternative.

Cumulative Impacts

Impacts to wildlife and wildlife habitat from cumulative actions under alternative 2 would be similar to those described under the no action alternative. Alternative 2 would contribute short-term, minor, adverse impacts as well as long-term, beneficial impacts to wildlife and wildlife habitat. Overall, cumulative impacts to wildlife and wildlife habitat would be long term, minor, and adverse.

Conclusion

Alternative 2 would result in negligible to localized, short-term, minor, adverse impacts from prescribed burns and associated activities. Because suppression efforts would incorporate mitigation measures to minimize the impacts to these resources, it is anticipated that the impacts of suppression activities on wildlife and habitat would be short-term, negligible to minor, and adverse. Long-term impacts would be beneficial. Cumulative effects to wildlife and wildlife habitat under this alternative would be long term, minor, and adverse.

IMPACTS OF ALTERNATIVE 3 TO WILDLIFE AND HABITAT

Analysis

Under alternative 3, the park would identify treatment areas for the strategic use of mechanical and chemical methods to reduce and manage fuels, reducing the risk of severe uncontrolled wildland fires compared to the no action alternative. Impacts to wildlife and wildlife habitat due to mechanical and chemical methods used for the removal of fuels would be the same as those described under alternative 2 and would be localized, short term, negligible, and adverse, but in the long term, impacts would be beneficial. Beneficial impacts from prescribed burning as described for alternative 2 would not be realized under alternative 3.

Impacts to wildlife and wildlife habitat from unplanned wildland fires and wildland fire suppression activities under alternative 3 would be similar to those described for alternative 2.

Cumulative Impacts

Impacts from cumulative actions under alternative 3 would be similar to those described under the no action alternative and alternative 2. Alternative 3 would contribute short-term, negligible, adverse impacts as well as long-term, beneficial impacts to wildlife and wildlife habitat. Overall, cumulative impacts to wildlife and wildlife habitat would be long term, minor, and adverse.

Conclusion

Alternative 3 would result in localized, short-term, negligible, adverse impacts from vegetation removal, herbicide application, and associated activities. Because suppression efforts would incorporate mitigation measures to minimize the impacts to these resources, it is anticipated that the impacts of suppression activities on wildlife and habitat would be short-term, negligible to minor, and adverse. Long-term impacts would be beneficial. Cumulative effects to wildlife and wildlife habitat under this alternative would be long term, minor, and adverse.

Air Quality

METHODOLOGY AND ASSUMPTIONS

Air quality impacts were qualitatively assessed using literature reviews and professional judgment based on consideration of fuel levels and types, and size of area that could burn.

STUDY AREA

The study area for impacts related to air quality includes the park and extends to areas surrounding the park that may contain sensitive receptors for smoke, such as surrounding communities; traffic on US Route 29, Virginia Route 234, Interstate 66, and local roadways; and arriving and departing flights at Dulles International Airport, approximately 12 miles northeast.

IMPACT THRESHOLDS AND DURATION

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

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

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

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

Major: The effects of the actions would be measurable, regional changes in air quality that would have substantial consequences, and would violate state and federal air quality standards and Class II air quality standards. Alteration to air quality resources would be long-term smoke exposure to sensitive resources. Extensive mitigation measures would be required.

Short-term: Impacts to air quality would last seven days or less.

Long-term: Impacts to air quality would last for more than seven days.

IMPACTS OF ALTERNATIVE 1 (NO ACTION) TO AIR QUALITY

Analysis

Under the no action alternative, fire management would continue to be limited to suppression activities only. Mechanical and manual vegetation removal and targeted herbicide application would take place; however, they would not be strategically integrated into fire management goals. Equipment used for mechanical vegetation removal would create emissions and dust that would temporarily impact air quality in the immediate vicinity of vegetation removal activities. Targeted herbicide application could result in herbicide temporarily in the air in the immediate vicinity of the work due to spray drift and volatilization. These impacts would be temporary, and air quality is expected to return to typical conditions shortly after cessation of mechanical and chemical vegetation removal activities. Mechanical and chemical vegetation management would therefore have localized, short-term, negligible to minor, adverse impacts to air quality.

Measurable adverse impacts to air quality would only occur in the event of an unplanned wildland fire, and under the existing fire management plan, such fires would be suppressed. Under the no action alternative, without targeted fuels management actions, there would be a slightly higher chance that a fire could occur that is more intense and more difficult to suppress. Wildland fire occurrences in the absence of prior fuel reduction activities could create greater particulate matter emissions and longer-lasting impacts to visibility than would be generated by either prescribed fire or wildland fires occurring where fuels management activities have taken place. Since the park is not located in a high fire frequency area, it is expected that unplanned wildland fires would be rare. In addition, suppression is expected to be aggressive and fast and would moderate the impacts from smoke and dust resulting from unplanned wildland fire. Impacts from unplanned wildland fires and fire suppression activities under the no action alternative would therefore be short term, minor to moderate, and adverse.

Cumulative Impacts

Ongoing and future projects that could impact air quality include the construction of the new bypass as well as prescribed burning at Conway Robinson State Forest. Ongoing and future prescribed burns at Conway Robinson State Forest will result in short-term, minor, adverse impacts to air quality from increased particulate matter and smoke during burning activities. Construction of the bypass will contribute short-term, adverse impacts from construction equipment and earth moving activities. These impacts are minor and will only occur during construction. The no action alternative would contribute localized, short-term, negligible to minor, adverse impacts to air quality; however, the impacts of an unplanned fire and related suppression activities would be short term, minor to moderate, and adverse. Overall, cumulative impacts to air quality would be minor and adverse.

Conclusion

The no action alternative would result in localized, short-term, negligible to minor, adverse impacts to air quality as a result of mechanical and chemical vegetation removal. In the event of an uncontrolled wildland fire, increased short-term impacts could result from higher volumes of smoke and particulate matter than would occur under a fuels management scenario. Cumulative effects would be minor and adverse.

IMPACTS OF ALTERNATIVE 2 TO AIR QUALITY

Analysis

Impacts to air quality from mechanical and chemical vegetation removal under alternative 2 would be similar to those described for the no action alternative above. In addition to these impacts, the impacts to air quality from prescribed burns would include the generation of particulate matter and smoke, as well as fugitive dust from suppression activities and increased vehicle traffic associated with fire crews. Smoke, particulate matter, and dust emissions would impact visibility in the park and surrounding area.

There may be an intermittent and short-term exceedance of air quality standards (especially particulates) resulting in short-term, localized, and negligible to minor adverse impacts to air quality and visibility. Best management practices for reducing these adverse impacts include burning during appropriate weather and fuel moisture conditions where fuels available to fire would burn out quickly. Burning under appropriate conditions can take advantage of favorable air column lift and transport conditions. If at any time a prescribed burn exceeds the scope of the burn plan, the fire would be immediately suppressed, thus reducing the severity of potential air quality impacts.

Adverse impacts from these air emissions would include reduced visibility along roadways in and around the park, reductions in recreation values due to visibility limitations, smoke and odors, and possible health effects to sensitive receptors, such as residents and visitors. These adverse impacts would be short term, localized, and minor. The amount and duration of these smoke impacts could be minimized by limiting the acres burned at one time and timing ignitions early in the day to allow for more complete combustion during daytime conditions.

Air quality impacts resulting from unplanned wildland fires would be similar to the no action alternative, but are expected to be diminished in severity and frequency relative to the no action alternative due to the incorporation of fuels management into the proposed fire management plan. Under Alternative 2, all unplanned fires would be suppressed as quickly as possible. Suppression would further moderate some of these impacts. Impacts from unplanned wildland fires and fire suppression activities under alternative 2 would therefore be short-term, minor, and adverse.

Cumulative Impacts

Impacts from cumulative actions would be the same as described under the no action alternative, resulting in short-term, minor adverse impacts to air quality. Fire management activities under alternative 2 would contribute short-term, negligible to minor adverse impacts to air quality. Overall cumulative impacts to air quality would be minor and adverse.

Conclusion

Alternative 2 would result in short-term, minor adverse impacts to air quality as a result of smoke and particulate matter from prescribed burns, and would also result in short-term, negligible to minor, adverse impacts to air quality as a result of mechanical equipment and herbicide applications. Impacts from unplanned wildland fires and fire suppression activities would be infrequent, short term, minor, and

adverse because unplanned fires would be suppressed, and the likelihood of more intense fires that would be difficult to suppress quickly would be lower due to fuels management.

Cumulative impacts would be minor and adverse.

IMPACTS OF ALTERNATIVE 3 TO AIR QUALITY

Analysis

Impacts to air quality from chemical and mechanical fuels management practices under alternative 3 would be similar to those described under alternative 2. Adverse air quality impacts from prescribed burning would not take place under alternative 3, therefore the air quality impacts from fuels management under alternative 3 would be somewhat reduced. Impacts would be localized, short-term, negligible to minor, and adverse.

Air quality impacts resulting from unplanned wildland fires would be similar to alternative 2, although mechanical and chemical fuels management alone, without the option to use prescribed fire, may somewhat limit the efficiency of fuels management efforts. Suppression would further moderate some of these impacts. Impacts from unplanned wildland fires and fire suppression activities under alternative 3 would therefore be short-term, minor, and adverse.

Cumulative Impacts

Impacts from cumulative actions would be the same as described under then no action alternative resulting in short-term, minor, adverse impacts to air quality. Fire management activities under alternative 3 would contribute short-term, negligible to minor, adverse impacts as well as long-term, beneficial impacts to air quality. Overall cumulative impacts to air quality would be negligible to minor and adverse.

Conclusion

Alternative 3 would result in short-term, negligible to minor, adverse impacts to air quality as a result of combustion engine equipment and herbicide applications. There would be long-term, beneficial impacts from the decreased potential for large, unplanned wildland fire events from the reduced fuel load. Impacts from fire suppression activities under alternative 3 would be short-term, minor, and adverse. Cumulative impacts would be negligible to minor and adverse.

Visitor Use and Experience

METHODOLOGY

The methodology used for assessing impacts on visitor use and experience included identifying the potential changes to visitor use and experience caused by implementation of the alternatives, and qualitatively evaluating how these changes would affect visitor use and experience using best professional judgment.

STUDY AREA

The study area for visitor use and experience is the boundary of the park.

IMPACT THRESHOLDS AND DURATION

The methodology used for assessing impacts on visitor use and experience included identifying the potential effects to visitor use from the action alternatives. The thresholds of change for the intensity of an impact are defined as follows:

Negligible: Visitors would not be affected or changes in visitor use and/or experience would be below or at the level of detection. Any effects would be short term. The visitor would not likely be aware of the effects associated with the alternative.

Minor: Changes in visitor use and/or experience would be detectable, although the changes would be slight and likely short-term. The visitor would be aware of the effects associated with the alternative, but the effects would be slight.

Moderate: Changes in visitor use and/or experience would be readily apparent and likely long term. The visitor would be aware of the effects associated with the alternative, and would likely be able to express an opinion about the changes.

Major: Changes in visitor use and/or experience would be readily apparent and have substantial long-term consequences. The visitor would be aware of the effects associated with the alternative, and would likely express a strong opinion about the changes.

Short-term: Impacts to visitor use and experience would last for the duration of an individual vegetation management/fuels treatment or wildland fire response action.

Long-term: Impacts to visitor use and experience would last longer than the duration of an individual vegetation management/fuels treatment or wildland fire response action.

IMPACTS OF ALTERNATIVE 1 (NO ACTION) TO VISITOR USE AND EXPERIENCE

Analysis

Under this alternative, fire management would be limited to current suppression activities. Prescribed fire would not be used. Mechanical and manual vegetation management work and the use of herbicides to slow the return of brush after vegetation removal would continue. Areas where active mechanical and chemical vegetation removal efforts are taking place would be temporarily closed to the public. Other areas of the park would remain open to visitor use, however, and would have similar resources available, so impacts to visitor use and experience the impact would be short term, negligible to minor, and adverse, depending on the size and length of the closure.

Since vegetation management activities would not be strategically integrated with fire management goals, the efficiency and effectiveness of fuels removal for fire management purposes would be limited. The lack of strategic integration of vegetation management with fire management goals could result in relatively less effective prevention of fuel buildup, which could result in the slightly increased potential for larger and more intense wildland fires that are more difficult to suppress. Larger and more intense wildland fires could require increased visitor use restrictions due to suppression efforts. Smoke emissions would negatively impact the experience of visitors using other areas of the park or surrounding lands. Depending on fire severity and size, unplanned wildland fires could remove large tracts of vegetation, changing the natural environment and scenery and reducing the quality of the visitor experience. These impacts would occur only in the event of a wildland fire, and are expected to be infrequent. Since all wildland fires would be immediately and aggressively suppressed, it is expected that the associated impacts to visitor use and experience would be moderated. The potential for a more intense and difficult to suppress wildland fire due to the buildup of fuel under this alternative would be slightly more elevated than with a strategic fuel management program; therefore, impacts from unplanned wildland fires and fire suppression activities would be localized, short term, minor, and adverse.

Cumulative Impacts

Ongoing projects that could impact visitor use and experience include prescribed burning at Conway Robinson State Forest. Future projects include the deer management plan and the construction of the new bypass. Prescribed burns at Conway Robinson would contribute short-term, negligible, adverse impacts to

visitor experience at Manassas due to potential for increased smoke in the park and the potential for reduced visibility during burning activities. Construction of the bypass would also contribute short-term adverse impacts during the construction period from increased noise from construction equipment, as well as any temporary road closures within the park and possible construction related traffic delays adjacent to the park. These impacts are expected to be minor. The deer management plan is expected to cause long-term, minor, adverse impacts, as well as beneficial impacts, based on the personal preferences of each visitor. Some visitors may experience adverse impacts due to the decreased deer viewing opportunities while others may enjoy beneficial impacts from improved vegetation and wildlife health. The no action alternative would contribute short-term, minor, adverse impacts should a severe wildland fire occur; however, without a fire, no impacts would result from the no action alternative. Construction of the bypass would improve visitor use and experience in the long term because it would remove through traffic from U.S. Route 29, which bisects the park. Overall, cumulative impacts to visitor use and experience would be short term and long term, minor, and adverse, in the relatively unlikely event that a severe fire should occur; otherwise, cumulative impacts would mostly be beneficial.

Conclusion

The no action alternative could result in short-term, minor, adverse impacts on visitor use and experience due to the slightly increased potential for wildland fires that are more intense and difficult to suppress/manage, than they would be with targeted fuels management. These impacts would only occur in the event of a fire, and all fires would be suppressed, most of them quickly. Impacts from unplanned wildland fires and fire suppression activities would be localized, short term, minor, and adverse. Combined with other projects in the study area, cumulative impacts to visitor use and experience would be long term, minor, and adverse, in the relatively unlikely event that a severe fire should occur; otherwise cumulative impacts would mostly be beneficial.

IMPACTS OF ALTERNATIVE 2 TO VISITOR USE AND EXPERIENCE

Analysis

Under alternative 2, prescribed fire, mechanical, and chemical methods would be used to manage fuels, improve vegetation, and maintain historic landscapes. Impacts from temporary visitor use restrictions during mechanical and chemical vegetation removal would be similar to those described for the no action alternative. The use of goats to manage vegetation would include fencing off areas with portable electric fencing, and there would be temporary visitor use restrictions in this area, and signage warning visitors about the fencing.

Prescribed fire would result in adverse impacts due to temporary displacement of some visitor activities (e.g. access restrictions and trail closures) during prescribed burn operations; the potential for smoke in scenic views; odors; and the presence of blacked areas within natural areas. These adverse impacts would be localized, short-term, and negligible to minor. The presence of fire, smoke, and blackened areas may present an opportunity for education and interpretation of natural values and processes, which may provide a beneficial impact. In the long term, strategic fuels management would increase the probability for lower-intensity ground fires that are easier to manage/suppress and increase the growth and germination of native herbaceous plant communities (grasses, forbs, and wildflowers), which would support native wildlife species. As hiking is the most popular recreation activity within the park, the perpetuation of native vegetation communities and native wildlife would enhance surrounding scenery, thus enhancing the visitor experience. Overall, alternative 2 would have short-term, negligible to minor, adverse impacts in the immediate area of treatment during the treatment period and localized, long-term, beneficial impacts by minimizing the potential for future severe wildland fires and maintaining native ecosystems and cultural landscapes.

Impacts from an unplanned wildland fire and fire suppression activities under alternative 2 would be similar to those described for the no action alternative; however, the use of vegetation management tools that are strategically integrated into fire management goals would increase the ability to efficiently reduce brush and ground cover density and maintain/create defensible space. It is expected that unplanned fires would be less frequent and lower in intensity than under the no action alternative. Impacts to visitor use and experience from an unplanned wildland fire and fire suppression activities under alternative 2 would be localized, short term, minor, and adverse.

Cumulative Impacts

Impacts to visitor use and experience from current and future actions would be the same as described under the no action alternative, resulting in short-term, negligible to minor, adverse impacts as well as long-term, beneficial impacts. Alternative 2 would have short-term, negligible, adverse impacts in the immediate area of treatment, and long-term, beneficial impacts by minimizing the potential for future severe wildland fires. Overall, cumulative impacts to visitor use and experience would be short term and long term, minor, and adverse as well as long term and beneficial.

Conclusion

Impacts to visitor use would be short term, negligible to minor, and adverse due to public use closures and long term, beneficial due to the reduced potential for future severe wildland fires and the perpetuation of native vegetation communities and associated wildlife that visitors could enjoy. Impacts from unplanned wildland fires and fire suppression activities would be localized, short term, minor, and adverse. Cumulative impacts to visitor use and experience would be short term, minor, and adverse as well as long term and beneficial.

IMPACTS OF ALTERNATIVE 3 TO VISITOR USE AND EXPERIENCE

Analysis

Impacts to visitor use and experience under alternative 3 would be the same as described under alternative 2, except prescribed fire would not be used in the park. Restricting fire suppression to only the use of mechanical and chemical methods would eliminate the short-term, adverse impacts of prescribed fires on visitor use, including charred areas, smoke, and closures. Without the option for use of prescribed fire in the park there may be more limited opportunities to effectively restore and/or maintain historic viewsheds and unique habitats. Overall, similar to alternative 2, the anticipated impacts to visitor use and experience from fuels management activities would be short term, negligible to minor, and adverse as well as long term and beneficial.

Impacts to visitor use and experience from an unplanned wildland fire and fire suppression activities would be similar to those described for alternative 2; however, without the option to use prescribed burning, there could be a slight increase in the potential for more intense and difficult to quickly suppress wildland fires. Therefore, the long-term, beneficial impacts of fuels reduction may be slightly lowered. The degree of impacts from an unplanned wildland fire would vary depending on how quickly the fire can be suppressed, the size of the fire, the location, extent, timing, and other factors related to the fire. Overall, impacts to visitor use and experience from an unplanned wildland fire and fire suppression activities under alternative 3 would be localized, short term, minor, and adverse.

Cumulative Impacts

Impacts to visitor use and experience from current and future actions would be the same as described under the no action alternative, resulting in short- and long-term, negligible to moderate, adverse, impacts

as well as long-term, beneficial impacts. Alternative 3 would contribute short-term, negligible to minor, adverse impacts during fuels management activities as well as long-term, beneficial impacts due to the reduced potential for future severe wildland fires. Overall, cumulative impacts to visitor use and experience would be long term, minor, and adverse as well as long term and beneficial.

Conclusion

Alternative 3 would have similar impacts to those described for alternative 2 because fuels reduction would reduce wildland fire potential. Without the ability to use prescribed burns, however, alternative 3 may not result in as large of a beneficial impact. . Impacts from unplanned wildland fires and fire suppression activities would be localized, short term, minor, and adverse. Overall impacts to visitor use would be short term, negligible to minor, and adverse as well as long term and beneficial. Combined with other projects in the study area, cumulative impacts to visitor use and experience would be long term, minor, and adverse as well as long term and beneficial.

Park Management and Operations

METHODOLOGY AND ASSUMPTIONS

The methodology used for assessing impacts to park operations included identification of anticipated changes in level of effort for fire staff and impacts to other staff generated by fire program activities.

STUDY AREA

The study area for park management and operations is the boundary of the park.

IMPACT THRESHOLDS AND DURATION

The impact intensities for park management and operations were defined as follows:

Negligible – Impacts would be barely detectable and would not have an appreciable effect on park operations.

Minor – The impact would be detectable and would be of a magnitude that would not have an appreciable effect on park operations. If mitigation was needed to offset adverse effects, it would be simple and likely successful.

Moderate – The impacts would be readily apparent and result in a substantial change in park operations in a manner noticeable to staff and the public. Mitigation measures would be necessary to offset adverse effects and would likely be successful.

Major – The impacts would be readily apparent, result in a substantial change in park operation in a manner noticeable to staff and the public, and be markedly different from existing operations. Mitigation measures to offset adverse effects would be needed and extensive, and success could not be guaranteed.

Short-term: Impacts to park management and operations would last for the duration of an individual vegetation management/fuels treatment or wildland fire response action.

Long-term: Impacts to park management and operations would last longer than the duration of an individual vegetation management/fuels treatment or wildland fire response action.

IMPACTS OF ALTERNATIVE 1 (NO ACTION) TO PARK MANAGEMENT AND OPERATIONS

Analysis

Under the no action alternative, impacts on park management and operations would largely be related to existing mechanical, manual, and chemical vegetation management activities that are used to maintain the cultural landscape, as well as occasional fire suppression activities. NPS staff would routinely be responsible for activities such as hand clearing trees and brush, hazardous tree management, and invasive plant control. Local fire departments, including but not limited to Prince William County Fire and Rescue or Fairfax County Fire and Rescue, would be responsible for fire suppression activities in coordination with NPS staff. Since certain rocky areas of the park are difficult to access with mowers and other mechanical equipment, maintenance of cultural landscapes through mechanical and manual vegetation removal alone can become somewhat arduous. Long-term, negligible, adverse impacts would therefore result from continuation of ongoing management. Fire suppression activities are anticipated to have intermittent, short-term, minor, adverse impacts to park management and operations that would only occur in the event of a fire.

In the event of an unplanned wildland fire that becomes difficult to suppress, there could be adverse impacts that occur, even though the fire would ultimately be suppressed. In the event of a large fire, park operations in law enforcement (who are responsible for coordinating and management fire suppression activities), public information and other divisions would likely be disrupted by demands related to traffic control, area closures, restrictions, and evacuations. The National Park Service would provide or support law enforcement activities, possible emergency medical services, fire information services, transporting supplies and personnel, other fire logistics and support, and follow-up maintenance work and park re-opening. Damage from wildland fires in or near developed areas may require long-term closures or restrictions, exterior repairs (to features such as landscaping), repair of smoke or fire damage to buildings, roads and trails repair, or sign replacement.

During wildland fire suppression activities, impacts to staff would continue to include increased public outreach and possible augmenting of staff levels to manage the activity. Staff may be brought in from other areas or may reassign park staff from other duties, but would result in minor, short-term, adverse impacts. Unplanned wildland fire is not expected to be frequent under the existing plan, and aggressive suppression would mitigate the impacts of an unplanned fire. Overall, the no action alternative would have long-term, negligible to minor, adverse impacts to park management and operations due to the limitations of current vegetation management practices in maintaining the cultural landscape and intermittent, short-term, minor to moderate, adverse impacts if an unplanned wildland fire becomes difficult to suppress.

Cumulative Impacts

Ongoing and future projects that could impact park management and operations include the deer management plan and the construction of the new bypass. Construction of the bypass would contribute short-term, negligible, adverse impacts during the construction period from increased law enforcement staffing to ensure visitors stay out of active construction areas, as well as any administrative assistance needed to secure all appropriate permits. The deer management plan would have long-term, moderate, adverse impacts at certain times of the year due to the increased staffing for monitoring, deer reduction, and coordinating activities. The no action alternative would contribute short-term, minor to moderate, adverse impacts if an unplanned wildland fire becomes difficult to suppress. Overall, cumulative impacts to park management and operations would be long term, minor to moderate, and adverse.

Conclusion

Overall, the no action alternative would have short-term, minor to potentially moderate, adverse impacts to park operations because of the increased probability of unplanned wildland fires. Combined with other projects in the study area, cumulative impacts would be long term, minor to moderate, and adverse.

IMPACTS OF ALTERNATIVE 2 TO PARK MANAGEMENT AND OPERATIONS

Analysis

Under alternative 2, park staff and resources would be required to support mechanical and manual vegetation treatments, targeted herbicide use, and prescribed burning operations. Local fire departments, including but not limited to Prince William County Fire and Rescue and Fairfax County Fire and Rescue, would be responsible for all fire suppression activities. Since mechanical, manual, and chemical fuels treatments would be targeted and integrated into the park's overall fire management plan, no impacts to park management and operations are anticipated as a result of mechanical, manual, and chemical fuels management and wildland fire suppression.

The work for managing prescribed burns and conducting mechanical and chemical fuels reduction would involve Manassas National Battlefield Park staff, and may require assistance from contractors, NPS National Capital Region and other NPS staff. Additional duties of park staff could include developing burn plans, monitoring weather conditions, enforcing area closures, and notifying park neighbors when and where treatment activities and burning would take place. These activities are expected to have short-term, negligible to minor, adverse impacts on park management and operations. The inclusion of prescribed burning as a fuels management option would increase the ease and efficiency of maintaining the cultural landscape and reducing the frequency and intensity of unplanned wildland fires, resulting in a long-term, beneficial impact to park management and operations.

In the event of an unplanned wildland fire that becomes difficult to suppress, impacts from alternative 2 would be similar to those described for the no action alternative; however, these impacts would be diminished. Over time, the strategic integration of vegetation management into fuels management goals should lower the probability of wildland fires, and associated impacts to park operations. The National Park Service would provide or be involved in law enforcement activities, possible emergency response services, fire information services, transporting supplies and personnel, other fire logistics and support, and follow-up maintenance work and park re-opening. As a result, impacts to park management and operations would be short term, minor, and adverse.

Cumulative Impacts

Cumulative impacts to park management and operations from current and future actions would be the same as described under the no action alternative, resulting in long-term, moderate, adverse impacts. Alternative 2 would have short-term, negligible to minor, adverse impacts and long-term, beneficial impacts. Overall, cumulative impacts to park management and operations would be long term, minor to moderate, and adverse.

Conclusion

Short-term impacts to park operations would be negligible to minor and adverse. Long-term effects on park operations would be beneficial, resulting from implementation of more active fuels management tools and increased ease and efficiency in maintaining the cultural landscape. Cumulative impacts to park management and operations would be long term, minor to moderate, and adverse.

IMPACTS OF ALTERNATIVE 3 TO PARK MANAGEMENT AND OPERATIONS

Analysis

Impacts to park operations would be the same as described under alternative 2, except there would be no use of prescribed fire in the park, and therefore no staff or resources would be required for prescribed burn planning and execution, and no coordination with outside contractors or staff would be required. Short-term, negligible to minor, adverse impacts to park operations would result from increased planning workload or the redirection of park staff to fuels management or fire response and suppression activities. Long-term, beneficial effects on park operations would result from implementation of more strategically integrated vegetation management tools and a reduction in the frequency and intensity of unplanned wildland fire events that would have the potential to disrupt park operations.

Cumulative Impacts

Cumulative impacts to park management and operations from current and future actions would be similar to those described under the no action alternative. These would result in short- and long-term, negligible to moderate, adverse impacts. Alternative 3 would contribute short-term, negligible to minor, adverse impacts and long-term, beneficial impacts. Combined with other projects in the study area, impacts to park management and operations would be long term, negligible to minor, and adverse.

Conclusion

Under alternative 3, using no prescribed fire would cause short-term, negligible to minor, adverse impacts. Long-term, beneficial impacts would result from the implementation of more strategically integrated vegetation management tools. Cumulative impacts to park management and operations would be long term, negligible to minor, and adverse.

Public Health and Safety

METHODOLOGY

Fire management actions and activities have safety implications for employees and visitors. Smoke from sources on and adjacent to a prescribed burn or wildland fire can be a safety issue to the visiting public. The flaming front of a fire can also put members of the public at risk. There is always a risk that curious park visitors or residents will approach a fire rather than avoid it. Firefighters and other fire staff face the most direct risks. As discussed in chapter 1, NPS Director's Order 18 requires all parks' fire management programs to protect human life and property both within and adjacent to park areas (NPS 2008e; NPS 2014a). The slightly elevated potential presence of UXO at Deep Cut represents a safety concern unique to that area of the park, requiring specific mitigation measures and safety practices when fighting fires.

The methodology used for assessing impacts to public health and safety included review of existing National Park Service and National Interagency Fire Center (NIFC) fire management directives (NIFC 1998; NPS 2014a); literature review including other National Park Service fire management plans (NPS 2005c; NPS 2012; NPS 2013b) as well as other NEPA documents related to Manassas National Battlefield Park (NPS 2008b; NPS 2011d; NPS 2014b); and best professional judgment to identify the potential impacts of the project on public health and safety.

STUDY AREA

The study area for public health and safety includes areas with the boundaries of the park, in addition to sensitive receptors outside the park such as neighboring residents, motorists on surrounding roadways, and arriving and departing flights at Washington Dulles International Airport, as the National Park

Service wishes to ensure that smoke from prescribed and wildland fires would not affect visibility or safety of these flights.

IMPACT THRESHOLDS AND DURATION

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

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

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

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

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

Short-term: Impacts to public health and safety would last for the duration of an individual vegetation management/fuels treatment or wildland fire response action.

Long-term: Impacts to public health and safety would last longer than the duration of an individual vegetation management/fuels treatment or wildland fire response action.

IMPACTS OF ALTERNATIVE 1 (NO ACTION) TO PUBLIC HEALTH AND SAFETY

Analysis

Under the no action alternative, the battlefield's fire management program would be limited to suppression of unplanned wildland fires. The battlefield's current vegetation management practices, which are focused on maintaining the cultural landscape and are not strategically integrated into existing fire management, would continue. Prescribed fire would not be used. Mechanical and manual vegetation management work and the use of herbicides to slow the return of brush after vegetation removal would continue. Operation of mechanical equipment and application of herbicides represent potential health and safety risks to visitor and park personnel. Areas where active vegetation management is taking place would be closed to the public. Park service personnel would receive appropriate protective equipment and safety training, and mechanical equipment would be properly maintained. Herbicides would be pre-approved at the NPS regional and national levels. Approval for use would be given only after considering numerous factors including: target use; type and effects of the specific herbicide; location where application would occur; potential sensitive species concerns; potential for migration into surface or ground water; persistence in the ecosystem; safety to employees and the public; and type of application (e.g., spot spraying). All staff utilizing herbicides would be trained in approved procedures related to proper handling, storage, transportation, mixing, spill prevention, and application procedures. As a result, mechanical and chemical vegetation removal is expected to have negligible to no impacts to public health and safety.

A lack of strategic integration with fire management goals would result in relatively less-effective prevention of fuel buildup from increased brush density and the continued accumulation of dead and down debris. This could lead to an increased potential for unplanned wildland fires that are more difficult to suppress. Potential impacts to firefighter health and safety would include exposure to heat, smoke

inhalation, and injuries from the use of fire-fighting equipment or fireline construction. Potential hazards to firefighter safety also exist at Deep Cut from the slightly elevated probability of encountering UXO in this area. Fire preparedness and suppression activities could be complicated by the presence of UXO if it is encountered, and risk of injury would increase. However, as part of the existing fire management plan, park staff meets with local emergency personnel annually, and issues such as the potential for presence of UXO would be discussed, so that appropriate safety procedures can be used during firefighting activities, including indirect attack methods. The potential for short-term, adverse impacts to firefighter health and safety related to suppression of unplanned wildland fires would therefore be moderated. It is also expected that ongoing mechanical and chemical vegetation management at Deep Cut would mitigate the risk of an unusually hot fire in that area of the park. Immediate and aggressive suppression of unplanned fires using indirect attack methods (e.g., suppressing fire from the perimeter of the fire area, creating fuel breaks, and wetting unburned vegetation) would further minimize the risk to firefighter safety associated with UXO.

Outside of the park, the safety of adjacent landowners could be placed at a higher risk of unplanned wildland fire incidents. Wildland fires could result in damage or loss to buildings and exposure to smoke. Smoke from fires could affect driver safety in area travel corridors including park roads, local roads, US Route 29, Virginia Route 234, and Interstate 66 due to reduced visibility. It is very unlikely that smoke would also represent a concern for arriving and departing flights at Washington Dulles International Airport, approximately 12 miles northeast of the park. Commercial flights would be at a relatively high altitude; as a result, smoke would not be likely to affect them. Jets landing at Dulles operate on instrument flight rules and would therefore be able to fly through the smoke, if necessary. Smoke would also not affect air quality in the plane cabin.

Impacts to public health and safety from unplanned wildland fire would be minimized by an immediate and aggressive fire suppression response. Overall, impacts to public health and safety due to potential fuel build up and increased risk for unplanned wildland fires would be short term, minor to moderate, adverse, and localized.

Cumulative Impacts

Ongoing and future projects that could impact public health and safety include the construction of the new bypass as well as prescribed burning at Conway Robinson State Forest. The bypass would result in long-term, beneficial impacts to public safety by eliminating vehicle traffic on a highway currently bisecting the park (NPS 2005b). Ongoing and future prescribed burns at Conway Robinson State Forest would result in short-term minor adverse impacts to public health and safety related to smoke. The no action alternative would contribute short-term, minor, adverse health and safety impacts related to smoke and fire safety in the event of an unplanned wildland fire. Overall, cumulative impacts to public health and safety would be minor and adverse.

Conclusion

The no action alternative could have minor to moderate, short-term, adverse impacts to firefighters, adjacent landowners, and the public through an increased potential for future severe wildland fires resulting from potential hazardous fuel buildup. Cumulative effects under this alternative would be minor and adverse.

IMPACTS OF ALTERNATIVE 2 TO PUBLIC HEALTH AND SAFETY

Analysis

Under alternative 2, prescribed fire, mechanical and manual hazardous fuel reduction, and targeted herbicide use would be used in combination with wildland fire suppression to reduce hazardous fuels.

Since they would be strategically integrated into the fire management plan, these fuels management techniques would involve more pre-planning and planned activities under defined conditions than the no action alternative. This would be expected to lead to better health and safety protections under more controlled conditions.

Impacts to public health and safety from mechanical and chemical vegetation removal would be similar to those described for the no action alternative. Smoke from prescribed burning would have the potential to result in adverse impacts to public health. Prescribed burning would incorporate smoke management and public notification measures into burn plans to reduce these impacts. Prescribed burns would only take place when weather conditions are sufficient to maximize the potential to control prescribed burns and minimize the potential for smoke to drift toward sensitive receptors. Notification efforts would include local communities that may experience smoke; park staff; and park visitors. Smoke behavior would be monitored during prescribed burning efforts in order to inform future prescribed burning efforts. Short-term health and safety impacts from prescribed burns would therefore be negligible to minor, adverse, and localized.

The use of proactive vegetation management tools would increase the ability to effectively manage buildup of brush and ground cover and to create and maintain fuel breaks and defensible space around structures. This would result in increased success and greater efficiency in reducing hazardous fuels. These actions would enhance the potential for unplanned fires to be lower in intensity, and therefore easier to manage and suppress. Potential impacts to public health and safety related to smoke and unplanned wildland fires would be similar to those described under the no action alternative, but would be reduced. Long-term impacts would be beneficial because prescribed burning would aid in reducing the occurrence and severity of unplanned wildland fire over time.

UXO poses potential hazards to firefighter safety during wildland fire and prescribed burning events that could result in major, adverse impacts, including potential loss of life. Therefore, prescribed fire would not be considered as a fuels management option at the Deep Cut landscape restoration unit until an archeological investigation has been completed, and any Civil War UXO have been noted, documented, and removed. Fuels management at both Deep Cut and Brawner Farm would be focused on mechanical and chemical vegetation removal, in addition to the use of goat grazing to maintain vegetation in a low-growing condition. Vegetation management would also prepare the area for later low-temperature prescribed fires. If prescribed fire is deemed a usable option at the landscape units after identification and removal of UXO, the low intensity of prescribed fire would not be expected to penetrate more than an inch into the soil and would not present an ignition hazard for UXO. The use of fuels management activities to reduce the frequency and severity of unplanned wildland fires would also moderate the potential impacts to firefighter safety if an uncontrolled wildland fire were to burn into areas containing UXO. In addition, prior to any fire management operation, all personnel involved would receive a safety briefing describing known hazards, including the potential for UXO, escape routes, safety zones, current fire season conditions, and current and predicted fire weather and behavior.

In the event of an unplanned fire, indirect attack fire suppression methods would be used. Overall, the mitigation and safety measures (discussed above) are expected to substantially minimize the potential for the most serious impacts, and UXO would present potential short-term, minor to moderate, adverse impacts to firefighter safety under alternative 2.

Cumulative Impacts

Impacts from cumulative actions under alternative 2 would be similar to those described under the no action alternative. Alternative 2 would contribute short-term, minor to moderate, adverse impacts and long-term, beneficial impacts to public health and safety. Overall, cumulative impacts to public health and safety would be short term, negligible to minor, and adverse.

Conclusion

Alternative 2 would have localized, short-term, minor to moderate impacts to firefighter safety from wildland fire. Archeological investigations at Deep Cut would locate, document, and remove Civil War UXO. Mechanical and chemical treatments and prescribed fire would have negligible to no adverse impacts to health and safety. The reduction in frequency and intensity of future wildland fires as a result of mechanical and chemical fuels management and prescribed burning would have long-term, beneficial impacts. Cumulative impacts to human health and safety would be short term, negligible to minor, and adverse.

IMPACTS OF ALTERNATIVE 3 TO PUBLIC HEALTH AND SAFETY

Analysis

Alternative 3 would include the use of mechanical and chemical vegetation removal, along with the use of goats as biological vegetation control agents at Deep Cut, as fuel management options. The health and safety impacts of alternative 3 would primarily result from unplanned wildland fires, although also potentially from mechanical and chemical fuel removal. These impacts would be similar to those described above for alternative 2, although the use of mechanical, manual, and chemical vegetation management without the additional option to use prescribed fire may prove slightly less effective in reducing fuels buildup and the probability of unplanned wildland fire. Potential impacts related to mechanical vegetation removal and chemical vegetation management would be identical to those described for alternative 2. Impacts related to prescribed fire would not occur under alternative 3 because prescribed fire would not be used under this alternative. Potential impacts related to UXO would be similar to those described for alternative 1. Local fire departments would be briefed annually about the locations that would be more likely to contain Civil War UXO. Overall, localized, short-term, minor to moderate, adverse impacts could result from unplanned wildland fires and wildland fires suppression activities, similar to the no action alternative. Long-term, beneficial impacts would occur as result of mechanical and chemical fuels treatments since the potential for future severe wildland fires and related smoke and threats to adjacent properties and structures from uncontrolled wildland fires would be reduced relative to the no action alternative.

Cumulative Impacts

Impacts from cumulative actions under alternative 3 would be similar to those described under alternative 2 and the no action alternative. Alternative 3 would contribute short-term, minor, adverse impacts and long-term, beneficial impacts to public health and safety. Overall, cumulative impacts to public health and safety would be short term and long term, negligible to minor, and adverse.

Conclusion

Alternative 3 would have minor to moderate, short-term, localized impacts from wildland fire. Mechanical and chemical treatments would have negligible to no adverse impacts to health and safety. The reduction in frequency and intensity of future wildland fires as a result of mechanical and chemical fuels management would have long-term, beneficial impacts. Cumulative impacts to human health and safety would be short and long term, negligible to minor, and adverse.

Cultural Resources

METHODOLOGY AND ASSUMPTIONS

To assess the potential impacts to historic structures, cultural landscapes, and archeological resources, available mapping and literature was first used to characterize the cultural resources of the park, and then

research was carried out in the extensive Federal literature on the effect of fires on Cultural Resources to estimate the impact of some alternatives.

In the discussion of cultural resources, the most difficult questions to address in this EA concern the potential impact of fire on archeological sites, specifically the remains of the two battles. The impact of fires on archeological sites has been intensively studied by several branches of the U.S. government, including the National Park Service (Ryan et al. 2012). The most important finding of these studies is that the impact varies greatly depending on the type of fire. A fast-moving grass fire may heat the soil to only 60 degrees Celsius, whereas a long-smoldering fire in a pile of logs may heat the soil to more than 450 degrees, well above the melting point of lead (Ryan et al. 2012; NPS 2013c; Sturdevant et al. 2009). Burning stumps have been shown to have particular severe effects on buried artifacts because they directly introduce fire into subsurface contexts (Winthrop 2004). Therefore, the key to keeping a fire from damaging buried archeological artifacts is keeping the fuel load low in the areas to be burned. Accumulations of fuel can lead to a hot, slow fire that does substantial damage to subsurface archeological resources. Old stumps are a particular hazard, and may have to be ground down mechanically to prevent them from introducing damaging fire into subsurface archeological resources. The accumulation of fuel is especially a problem in the Deep Cut area, where woody growth was cut several years ago but not entirely cleared, and has begun to reestablish itself.

The intense fighting during Second Manassas included areas where prescribed burns would take place under alternative 2. This included the Deep Cut area along the Unfinished Railroad. The accumulation of fuel has become a problem within these areas, particularly in the Deep Cut where woody growth was cut several years ago but not entirely cleared, and has begun to reestablish itself. The Deep Cut area and parts of the Brawner Farm are rugged, rocky and the vegetation is currently described as “brush.” These areas have not been fully surveyed, but as discussed previously, there is a high potential for archeological resources in these areas. Given the high potential for archeological resources in this area, it is assumed that there is an increased potential for impacts to those resources from the action alternatives than in other units proposed for treatment.

Is it assumed that there is a low potential for impacts to cultural resources within the farmed/grassland units proposed for treatment in the action alternatives. These units have been repeatedly plowed or mowed for over 100 years. Archeological resources within these units, if present, have likely been disturbed and would not be further impacted by the continuation of mechanical activities.

It is also assumed that the park will employ guidelines and mitigation measures that have been developed through consultation with the State Historic Preservation Office for previous mechanical and chemical treatments within the park. These activities have previously occurred within areas in the park where there is a high potential for archeological resources, or that are designated cultural landscapes or historic districts. Previous compliance for these activities would be the basis for future similar activities throughout the park.

STUDY AREA

While this EA considers the entirety of the battlefield, the impact of the proposed actions on certain areas has been analyzed in greater detail. The treatment areas where prescribed burns are recommended under alternative 2 have been closely scrutinized for the potential impact of these fires on cultural resources. Two areas in particular, the viewshed restoration units around Deep Cut and the northern part of the Brawner Farm property, merit particular attention. While most of the prescribed burn areas are grassy fields, these two areas were recently wooded and have been only partially cleared, and therefore have a substantially greater fuel load.

IMPACT THRESHOLDS AND DURATION

For the purposes of analyzing potential impacts on archeology, historic structures, and cultural landscapes, the thresholds for the intensity of an impact are defined as follows:

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

Minor: Disturbance of an archeological site(s) or historic structure(s) is confined to a small area with little, if any, loss of important information potential. For purposes of section 106, the determination of effect would be no adverse effect. Alteration of a pattern(s) or feature(s) of a historic property listed in or eligible for the national register would not diminish the integrity of a character-defining feature(s) or the overall integrity of the historic property.

Moderate: Disturbance of an archeological site(s) or historic structure(s) would not result in the loss of integrity. For purposes of section 106, the determination of effect would be adverse effect. The impact would alter a character-defining feature(s) of a historic property and diminish the integrity of that feature(s) of the historic property.

Major: Disturbance of an archeological site(s) or historic structure(s) is substantial and results in the loss of most or all of the site and its integrity. For purposes of section 106, the determination of effect would be adverse effect. The impact would alter a character-defining feature(s) of the historic property and severely diminish the integrity of that feature(s) and the overall integrity of the historic property.

Beneficial: No levels of intensity for beneficial impacts are defined. Beneficial impacts can occur under the following scenarios: when character-defining features of the historic property would be stabilized/preserved in accordance with the secretary of the interior's *Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes* (NPS 1996) to maintain its existing integrity; when the historic property would be rehabilitated in accordance with the secretary of the interior's Standards for the Treatment of Historic Properties to make possible a compatible use of the property while preserving its character-defining features; or when a historic property would be restored in accordance with the secretary of the interior's Standards for the Treatment of Historic Properties to accurately depict its form, features, and character as it appeared during its period of significance.

Duration: Short-term impacts would occur during all or part of alternative implementation; long-term impacts would extend beyond the implementation of the alternative.

ARCHEOLOGICAL RESOURCES

Impacts of Alternative 1 (No Action) to Archeological Resources

ANALYSIS

Under this alternative, the fire management program would be limited to wildland fire suppression actions under the current fire management plan. The park's current vegetation management practices, which are not strategically integrated into existing fire management, would continue. Prescribed fire would not be used. Mechanical and manual vegetation management work and the use of herbicides to slow the return of brush after vegetation removal would continue, but a lack of strategic integration with fire management goals would limit the efficiency and effectiveness of fuels management in areas adjacent to archeological and historic resources. This could lead to increased potential for wildland fires that are difficult to suppress or manage, although Manassas is not in an area at high risk for fires. These fires may require greater suppression efforts, which could impact archeological resources, by compacting soils that contain

artifacts. However, if intensity remains low and fire suppression is performed quickly and in a sensitive way per the existing fire management plan, with cognizance of important archeological and historical sites, the adverse impacts would be localized and minor. The National Park Service has identified mitigation measures that would be employed in order to reduce the potential effects of wildland fire suppression on archeological sites.

Because the impact of fire on archeological resources depends sensitively on the fuel load and on the materials from which the archeological artifacts are made, future wildland fires could become more destructive if fuel loads are high. Fires burning in grass are unlikely to damage archeological sites or artifacts, either the Civil War-era artifacts likely at the park, or prehistoric artifacts that might also be at the park, and are relatively easy to suppress, but fires burning in dense brush might raise subsurface temperatures high enough to damage metal artifacts such as lead bullets, tin cans, and canteens. Fires burning in dense accumulations of woody material may be more difficult to suppress quickly, and can grow hot enough to damage glass, ceramics, and stone or brick building foundations. The accumulation of fuel is especially a problem in the two viewshed restoration units identified in figure 3, where woody growth was cut in the past, but not entirely cleared. In the unlikely event that there is a high intensity fire with a high fuel load in areas where there are archeological resources near the surface, a wildland fire has the potential to cause major, long-term, adverse impacts to archeological resources by destroying or melting them. It is expected that immediate and aggressive fire suppression would mitigate these potential impacts.

Another potential risk from unplanned wildland fires is the potential presence of Civil War UXO in the park. As a battlefield, there is a possibility that UXO could be anywhere in the park, but in areas such as Deep Cut (shown as the viewshed restoration area 10 in figure 4), which was the location of heavy shelling and was also lightly disturbed in intervening years, the potential that that UXO is present is small but real. Existing studies of fire impacts do not seem to address this possibility, so information on how various types of fires might impact buried UXO is lacking.

Besides the possible impact of more intense wildland fires, there is potential for damage from current vegetation management practices using mechanical means. Mechanical vegetation management (mowing, bush-hogging) could result in long-term, adverse, localized impacts due to displaced surface materials, especially in rugged areas; exposure of materials due to ground disturbance associated with the activities; or to disturb materials immediately below the surface with vehicle use due to earth moving or compaction. Adverse impacts would include exposure of artifacts to erosion. These adverse impacts would be considered minor.

CUMULATIVE IMPACTS

The only past, present, or reasonably foreseeable future project that has the potential to affect archeological resources is the proposed bypass. However, the bypass received full study and evaluation under section 106 of the Historic Preservation Act, which found that it would have no impact on archeological resources. Therefore, there would be no cumulative impacts to archeology.

CONCLUSION

While the no action alternative seems to have low risks in the short term, it has substantial risks in the long term. Mechanical vegetation control has long-term minor impacts on archeological resources, especially in rugged areas. Also, the reduced ability to control brush and reduce fuel loads increases the risk of wildland fire in the park, and in areas with a significant fuel load, wildland fires could have moderate adverse impacts on archeological sites. There would be no cumulative impacts to archeological resources.

Impacts of Alternative 2 to Archeological Resources

ANALYSIS

Wildland fire suppression impacts to archeological sites under this alternative would be the same as discussed under the no action alternative; however, prescribed burns, mechanical and manual treatments, and targeted herbicide application would be used as proactive vegetation management tools in combination with wildland fire suppression. This would reduce the potential for archeological resources to be damaged during suppression activities.

The use of proactive vegetation management tools would increase the ability to reduce brush density and ground cover, reducing the fuel load in the park. Fires under this alternative would likely be lower intensity ground fires, which are easier to manage or suppress, thus reducing the potential risk of damage to historic resources. Across most of the park, the impact of alternative 2 on archeological sites and artifacts would be beneficial. In grassy areas, the impact of properly managed prescribed burns on archeological resources would be negligible, the risk of a destructive fire would be reduced, and the reduced use of machinery would reduce the potential for damage to archeological resources from mechanical vegetation management.

However, the use of prescribed burns in the viewshed restoration units in their current state could result in moderate adverse impacts to archeological sites and artifacts if not managed correctly. These areas have current fuel loads that could create hot, damaging fires, and they have stumps that could introduce hot, damaging fire into subsurface contexts. These areas saw heavy fighting during the Second Battle of Manassas and may contain important remains of the battle. Again, a fast-burning grass fire would result in negligible to minor adverse impacts to such resources, but a slower-burning fire in accumulations of brush and forest litter might result in moderate and adverse impacts.

However, the National Park Service has instituted mitigation measures (see appendix A) in order to avoid adverse effects to these resources. Mechanical and chemical treatments or goat grazing would be used to reduce the vegetation prior to implementing prescribed burns. These activities would have a minor impact on archeological resources provided that the park adheres to guidelines and mitigation measures that have been previously consulted upon with the State Historic Preservation Office through section 106 compliance to avoid or minimize impacts. Additionally, the National Park Service would complete archeological investigations of the Deep Cut and Brawner Farm areas prior to prescribed fires in order to avoid or minimize impacts to archeological resources.

Additional mitigation measures suggested by the National Center for Preservation Technology and Training (Winthrop 2004) to mitigate and minimize adverse effects include the following:

- Manually reducing fuels on and/or around vulnerable sites and piling debris offsite
- Removing logs / heavy fuels from vulnerable areas
- Flush cutting and covering stumps with dirt where burnout could affect subsurface cultural resources
- Modifying burn plans to minimize effects to cultural resources, such as burning when duff has high moisture
- Limiting fire intensity and duration over vulnerable sites

The reduction of fuels prior to prescribed burns would reduce the intensity and duration of prescribed burns. As described in the alternative, the goal of up-front fuels reduction would be to remove enough vegetation to limit the subsurface depth to which the fire would burn to less than one inch. The exact nature of the effects of these types of fires on UXO is unknown. However, the low intensity, short duration prescribed fires coupled with complete archeological inventory of the area prior to burns should limit the impacts of fire on these resources.

CUMULATIVE IMPACTS

As discussed under the no action alternative, there would be no cumulative impacts to archeological resources.

CONCLUSION

Alternative 2 would have a long-term, beneficial impact on archeological resources because it would reduce the chance of a destructive fire in the park. It would also lead to less impact over time from mechanical mowing. Across most unforested areas of the park, the use of prescribed fires would have a negligible impact on archeological sites because grass fires generally do not burn hot enough to damage subsurface artifacts or features. However, in the Deep Cut and Brawner Farm viewshed restoration units, where the fuel load is greater and some stumps are present, there is a danger that improperly managed fires could have moderate adverse impacts on the archeological remains of the Second Battle of Manassas, although with archeological investigations, the adverse impacts would be minor. There would be no cumulative impacts to archeological resources.

Impacts of Alternative 3 to Archeological Resources

ANALYSIS

Under this alternative, the park would identify treatment areas that would use expanded use of mechanical and chemical methods to reduce and manage fuels. Prescribed fire would not be used as a management tool under this alternative. Treatment areas would likely be similar to those established under alternative 2, but may be configured differently.

Alternative 3 would therefore lead to some reduction in the fuel load of the treated areas compared to the no action alternative, but would likely be less than should be achieved by alternative 2. Alternative 3 would therefore achieve some reduction in the chance of high intensity wildland fires that could damage archeological sites and artifacts, but less so than alternative 2. Wildland fire suppression impacts to archeological sites under this alternative would be the same as discussed under the no action alternative. Increased use of mechanical vegetation control could have minor adverse impacts on archeological resources.

CUMULATIVE IMPACTS

As discussed under the no action alternative, there would be no cumulative impacts to archeological resources.

CONCLUSION

Alternative 3 would achieve some reduction in the long-term risk of a destructive fire in the park, a beneficial impact for archeological resources, but not as much as alternative 2. However, increased use of mechanical mowing and clearing would have minor to moderate adverse impacts. Wildland fire suppression impacts to archeological sites under this alternative would be the same as discussed under the no action alternative. There would be no cumulative impacts to archeological resources.

CULTURAL LANDSCAPES

Impacts of Alternative 1 (No Action) to Cultural Landscapes

ANALYSIS

Under this alternative, the fire management program would be limited to wildland fire suppression actions under the current fire management plan, which would result in generally beneficial impacts. However, the lack of strategic integration of vegetation management with fire management goals, and the lack of

prescribed burning as a fuels management option, could result in relatively less effective prevention of fuel buildup adjacent to cultural landscapes. This could lead to increased potential for wildland fires that are difficult to suppress/manage. The suppression of wildland fires would help preserve important features of these landscapes. Given the mitigation measures in place for the consideration of cultural resources during suppression activities, the suppression of wildland fires would have little effect on the cultural landscapes.

Wildland fire would, depending on its severity, diminish the visual integrity of cultural landscapes. Short-term, minor to moderate adverse impacts could include unsightly burned and scorched vegetation and unvegetated areas from intense burning. Intense unplanned wildland fires could also result in the removal of important cultural landscape features, resulting in long-term, moderate to major, adverse impacts to cultural landscapes, although under the 2010 fire management plan, the intent is to suppress such fires before they can become intense.

Increased vegetation density could encroach on cultural landscapes and viewsheds, resulting in long-term, minor to moderate, adverse impacts due to continued retention and increased density of vegetation that would change the historic character of these viewsheds and vistas, particularly in the Deep Cut area.

Manual and mechanical treatments could consist of minor trimming or vegetation, removal around structures in an effort to create and/or maintain space. The impact of minor trimming or vegetation removal could be short term and beneficial due to the stabilization/preservation or restoration of cultural landscape features.

CUMULATIVE IMPACTS

Ongoing and future projects that could impact cultural landscapes include the deer management plan and new bypass. Construction of the bypass would contribute long-term, beneficial impacts in reducing traffic and modern intrusions, improving views and vistas from cultural landscapes. The deer management plan would also contribute long-term, beneficial impacts to cultural landscapes by decreasing possible damage to the integrity of resources. The no action alternative would contribute short- and long-term, minor to moderate, adverse impacts as well as beneficial impacts. Overall, cumulative impacts to cultural landscapes would be short term and long term and beneficial.

CONCLUSION

The no action alternative would have potential minor to moderate adverse impacts on cultural landscapes over the long term, given the slightly increased risk of higher intensity wildland fire in the park. Wildland fire suppression impacts to archeological sites under this alternative would be the same as discussed under the no action alternative. In addition to the increased risk of fire, the long-term impact of this alternative would result in increasingly-dense vegetation encroaching on cultural landscapes and changing the nature of the historically significant viewsheds and sightlines such as the Deep Cut area. Cumulative impacts to cultural landscapes would be short term and long term and beneficial.

Impacts of Alternative 2 to Cultural Landscapes

ANALYSIS

Wildland fire suppression impacts to cultural landscapes under this alternative would be the same as the no action alternative; however, prescribed burns, mechanical and manual treatments, and chemical methods would be used as proactive vegetation management tools in combination with wildland fire suppression.

The use of proactive vegetation management tools would increase the ability and efficiency to reduce brush density and ground cover, increasing the reduction of hazardous fuels and success rate of ecological restoration efforts to fire-adapted and other unique habitats. This would increase the potential for lower

intensity ground fires, which are easier to manage/suppress, thus reducing the potential risk of damage to cultural landscapes. These lower intensity ground fires would help maintain more open cultural landscapes and historic viewsheds. In addition, the proactive vegetation management actions in this alternative would be planned and designed to complement cultural landscape objectives. Impacts to cultural landscapes under alternative 2 would be long term and beneficial due to minimizing the potential for future severe wildland fires as the amount of acres restored space increases and brush density decreases. Short-term, minor to moderate, adverse impacts could include unsightly burned and scorched vegetation and unvegetated areas from both prescribed burns and more intense unplanned wildland fires.

Prescribed fire would allow for advance clearance and avoidance and mitigation activities in cultural landscapes. Prescribed burning combined with mechanical methods would be used to reduce the risk of brush encroachment and to enhance cultural resources important to the cultural landscapes (e.g., maintaining open fields, improving and creating defensible space around structures) and visual aesthetics, thus decreasing the probability of severe wildland fires and enhancing their protection. Based upon current information, the impacts of alternative 2 on cultural landscapes would be long term and beneficial by helping to restore and maintain cultural landscapes.

Mechanical and chemical fuels management under this alternative would beneficially impact cultural landscapes since trimming and removing vegetation would restore open areas and viewsheds.

CUMULATIVE IMPACTS

Impacts from cumulative actions would be the same as described under the no action alternative, resulting in long-term, beneficial impacts to cultural landscapes. Under alternative 2, impacts would be short term, minor to moderate, and adverse as well as long term and beneficial. Overall cumulative impacts to cultural landscapes would be long term and beneficial.

CONCLUSION

Alternative 2 would have a beneficial impact on the cultural landscapes. Prescribed burns and mechanical methods to manage fuels would have a short-term, minor to moderate, adverse impact by creating unsightly burned vegetation. The long-term impact, however, would be beneficial; use of these methods would decrease the likelihood of uncontrollable fire and restore historic landscapes. Cumulative impacts to cultural landscapes would be long- term and beneficial.

Impacts of Alternative 3 to Cultural Landscapes

ANALYSIS

Impacts to cultural landscapes under this alternative would be similar to the no action alternative, but expanded use of mechanical and chemical methods would decrease the buildup of fuels in and adjacent to cultural landscapes. The diminished potential for wildland fires would have a short-term, beneficial impact on cultural landscapes. The potential for wildland fires that are difficult to suppress, however, would be greater than under alternative 2 because prescribed fire would not be used under alternative 3. Wildland fire suppression impacts to cultural landscapes under this alternative would be the same as the no action alternative.

Mechanical and chemical fuels management under this alternative would have similar impacts as those under alternative 2. Trimming and removing vegetation could beneficially impact cultural landscapes through restoration of open areas and viewsheds.

CUMULATIVE IMPACTS

Impacts from cumulative actions would be the same as described under the no action alternative, resulting in long-term, beneficial impacts to cultural landscapes. Under alternative 3, impacts would be short term and beneficial. Overall cumulative impacts to cultural landscapes would be long term and beneficial.

CONCLUSION

Alternative 3 would have short- and long-term, beneficial impacts on cultural landscapes, decreasing the chance of wildland fire and removing vegetation in order to restore open areas and historic viewsheds. Wildland fire suppression impacts to cultural landscapes under this alternative would be the same as the no action alternative. Cumulative impacts to cultural landscapes would be long term and beneficial.

HISTORIC STRUCTURES AND DISTRICTS

Impacts of Alternative 1 (No Action) to Historic Structures and Districts

ANALYSIS

Impacts of this alternative on historic structures would be similar to those for cultural landscapes. The continued use of the current fire management plan could lead to increased brush and fuel buildup adjacent to historic resources and increased potential for wildland fires that are difficult to suppress. Fire suppression activities, such as firelines, spraying structures with water, or wrapping them in fire protective tarps, could have an impact on historic structures. However, the impacts would be minimal when compared to the potential complete loss of the resource from a wildland fire. The park has instituted mitigation measures to ensure that historic structures and districts are protected during wildland fire suppression activities.

In the event of a fire, historic structures could be degraded by charring of wooden structures or spalling of cement-based structures, which appears as distinct lines or striations resulting in cracking, breaking, chipping, or craters on the surface (Ryan 2012). The adverse impact to historic structures in this case would be long term and minor to moderate. Fires would be suppressed, but without fuel reduction, they could be higher in intensity, and could result in unacceptable changes to character-defining features of historic districts or structures, as well as remove important structures or historic sites if they are not suppressed quickly enough. With avoidance of known historic structure and implementation of mitigation actions, the adverse impacts of fire suppression tactics would be localized, short-term, and minor.

Manual and mechanical treatments could consist of minor trimming or vegetation removal around structures in an effort to create and/or maintain space. The impact of minor trimming or vegetation removal could be short term and beneficial.

Impacts to the historic district would be the same as those to historic structures. Additionally, wildland fires would degrade contributing resources such as monuments and cemeteries, resulting in long-term minor to moderate, adverse effects to the historic district by causing changes to character defining features. With avoidance of known historic structure and implementation of mitigation actions, the adverse impacts of fire suppression tactics would be localized, short term, and minor. See “Archeological Resources” section above for impacts to archeological sites that are contributing resources in the historic district.

CUMULATIVE IMPACTS

Ongoing and future projects that could impact historic structures and historic districts include the deer management plan and new bypass. Construction of the bypass would contribute long-term, beneficial impacts in reducing traffic and modern intrusions in the historic district, improving views and vistas throughout the district. The deer management plan would also contribute long-term, beneficial impacts to

cultural landscapes by decreasing possible damage to historic structures and contributing resources in the historic district. The no action alternative would contribute short- and long-term, minor to moderate, adverse impacts. Overall, cumulative impacts to cultural landscapes would be short term and long term, moderate, adverse, and beneficial.

CONCLUSION

The impacts of continuing the current fire management plan in the no action alternative could result in long-term, beneficial impacts by suppressing fires, although there could be long-term, minor to moderate, adverse impacts on cultural resources if a high intensity wildland fire occurred that could not be easily suppressed, resulting in the loss of character-defining features of historic structures. Avoidance of historic structures and implementation of mitigation actions would minimize the possibility of adverse effects. Wildland fire suppression impacts to cultural landscapes under this alternative would be the same as the no action alternative. Cumulative impacts to historic districts and structures would be short term and long term, minor, and adverse.

Impacts of Alternative 2 to Historic Structures and Districts

ANALYSIS

Impacts on buildings and structures would be less than that as discussed above under the analysis of the no action alternative for historic structures resources. Prescribed fires would not be managed without adequate protection and mitigations to historic and cultural sites. Impacts to historic structures would be long term and beneficial due to the decreased risk of wildland fire.

Manual and mechanical treatments would have negligible to minor impacts on landscaped vegetation characteristics around historic structures. These effects could consist of minor trimming or vegetation removal around structures in an effort to create and/or maintain defensible space. Impacts to historic structures associated with suppression of unplanned wildland fires would be the same as those described for the no action alternative.

Impacts to the historic district would be the same as those to historic structures. Impacts to the historic district would be long term and beneficial due to the decreased risk of wildland fire. See the “Archeological Resources” section above for impacts to archeological sites that are contributing resources in the historic district.

CUMULATIVE IMPACTS

Impacts from cumulative actions would be the same as described under the no action alternative, resulting in long-term, beneficial impacts to historic structures and historic districts. Under alternative 2, impacts would be long term and beneficial. Overall cumulative impacts to historic structures and historic districts would be long term and beneficial.

CONCLUSION

Alternative 2 would have beneficial impacts on historic structures by reducing the risk of fire. The reduction of wildland fire risk would be greater than under the no action alternative. Impacts to historic structures associated with suppression of unplanned wildland fires would be the same as those described for the no action alternative.

Cumulative impacts to historic districts would be long term and beneficial.

Impacts of Alternative 3 to Historic Structures and Districts

ANALYSIS

Impacts to historic structures under this alternative would be similar to the no action alternative, but expanded use of mechanical and chemical methods would decrease the buildup of fuels in and adjacent to historic structures. The diminished potential for unplanned wildland fires would have short- to long-term, beneficial impacts on historic structures. The potential for wildland fires that are difficult to suppress, however, would be greater than under alternative 2 since the amount of vegetation and brush cleared would likely be less than if prescribed fire was used. Impacts to historic structures associated with suppression of unplanned wildland fires would be the same as those described for the no action alternative.

Impacts to the historic district would be the same as those to historic structures. See the “Archeological Resources” section above for impacts to archeological sites that are contributing resources in the historic district.

CUMULATIVE IMPACTS

Impacts from cumulative actions would be the same as described under the no action alternative, resulting in long-term, beneficial impacts to historic structures and historic districts. Under alternative 3, impacts would be short term to long term and beneficial. Overall cumulative impacts to historic structures and historic districts would be long term and beneficial.

CONCLUSION

Alternative 3 has beneficial impacts on historic structures by reducing the risk of fire. The reduction of wildland fire risk would be greater than the no action alternative, but less than alternative 2. Impacts to historic structures associated with suppression of unplanned wildland fires would be the same as those described for the no action alternative. Cumulative impacts to historic districts would be long term and beneficial.

CHAPTER 5: CONSULTATION AND COORDINATION

Coordination with state and federal agencies was conducted during the NEPA process to identify issues and/or concerns related to fire management planning and natural and cultural resources in Manassas National Battlefield Park.

Section 7 of the Endangered Species Act

In accordance with section 7 of the Endangered Species Act of 1973, in February 2014 the National Park Service sent a letter to solicit comments from the U.S. Fish and Wildlife Service regarding the existence of threatened or endangered species in the project area. In March 2014, the U.S. Fish and Wildlife Service responded and directed that consultation be completed on their website. Upon further review of the USFWS website, the National Park Service concluded there would be no impact to threatened or endangered species in the project area.

Two state agencies—the Virginia Department of Game and Inland Fisheries and the Department of Agriculture and Consumer Services—have legal authority for endangered and threatened species and are responsible for their conservation in Virginia. The Virginia Department of Game and Inland Fisheries has statutory responsibility to manage the Commonwealth’s wildlife and inland fisheries, and to protect state and federally threatened or endangered species (excluding plants and insects). In 1979, the Endangered Plant and Insect Species Act, Chapter 10 §3.2-1000 through 1011 of the Code of Virginia, as amended, mandated that the Virginia Department of Agriculture and Consumer Services conserve, protect, and manage endangered and threatened species of plants and insects. The National Park Service sent a letter to the Virginia Department of Game and Inland Fisheries on February 4, 2014, and will also send the public review EA to the Virginia Department of Game and Inland Fisheries to ensure no further consultation needs to be done. The Virginia Department of Game and Inland Fisheries will circulate the EA for comment throughout Virginia agencies.

Section 106 of the National Historic Preservation Act

All consultations with the Virginia Department of Cultural Resources, which serves as Virginia’s State Historic Preservation Office, as mandated in section 106 of the National Historic Preservation Act, are occurring as part of the development of this EA. The proposed activities have the potential to impact important park cultural landscapes due to the effects of fire.

The National Park Service began coordination with the State Historic Preservation Office and Advisory Council on Historic Preservation regarding the potential effects of fire on important park cultural landscapes in February 2014. The State Historic Preservation Office replied on May 12, 2014, and noted that the proposed Area of Potential Effect seemed reasonable and that they encourage park staff to work with Department of Historic Resources staff as the project progresses. The park continues consultation with the State Historic Preservation Office.

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GLOSSARY AND ACRONYMS

Glossary of Terms

Aerial fuels — All live and dead vegetation in the forest canopy or above surface fuels, including tree branches, twigs and cones, snags, moss, and high brush.

Affected environment — The existing environment to be affected by a proposed action and alternatives.

Anchor point — An advantageous location, usually a barrier to fire spread, from which to start building a fire line. Used to reduce the chance of firefighters being flanked by fire.

Archeological resource — Any material remnants or physical evidence of past human life or activities which are of archeological interest, including the record of the effects of human activities on the environment. They are capable of revealing scientific or humanistic information through archeological research. Any material remnants of human life or activities which are at least 100 years of age, and which are of archeological interest (32 CFR Part 229.3[a]).

Archeological survey — Archeological survey is the process of using explicitly specified methods to prospect for archeological sites- appropriate survey methods vary widely for different environments and archeological resource types.

Artifact — A material object made or modified in whole or in part by man. Among the most common artifacts on archeological sites are fragments of broken pottery (sherds), stone tools, chips (debitage), projectile points, and similar lithic debris.

Back burn — Starting small fires along a natural or constructed firebreak in the path of a wildland fire in order to reduce the amount of flammable material available and limit the spread of fire.

Burn boss — Person responsible for supervising a prescribed fire from ignition through mop-up.

Chemical fuel removal — Removal of vegetation fuel sources using herbicides. Herbicides would be used in a manner consistent with Integrated Pest Management practices at Manassas National Battlefield Park.

Condition class — Depiction of the degree of departure from historical fire regimes, possibly resulting in alternations of key ecosystem components. These classes categorize and describe vegetation composition and structure conditions that currently exist inside the Fire Regime Groups, and serve as generalized wildland fire rankings. The risk of loss of key ecosystem components from wildland fires increases from Condition Class 1 (lowest risk) to Condition Class 3 (highest risk).

Contained — The status of a wildland fire suppression action indicating a control line has been completed around the fire, which can reasonably be expected to stop its spread.

Consultation — The act of seeking and considering the opinions and recommendations of appropriate parties about undertakings that might affect properties on the national register. Appropriate parties ordinarily include the State Historic Preservation Officer and Advisory Council on Historic Preservation. Consultation is very formal and procedurally oriented. Correct procedures are promulgated in 36 CFR Part 800.

Contributing resource — A building, site, structure, or object that adds to the historic significance of a national register property or district.

Council on Environmental Quality (CEQ) — Established by Congress within the Executive Office of the President with passage of the National Environmental Policy Act. The Council on Environmental Quality coordinates federal environmental efforts and works closely with agencies and other White House offices in the development of environmental policies and initiatives.

Crown fire — A fire that advances from top to top of trees or shrubs, more or less independent of a surface fire.

Cultural landscape — A geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values.

Cultural resources — Historic districts, sites, buildings, objects, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, religious, or any other reason.

Dead fuels — Fuels with no living tissue, in which moisture content is governed almost entirely by absorption or evaporation of atmospheric moisture.

Defensible space. Natural and landscaped area around a structure that has been designed and maintained to reduce fire danger. Defensible space reduces the risk that fire will spread from the surrounding vegetation to the structure and provides firefighters access and a safer area from which to defend the structure.

Enabling legislation — NPS legislation setting forth the legal parameters by which each park may operate.

Environmental assessment (EA) — An environmental analysis prepared pursuant to the National Environmental Policy Act to determine whether a federal action would significantly affect the environment and thus require a more detailed environmental impact statement.

Escaped prescribed fire — Prescribed fire that has exceeded or is expected to exceed prescription parameters or otherwise meets the criteria for conversion to wildland fire.

Ethnographic resource — A site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it.

Executive Order — Official proclamation issued by the President that may set forth policy or direction or establish specific duties in connection with the execution of federal laws and programs.

Fire-maintained ecosystem — An ecosystem composed of communities of plant species that have evolved in the presence of frequent fire. These species typically have characteristics enabling them to survive fires at various stages in their life cycles; for example, serotinous cones, fire resistant bark, fire resistant foliage, or rapid growth and development enable various kinds of plants to survive and thrive in a fire-prone environment.

Fire Management Plan — A plan which identified and integrates all wildland fire management and related activities within the context of approved land/resource management plans. It defines a program to manage wildland fires (wildland fire and prescribed fire).

Fire regime — Patterns of fire occurrences, frequency, size, severity, and sometimes vegetation and fire effects as well, in a given area or ecosystem. A fire regime is a generalization based on fire histories at individual sites.

Fuels management — Act or practice of controlling flammability of wildland fuels through mechanical, chemical, biological, or manual means, or by fire, in support of land management objectives.

Hazard fuel — A fuel complex defined by kind, arrangement, volume, condition, and location that presents a threat of ignition and resistance to control.

Historic district — A geographically definable area, urban or rural, possessing a significant concentration, linkage, or continuity of sites, landscapes, structures, or objects, united by past events or

aesthetically by plan or physical developments. A district may also be composed of individual elements separated geographically but linked by association or history.

Indirect attack — The use of natural and constructed fuel breaks, back burns, and similar tactics which allow fire management to contain wildland fires while remaining a safe distance from the fire.

Initial response — Resources and staff initially committed to a wildland fire incident.

Integrated pest management — Integrated Pest Management is an effective and environmentally sensitive approach to pest management that relies on a combination of common-sense practices. Integrated Pest Management programs use current, comprehensive information on the life cycles of pests and their interaction with the environment. This information, in combination with available pest control methods, is used to manage pest damage by the most economical means, and with the least possible hazard to people, property, and the environment. Integrated Pest Management takes advantage of all appropriate pest management options including, but not limited to, the judicious use of pesticides.

Ladder fuels — Fuels which provide vertical continuity between strata, allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease.

Mechanical fuel removal — Fuel management using mechanical means, such as handheld tools (shovels, axes), mechanized tools (chainsaws, brush cutters), or wheeled mechanized equipment (all-terrain vehicles, wood chippers).

Minimum Impact Suppression Tactics — Fire suppression procedures, tools, and equipment that least impact the environment. These depend on local conditions a fire size, and may include use of water as a fireline tactic; allowing a fire to burn to a natural barrier; minimizing cutting of trees, burned trees and snags; and other tactics.

Mop-up — Extinguishing or removing burning material near control lines, felling snags, and other measures to make a fire area safe or to reduce residual smoke.

Museum object — Assemblage of archeological objects, objects, works of art, historic documents, and/or natural history specimens collected according to a rational scheme and maintained so they can be preserved, studied, and interpreted for public benefit. Museum objects normally are kept in park museums, although they may also be maintained in archeological and historic preservation centers.

National Environmental Policy Act of 1969 (42 USC 4321–4347) (NEPA) — The act as amended articulates the federal law that mandates protecting the quality of the human environment. It requires federal agencies to systematically assess the environmental impacts of their proposed activities, programs, and projects including the no action alternative of not pursuing the proposed action. The National Environmental Policy Act requires agencies to consider alternative ways of accomplishing their missions in ways which are less damaging to the environment.

National Historic Preservation Act of 1966 (16 USC 470 et seq.) (NHPA) — An act to establish a program for the preservation of historic properties throughout the nation, and for other purposes, approved October 15, 1966 (Public Law [PL] 89-665; 80 STAT. 915; 16 USC 470 as amended by PL 91-243, PL 93-54, PL 94-422, PL 94-458, PL 96-199, PL 96-244, PL 96-515, PL 98-483, PL 99-514, PL 100-127, and PL 102-575).

National Register of Historic Places (national register) — A register of districts, sites, buildings, structures, and objects important in American history, architecture, archeology, and culture, maintained by the Secretary of the Interior under authority of section 2(b) of the Historic Sites Act of 1935 and section 101(a)(1) of the National Historic Preservation Act of 1966, as amended. The national register provides for three levels of significance: national, state, and local.

NPS Organic Act of 1916 — Enacted in 1916, this act commits the National Park Service to making informed decisions that perpetuate the conservation and protection of park resources unimpaired for the benefit and enjoyment of future generations.

Planning, Environment, and Public Comment (PEPC) — The NPS’s website for public involvement. This site provides access to current plans, environmental impact analyses, and related documents on public review. Users of the site can submit comments for documents available for public review.

Prescribed fire / prescribed burn — Any fire intentionally ignited by management under an approved plan to meet specific objectives, such as reducing fuels or managing fire-adapted native vegetation communities, using methods such as a drip torch and a slow-burn fuel to ignite the fire.

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.

Programmatic Agreement — A written agreement among a federal agency, State Historic Preservation Officer, and Advisory Council on Historic Preservation that stipulates how a program or a class of undertakings repetitive in nature or similar in effect will be carried out so as to avoid or mitigate adverse effects on cultural resources.

Protection — Management objectives to limit the adverse physical, environmental, social, political, or economic effects of fire.

Red-card (Incident Qualifications Card) — A card issued to personnel showing their incident management and trainee qualifications to fill specified fire management positions in an incident management organization.

Scoping — Scoping, as part of the National Environmental Policy Act, requires examining a proposed action and its possible impacts; establishing the depth of environmental analysis needed; determining analysis procedures, data needed, and task assignments. The public is encouraged to participate and submit comments on proposed projects during the scoping period.

Section 106 — Refers to section 106 of the National Historic Preservation Act of 1966, which requires federal agencies to take into account the effects of their proposed undertakings on properties included or eligible for inclusion in the national register and give the Advisory Council on Historic Preservation a reasonable opportunity to comment on the proposed undertakings.

Significance — Significance of cultural resources is evaluated in terms of national register criteria published in 36 CFR Part 60.

Suppression — Management action to extinguish a fire or confine fire spread. Suppression actions may take protection objectives into consideration.

Wildland — An area in which development is essentially non-existent, except for roads, railroads, power lines, and similar transportation facilities. Structures, if any, are widely scattered.

Wildland fire — A general term describing any non-structure fire that occurs in wildland areas.

Wildland-urban interface — The line, area, or zone where structures and other human developments meet or intermingle with undeveloped wildland or vegetative fuel.

Acronyms

CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
DM	Departmental Manual
EA	environmental assessment
national register	National Register of Historic Places
NEPA	National Environmental Policy Act
NPS	National Park Service
NIFC	National Interagency Fire Center
O ₃	Ozone
PEPC	Planning, Environment, and Public Comment
PM _{2.5}	Particulate matter less than 2.5 micrometers
UXO	Unexploded Ordnance

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APPENDIX A

MITIGATION MEASURES

TABLE A-1: MITIGATION MEASURES AND REQUIRED BEST MANAGEMENT PRACTICES

Proposed Mitigation Measures and Required Best Management Practices	Soils	Vegetation	Water Resources	Wildlife and Habitat	Air Quality	Visitor Use and Experience	Park Management and Operations	Public Health and Safety	Cultural Resources
SUPPRESSION OF UNPLANNED WILDLAND FIRES									
Park staff would meet with Prince William and Fairfax County Fire and Rescue personnel to brief them on areas of fire sensitive cultural resources, such as at Brawner Farm and Deep Cut, and areas where there might be safety concerns (also at Deep Cut). County fire and rescue personnel would update their "run cards" based on these meetings.							x	x	x
Initial response staff (those initially committed to a wildfire incident) would determine the proximity of fire to visitors, adjacent landowners and communities. They would coordinate with rangers and local agencies to inform them of the potential hazard and evacuate as necessary.						x	x	x	
Upon notification of a wildfire, resource management staff would examine maps and information resources to assess and discuss wildlife effects.				x					
For long duration wildfires, regular media releases would inform the local public and visitors about the expected impacts of the fire, especially related to smoke and closures or restrictions. Signs or notices may be posted at appropriate places in the park to inform incoming visitors of the fire situation. Announcements would also occur during visitor orientations. The superintendent would authorize temporary closure of some areas to public and visitors as necessary.					x	x		x	
Resource managers would be consulted regarding effects of pumping from specific surface waters for fire control operations. There are a limited number of water sources available for pumping.			x						
Personnel would fell snags or trees only when essential for control of the fire or the safety of firefighters.		x						x	
Vegetation would be removed, cut, or manipulated along firelines to the minimum width necessary for fire control or to protect human, natural, or cultural values.	x	x	x						x
Responding firefighters would deploy absorbent materials as needed in the event of unintended spills of lubricants, surfactants, and other liquid pollutants.	x	x	x	x				x	
Visitors that may be in the path of a wildfire would be located and escorted out of the risk area.						x		x	
Stream or water crossings by equipment would be avoided to minimize riparian vegetation disturbances. When necessary, crossings would be carefully constructed to minimize disturbance to the watercourse. Crossings would promptly be restored and rehabilitated in consultation with resource specialists.		x	x	x					
In mop-up, personnel would use soaker hoses, sprinklers, or foggers; and would avoid straight stream	x	x							

Proposed Mitigation Measures and Required Best Management Practices	Soils	Vegetation	Water Resources	Wildlife and Habitat	Air Quality	Visitor Use and Experience	Park Management and Operations	Public Health and Safety	Cultural Resources
hydraulic action.									
"Bone yards" of cut vegetation would be moved into a natural or random arrangement, and cut ends of logs would be moved to be less visible to visitors and "camouflaged" where possible with materials such as soil and moss.		x				x			
Areas disturbed by suppression activities on wildland fires would be monitored for establishment of new invasive plants.		x							
Park cultural and historic site base maps would be immediately available to fire managers and incident commanders to allow them to avoid impacts to cultural sites.									x
During wildfires, park cultural and historic site base maps would be immediately available to fire management personnel and incident commanders to allow them to avoid impacts to cultural sites, and as necessary, park resource specialist with cultural responsibilities would be available to consult with fire managers to determine initial and extended attack response strategies, ground disturbance, and actual and predicted extent of fire area to protect cultural resources.									x
If a wildfire or prescribed fire is likely to spread into an area where historic structures, such as buildings, need to be protected, fire management personnel would immediately consult with resource management and facility management staff to develop a structure protection plan that best protects the historic materials present.									x
Disturbed areas would be rehabilitated and re-seeded with an NPS-approved mix as soon as possible after fires are out to prevent erosion and negative visual effects.	x	x	x	x		x			
CHEMICAL FUEL MANAGEMENT									
Herbicides would only be used after undergoing national and regional approval processes and considering impacts to natural resources and public health and safety. Herbicides would not be used during winds of 8 mph or greater. The U.S. Environmental Protection Agency instructions would be the primary direction that would be followed when applying herbicides.	x	x	x					x	
An herbicide application map and treatment plan would be developed for each treatment area.	x	x	x					x	
Herbicides would not be applied within 3 hours of predicted precipitation or in areas of standing or flowing water.			x						
Staff using herbicides would be trained in approved procedures related to proper handling, storage, transportation, mixing, spill prevention, and application procedures.	x		x				x	x	

Proposed Mitigation Measures and Required Best Management Practices	Soils	Vegetation	Water Resources	Wildlife and Habitat	Air Quality	Visitor Use and Experience	Park Management and Operations	Public Health and Safety	Cultural Resources
Herbicides would only be used after visitors were out of the area, or informed in advance, and appropriate informational signing was placed at human entryways to the spray area.						x		x	
MECHANICAL FUEL MANAGEMENT									
Slash disposal areas would be identified that do not contain sensitive natural or cultural resources, or sensitive vegetation or wildlife habitats, or streams, ponds, or other water bodies.		x		x					x
Mechanical fuels removal would generally not take place within 50 feet of streams or surface waters.			x						
Brush cutting equipment use would be curtailed during prime nesting seasons, or other sensitive wildlife activity periods, upon consultation with resource management staff.				x					
Mechanical tools would be limited to equipment such as tractors, brush hogs, and chippers, in addition to hand held tools. All-terrain vehicles would be used on trails and larger vehicles would remain on paved areas.									
PRESCRIBED FIRE									
Appropriate weather, fuel, fire behavior, fire management staffing and social considerations for managing prescribed fire would be outlined in the prescribed burn plan.		x			x		x	x	
When sensitive species locations, seasons, unique habitat, nesting areas, or other parameters are involved with a fire management project or wildland fire, additional consultation with resource management and/or specific wildlife experts would occur. Written directions specifying appropriate and reasonable actions and/or mitigations would then be used by the fire management staff to minimize disturbance effects or maximize benefits to those sensitive species.		x		x					
Burning prescriptions would be developed that meet specific vegetation management objectives for each prescribed burn unit. These prescriptions would consider variables such as live and dead fuel loading and moisture, wind parameters, temperature, seasonal timing of burn, firing methods, relative humidity, etc.		x			x				
When planning and before initiating non-emergency field fire management activities, NPS biologists or resource specialists would be consulted to determine presence or effects on sensitive species. If present, mitigation actions would be developed to minimize impacts on species of concern.				x			x		
Effects on wildlife and sensitive species would be fully considered when developing prescribed fire plans and prescriptions through consultation with resource management staff and wildlife experts.				x			x		
The park would follow the burning regulations issued by the Virginia Department of Environmental Quality, Air Division and the Virginia Department of Forestry, and prescribed burns would be postponed when state or					x				

Proposed Mitigation Measures and Required Best Management Practices	Soils	Vegetation	Water Resources	Wildlife and Habitat	Air Quality	Visitor Use and Experience	Park Management and Operations	Public Health and Safety	Cultural Resources
county air regulatory agencies declare air pollution episodes where smoke from fires could worsen poor air quality conditions.									
The amount and duration of these smoke impacts could be minimized by limiting the acres burned at one time and timing ignitions early in the day to allow for more complete combustion during daytime conditions.									
Coordination with adjacent agencies and landowners would occur regarding the total number of prescribed fires simultaneously occurring in the area, to limit cumulative smoke impacts.					x				
Fire/park staff would perform agency, public, and neighbor notification procedures for all prescribed burns, focusing on residents and activities that might be impacted by smoke from the burns. There would be a specified list of contacts in the burn plan.					x	x	x	x	
Coordination with the superintendent would occur in advance of prescribed fires to fully consider the effects of prescribed fire smoke during holidays, periods of heavy public visitation, and/or hunting activities outside the park. Superintendent approval would be required at the time of ignition.					x				
When planning prescribed fires, the proximity and effects on surface water resources would be a consideration when developing prescriptions.			x						
Equipment with fluid leaks would not be used. Refueling or filling or mixing of gas and other fluids would be avoided in the field when possible; when necessary, appropriate precautions would be taken to prevent spills. These actions would be taken away from streams and watercourses.			x						
Refueling of mechanical equipment would not be conducted within 200 feet of standing water or streams to protect fisheries and aquatic animal life.			x	x					
When possible, prescribed burns would be conducted when fuel moistures are relatively low to provide better combustion, more transport and lofting of the smoke column, and less residual burning.		x			x				
Prescribed fire would not occur sooner than 2 weeks after herbicides have been applied. Longer delays may be planned to allow target vegetation time to dry and burn better during prescribed burning.					x		x	x	
Timing and methods of ignition on prescribed burns would be constantly assessed and reviewed by fire managers to minimize smoke impacts.					x				
The prescribed fire burn boss (person responsible for supervising a prescribed fire) would be trained in smoke reduction techniques.					x				
During prescribed burns, smoke monitoring would occur as specified in the burn plan; data would be saved as					x				

Proposed Mitigation Measures and Required Best Management Practices	Soils	Vegetation	Water Resources	Wildlife and Habitat	Air Quality	Visitor Use and Experience	Park Management and Operations	Public Health and Safety	Cultural Resources
part of the prescribed fire project records.									
To prevent accidental exposure to hazards, visitors would be kept out of the immediate vicinity when fire management activities are underway.						x		x	
The park would monitor fuel, weather and fire condition parameters and may limit public access and activities when extreme conditions develop.						x		x	
Prior to ignition, all personnel involved would receive a safety briefing describing known hazards (i.e., UXO) and mitigation actions; lookouts, communications, escape routes, and safety zones; current fire season conditions; and current and predicted fire weather and behavior.							x	x	
Compliance with section 106 of the National Historic Preservation Act would occur before any prescribed burn or fuel treatment projects.									x
Special flagging would be used to identify archeological and historic sites; flagging must be monitored as fire threat passes and may need early removal to prevent undue attention to cultural sites.									
Equipment used for mechanical vegetation removal, as well as equipment used by fire crews for wildland fire suppression efforts, would be inspected and cleaned as necessary after use to prevent the spread of invasive plants within the park.		x							
GENERAL									
When unplanned wildland fires or prescribed fires occur, the Superintendent and staff would re-prioritize and re-program work to activities focused on incident management and support as necessary.						x	x		
Fire and resource management staffs would discuss and design systematic monitoring systems to measure the effects of fire related vegetation management activities such as mechanical removal of woody debris, herbicide use, and prescribed burning.		x							
The safety of firefighters and the public would be the highest priority in all fire management activities.						x	x	x	
Defensible space planning and hazardous fuel reduction would be an ongoing and continuous activity for park buildings and infrastructure. The National Park Service would coordinate with the Virginia Department of Forestry on developing defensible space and hazard fuel reduction for private properties.								x	
Fire management officers would work with all park divisions to develop non-red carded incident support personnel that can assist with incident operations (planning, fiscal, logistics, etc.) during both planned and unplanned fires.							x		

Proposed Mitigation Measures and Required Best Management Practices	Soils	Vegetation	Water Resources	Wildlife and Habitat	Air Quality	Visitor Use and Experience	Park Management and Operations	Public Health and Safety	Cultural Resources
Fire personnel would be educated about the significance of cultural sites, how to identify those sites, and appropriate actions and notifications to be made if new sites are encountered.									x
Park cultural and historic site base maps would be immediately available to fire managers and incident commanders to allow them to avoid impacts to cultural sites.									x
The park would consider development of programmatic agreement with the Virginia State Historic Preservation Office to help identify effects, actions, and considerations of wildfires and prescribed fires on park historic and archeological resources.									x
Resource advisors and cultural resource specialists would be assigned to wildfire incidents or other projects to help the officers in charge prevent damage to historic, cultural, archeological, ethnographic, or landscape sites during suppression of unplanned wildland fires prescribed burns, or mechanical or chemical fuels management activities.									x
As burned areas are opened to visitors after a fire, signs would be posted informing the public of potential hazards in the burned areas, (snags, stump holes, etc.).						x		x	
Manually reducing fuels on and/or around vulnerable sites and piling debris offsite									x
Removing logs / heavy fuels from vulnerable areas									x
Flush cutting and covering stumps with dirt where burnout could affect subsurface cultural resources									x
Modifying burn plans to minimize effects to cultural resources, such as burning when duff has high moisture									x
Limiting fire intensity and duration over vulnerable sites.									x

APPENDIX B
CONSULTATION CORRESPONDENCE



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
6669 Short Lane
Gloucester, Virginia 23061



FEB 04 2013

Greetings:

Due to increases in workload and refinement of our priorities in Virginia, this office will no longer provide individual responses to requests for environmental reviews. However, we want to ensure that U.S. Fish and Wildlife Service trust resources continue to be conserved. When that is not possible, we want to ensure that impacts to these important natural resources are minimized and appropriate permits are applied for and received. We have developed a website, http://www.fws.gov/northeast/virginiafield/endspecies/Project_Reviews_Introduction.html, that provides the steps and information necessary to allow landowners, applicants, consultants, agency personnel, and any other individual or entity requiring review/approval of their project to complete a review and come to the appropriate conclusion.

The website will be frequently updated to provide new species/trust resource information and methods to review projects, so refer to the website for each project review to ensure that current information is utilized.

If you have any questions about project reviews or need assistance, please contact Troy Andersen of this office at (804) 693-6694, extension 166, or troy_andersen@fws.gov. For problems with the website, please contact Mike Drummond of this office at mike_drummond@fws.gov.

Sincerely,

Cindy Schulz
Supervisor
Virginia Field Office



IN REPLY REFER TO:

United States Department of the Interior

NATIONAL PARK SERVICE
Manassas National Battlefield Park
12521 Lee Highway
Manassas, Virginia 20109-2005

02/19/2014

Cindy Shulz
Field Office Supervisor
U.S. Fish and Wildlife Service
Virginia Field Office
6669 Short Lane
Gloucester, VA 23061

RECEIVED
FEB 25 2014

Virginia Field Office

Dear Sir:

The National Park Service (NPS), in accordance with the National Environmental Policy Act (NEPA), is currently preparing an updated Fire Management Plan and Environmental Assessment (EA) for Manassas National Battlefield Park. The purpose of the plan/EA is to develop a fire management strategy that meets the goals of federal policy for fire management at Manassas National Battlefield Park while providing park staff flexibility with fire management tools to meet management objectives, thereby increasing safety for firefighters who are fighting fires as well as public safety in general.

The plan will address a number of issues related to fire management at the park, such as impacts to vegetation and wildlife, water resources, public safety, and visitor experience, among others. A primary focus of the plan/EA will be the effects of fire on important park cultural landscapes. We welcome your input on any aspect of this project. We specifically seek information on the presence of federally-listed threatened or endangered species in the vicinity of Manassas National Battlefield Park. To the knowledge of the NPS, no federally-listed threatened or endangered species occur in the vicinity of Manassas National Battlefield Park.

Additional information on the plan/EA may be found on the NPS's website at <http://parkplanning.nps.gov/Manassasfiremanagement>. The NPS is now working on the draft plan/EA which is anticipated for release in late 2014.

Your input will help ensure that the environmental impacts of the proposal are properly considered in the planning process. If you have any questions or require additional information, please contact Bryan Gorsira at (703) 754-1861 Ext. 1109 or by e-mail at Bryan_Gorsira@nps.gov. Thank you for your assistance.

Sincerely,

Chris Stubbs
Acting Superintendent
Manassas National Battlefield Park

Cc: Margaret Stewart, The Louis Berger Group
Kimberly Benson, NPS-National Capital Region



IN REPLY REFER TO:

United States Department of the Interior

NATIONAL PARK SERVICE
Manassas National Battlefield Park
12521 Lee Highway
Manassas, Virginia 20109-2005

2/20/2014

Julie Langan
State Historic Preservation Officer
Virginia Department of Historic Resources
2801 Kensington Avenue
Richmond, VA 23221

Dear Ms. Langan:

The National Park Service (NPS), in accordance with the National Environmental Policy Act (NEPA), is currently preparing a Fire Management Plan and Environmental Assessment (EA) for Manassas National Battlefield Park. The purpose of the plan/EA is to develop a fire management strategy that meets the goals of federal policy for fire management at Manassas National Battlefield Park while providing park staff flexibility with fire management tools to meet management objectives, thereby increasing safety for firefighters who are fighting fires as well as public safety in general.

The plan will address a number of issues related to fire management at the park, such as impacts to vegetation and wildlife, cultural resources, public safety, and visitor experience, among others. A primary focus of the plan/EA will be the effects of fire on important park cultural landscapes. Therefore, in accordance with the National Historic Preservation Act of 1966 (NHPA), as amended, and the regulations of the Advisory Council on Historic Preservation, the NPS wishes to formally begin consultation with your office with regard to the plan's potential to affect historic properties at Manassas National Battlefield Park.

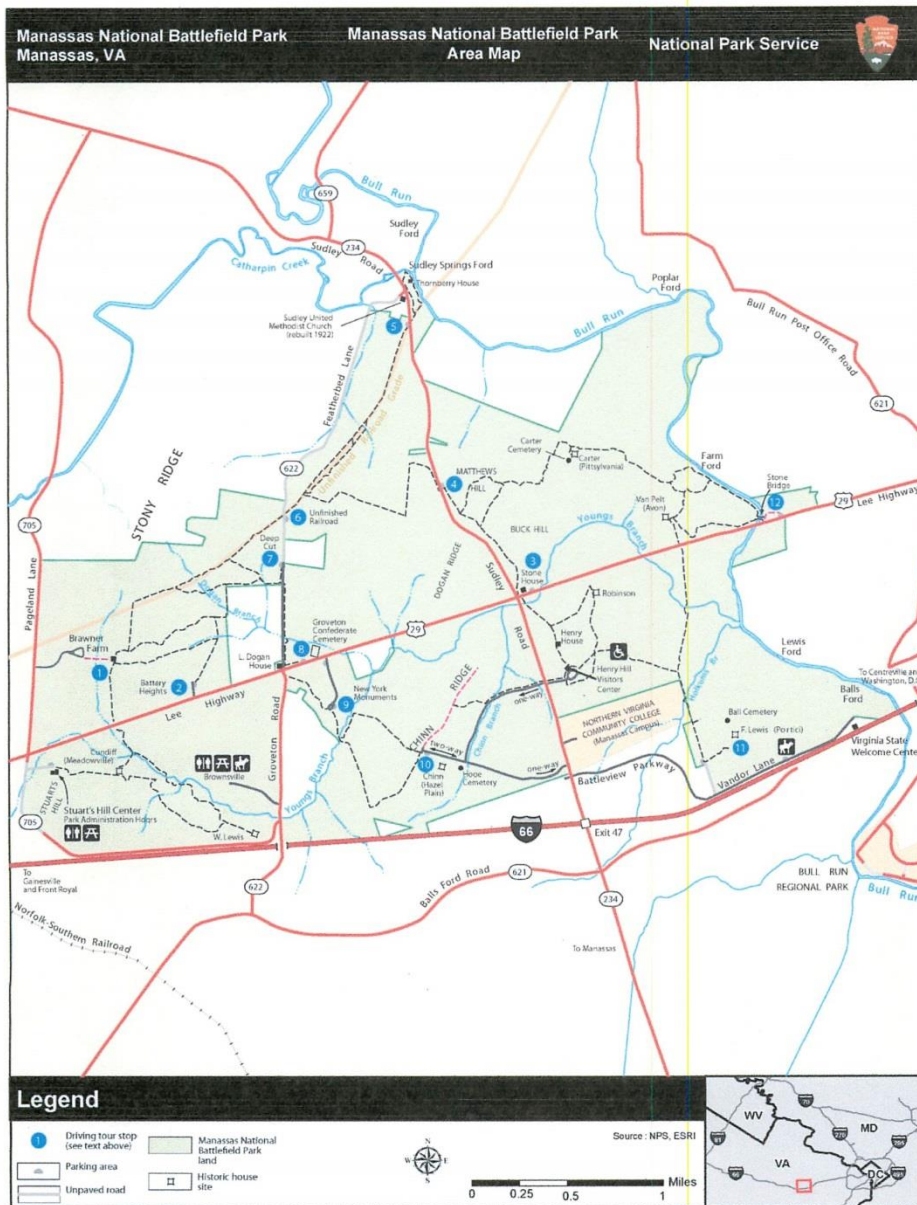
The NPS plans to consult the public per 36 CFR 800.3(e) during the public scoping meeting through combined public scoping/NHPA Section 106 consulting parties meeting. Information on the plan/EA may also be found on the NPS's website at <http://parkplanning.nps.gov/Manassasfiremanagement>.

We are enclosing a map that illustrates the project area, roughly the park boundaries, that is our proposed Area of Potential Effect. Please notify us of any concerns within 30 days. If you have any questions or require additional information, please contact Bryan Gorsira (703) 754-1861 ext. 1109 or by e-mail at bryan_gorsira@nps.gov.

Sincerely,

Christopher J. Stubbs
Acting Superintendent
Manassas National Battlefield Park

Cc: Margaret Stewart, The Louis Berger Group
 Kimberly Benson, NPS-National Capital Region





COMMONWEALTH of VIRGINIA

Department of Historic Resources

Molly Joseph Ward
Secretary of Natural Resources

2801 Kensington Avenue, Richmond, Virginia 23221

Julie V. Langan
Director
Tel: (804) 367-2323
Fax: (804) 367-2391
www.dhr.virginia.gov

May 12, 2014

Jon G. James, Superintendent
National Park Service
Manassas National Battlefield Park
12521 Lee Highway
Manassas, Virginia 20109

Re: Proposed Fire Management Plan and Environmental Assessment
Manassas National Battlefield Park
Prince William County, Virginia
DHR File No. 2014-0512

Dear Mr. James:

Thank you for notifying the Virginia Department of Historic Resources of the Park's intent to use the process and documentation required for the preparation of an Environmental Assessment/Finding of No Significant Impact in accordance with 36 CFR Part 800.8 (c) to comply with Section 106 in lieu of the procedures set forth in 36 CFR Part 800.3 through 36 CFR Part 800.6. Enclosed with the letter of February 20, 2014 is a map showing the proposed Area of Potential Effects (APE), roughly the Park boundaries. We agree that this seems an appropriate APE.

We understand that a public scoping open house meeting was held on March 4, 2014 in the Visitor Center at Manassas National Battlefield Park. We are pleased to see that you are involving the public in the process.

We encourage the regional natural resources staff to work closely with the cultural resource staff and the Park's 106 coordinator in developing the plan. We look forward to receiving the plan for review. If you have any questions concerning our comments, or if we may provide any further assistance, please do not hesitate to contact me at (804) 482-6088.

Sincerely,

Ethel R. Eaton, Ph.D., Senior Policy Analyst
Division of Resource Services and Review

c. Ray Brown, Chief of Interpretation and Cultural Resources Management, MANA

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Bryan Gorsira, Natural Resources Program Manager, WASO

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IN REPLY REFER TO:

United States Department of the Interior

NATIONAL PARK SERVICE
Manassas National Battlefield Park
12521 Lee Highway
Manassas, Virginia 20109-2005

Ray Fernald
Manager
Virginia Department of Game and Inland Fisheries
Environmental Services Section
P.O. Box 11104
Richmond, VA 23230

Dear Mr. Fernald:

The National Park Service (NPS), in accordance with the National Environmental Policy Act (NEPA), is currently preparing an updated Fire Management Plan and Environmental Assessment (EA) for Manassas National Battlefield Park (see attached map). The purpose of the plan/EA is to develop a fire management strategy that meets the goals of federal policy for fire management at Manassas National Battlefield Park while providing park staff flexibility with fire management tools to meet management objectives, thereby increasing safety for firefighters who are fighting fires as well as public safety in general.

The plan will address a number of issues related to fire management at the park, such as impacts to vegetation and wildlife, water resources, public safety, and visitor experience, among others. A primary focus of the plan/EA will be the effects of fire on important park cultural landscapes. We welcome your input on any aspect of this project. We specifically seek information on the presence of any known state-listed rare, threatened or endangered species in the vicinity of Manassas National Battlefield Park.

Additional information on the plan/EA may be found on the NPS's website at <http://parkplanning.nps.gov/Manassasfiremanagement>. The NPS is now working on the draft plan/EA which is anticipated for release in late 2014.

Your input will help ensure that the environmental impacts of the proposal are properly considered in the planning process. If you have any questions or require additional information, please contact Bryan Gorsira at (703) 754-1861 Ext. 1109 or by e-mail at Bryan_Gorsira@nps.gov. Thank you for your assistance.

Sincerely,

Chris Stubbs
Acting Superintendent
Manassas National Battlefield Park

Cc: Margaret Stewart, The Louis Berger Group
Kimberly Benson, NPS-National Capital Region