

National Park Service
U.S. Department of the Interior

Natchez Trace Parkway
Mississippi, Alabama, Tennessee



Fire Management Plan

Environmental Assessment

May 2008



PAGE INTENTIONALLY LEFT BLANK

Natchez Trace Parkway Fire Management Plan *Environmental Assessment*

**National Park Service
U.S. Department of the Interior**

**Natchez Trace Parkway
2680 Natchez Trace Parkway
Tupelo, MS 38804**

Document Prepared by:
Mangi Environmental Group
7915 Jones Branch Drive
Suite 2300
McLean, VA 22102

Project Manager:
Jennifer Karanian

Geographic Information Systems Analyst:
Mark Blevins

Cover Photos courtesy Natchez Trace Parkway website: Old Trace, Mississippi; Birdsong Hollow Bridge, Tennessee; Cypress Swamp, Mississippi; Mount Locust Historic Inn, Mississippi; Fall Hollow, Tennessee; Meriwether Lewis Monument, Tennessee.

Compilation date: May 2008

PAGE INTENTIONALLY LEFT BLANK

Table of Contents

Chapter 1 Purpose and Need	1-1
1.1 Introduction	1-1
1.2 Proposed Action	1-1
1.3 Purpose and Need.....	1-3
1.4 Background.....	1-3
1.5 Fire Management Objectives.....	1-6
1.6 Scoping Issues and Impact Topics.....	1-7
1.6.1 Scoping	1-7
1.6.2 Important Issues Raised During Scoping.....	1-8
1.6.3 Impact Topics Evaluated in this EA	1-8
1.6.4 Impact Topics Considered but Dropped from Further Analysis	1-9
Chapter 2 Issues and Alternatives	2-1
2.1 Alternatives Considered But Not Analyzed Further in This EA	2-1
2.1.1 Fire Management Plan to include wildland fire suppression only	2-1
2.2 Alternatives Considered and Analyzed in This EA.....	2-1
2.2.1 Alternative 1 (No Action Alternative) – Continue to operate under the 2005 Fire Management Plan.....	2-1
2.2.2 Alternative 2 (Proposed Action) – Implement updated and revised FMP.....	2-4
2.2.3 Environmentally Preferred Alternative	2-7
2.3 Mitigation Measures and Monitoring.....	2-8
2.4 Impact Definitions	2-10
2.5 Comparison of Alternatives	2-15
Chapter 3 Environmental Analysis	3-1
3.1 Soils and Geology.....	3-1
3.1.1 Affected Environment.....	3-1
3.1.2 Environmental Consequences	3-2
3.2 Water Resources (including Wetlands and Floodplains).....	3-3
3.2.1 Affected Environment.....	3-3
3.2.2 Environmental Consequences	3-4
3.3 Vegetation	3-7
3.3.1 Affected Environment.....	3-7
3.3.2 Environmental Consequences	3-9
3.4 Wildlife.....	3-11
3.4.1 Affected Environment.....	3-11
3.4.2 Environmental Consequences	3-13
3.5 Air Quality	3-16
3.5.1 Affected Environment.....	3-16
3.5.2 Environmental Consequences	3-16
3.6 Visitor Use and Experience (including Park Operations).....	3-19
3.6.1 Affected Environment.....	3-19
3.6.2 Environmental Consequences	3-19
3.7 Human Health and Safety	3-20
3.7.1 Affected Environment.....	3-20
3.7.2 Environmental Consequences	3-21
3.8 Cultural Resources.....	3-23

3.8.1 Affected Environment	3-23
3.8.2 Environmental Consequences	3-24
3.9 <i>Cumulative Impacts</i>	3-25
Chapter 4 Consultation and Coordination	4-1
4.1 <i>List of Preparers</i>	4-1
4.2 <i>Persons, Organizations, and Agencies Consulted</i>	4-1
4.3 <i>Persons, Organizations, and Agencies Who Received this EA</i>	4-1
Chapter 5 References Cited	5-1
Appendix A – Consultations with the U.S. Fish and Wildlife Service and The Florida Department of State: Division of Historical Resources	

List of Tables

Table 1-1 Impact Topics for Natchez Trace Parkway Draft FMP EA	1-12
Table 2-1 Management Strategies and Recommended Standard (RS) Monitoring Levels	2-8
Table 2-2 Impact Definitions	2-10
Table 2-3 Comparison of Alternatives.....	2-15
Table 3-2 Wetlands located within NATR boundaries.....	3-4
Table 3-3 Federally- and State-Listed Species Identified at NATR	3-12
Table 3-4 Affected Impact Topics and Activities/Land Uses Contributing to Fire Management Plan Cumulative Impacts	3-26
Table 3-5 Cumulative Impacts.....	3-27

List of Figures

Figure 1-1 Natchez Trace Parkway.....	1-5
Figure 2-1 Fire Management Units on the Natchez Trace Parkway.....	2-2

Chapter 1 Purpose and Need

1.1 INTRODUCTION

This Environmental Assessment (EA) documents the results of a study of the potential environmental impacts of alternatives for fire management on the Natchez Trace Parkway (NATR).

This EA has been prepared in compliance with:

- The National Environmental Policy Act (NEPA) of 1969 (42 United States Code (USC) 4321 et seq.), which requires an environmental analysis for major Federal Actions having the potential to impact the quality of the environment;
- Council of Environmental Quality Regulations at 40 Code of Federal Regulations (CFR) 1500-1508, which implement the requirements of NEPA;
- National Park Service Conservation Planning, Environmental Impact Analysis and Decision Making; Director's Order (DO) #12 and Handbook.

The Purpose of an Environmental Assessment (EA)

There are three primary purposes of an EA:

- To help determine whether the impact of a proposed action or alternative could be significant, thus indicating that an environmental impact statement (EIS) is needed;
- To aid in compliance with NEPA when no EIS is necessary by evaluating a proposal that would have no significant impacts, but that may have measurable adverse impacts; and
- To facilitate preparation of an EIS if one is necessary.

Key goals of NEPA are to help Federal agency officials make well-informed decisions about agency actions and to provide a role for the general public in the decision-making process. The study and documentation mechanisms associated with NEPA seek to provide decision-makers with sound knowledge of the comparative environmental consequences of the several courses of action available to them. NEPA studies and the documents recording their results, such as this EA, focus on providing input to the particular decisions faced by the relevant officials.

1.2 PROPOSED ACTION

The Superintendent of the Natchez Trace Parkway is faced with a decision to revise the Parkway's 2005 Fire Management Plan (FMP) as described below. This decision would be made within the overall management framework established in the 1987 NATR General Management Plan and the 1997 NATR Resources Management Plan. It is consistent with the 2001 Federal Wildland Fire Management Policy and Guidelines. The alternative courses of action to be considered at this time are, unless otherwise noted, crafted to be consistent with the concepts established in the 1987 General Management Plan and the 2001 Federal Wildland Fire Management Policy and Guidelines.

In making decisions about resources administered by the National Park Service (NPS), the Park Service is guided by the requirements of the 1916 Organic Act and other laws, such as the Clean Air Act, Clean Water Act, and Endangered Species Act. The authority for the conservation and management of the National Park Service is clearly stated in the Organic Act, which states the agency's purpose "...to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as would leave them unimpaired for the enjoyment of future generations." This authority was further clarified in the National Parks and Recreation Act of 1978: "Congress declares that...these areas, though distinct in character, are united...into one national park system.... The authorization of activities shall be construed and the protection, management, and administration of these areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress."

The requirements placed on the National Park Service by these laws, especially the Organic Act, mandates that resources are passed on to future generations "unimpaired" (DOI, 2001a). Impairment is an impact that, in the professional judgment of the responsible National Park Service manager, would harm the integrity of park resources or values, including opportunities that otherwise would be present for the enjoyment of those resources or values. An impact would be less likely to constitute impairment to the extent that it is an unavoidable result from an action necessary to preserve or restore the integrity of park resources or values (DOI, 2001b). This EA addresses whether the actions of the various alternatives proposed by the Natchez Trace Parkway impair resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the park (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, and (3) identified as a goal in the park's general management plan or other Park Service planning documents (see Chapter 3, Environmental Consequences).

Congress authorized the Natchez Trace Parkway on May 18, 1938. It was established to "Preserve, protect, and manage the park's cultural and natural resources within naturally functioning ecosystems, consistent with cultural resource preservation (NPS, 1995)."

The Natchez Trace Parkway is 444 miles in length and averages 825 feet in width. The Parkway traverses the states of Mississippi, Alabama, and Tennessee and it is located on highlands between watersheds throughout almost its entire length. The Parkway contains 45,748.98 acres in fee-simple title and scenic easements that contain restrictive covenants on 5,907 additional acres. Much of the land adjacent to the Parkway is rapidly changing from rural agricultural and commercial timber use to urban and suburban use. Urban communities, both large and small, lie adjacent to the Parkway boundary. Scenic easements and special use permits provide restricted agricultural uses including grazing, hay, and row cropping. Rights-of-way easements cross the Parkway throughout its entire length.

1.3 PURPOSE AND NEED

Fire has always been an integral component of habitats found throughout the Southeastern United States. The climate of the region promotes fires through seasonal dry periods and frequent thunderstorms that produce lightning. Prior to European settlement the Chickasaw and Choctaw Indians were the primary inhabitants of the Coastal Plain.

Written accounts strongly suggest the use of fire by Indians to burn off woodlands. This was done to encourage the emergence of lush new grasses, relished by free-ranging deer and bison, and to drive wildlife toward hunters in ambush. The flora and fauna of this region have evolved with fire, and many plant communities depend on fire for their continued existence. Fire suppression and landscape fragmentation have led to altered ecosystems and dangerous fuel build-ups across much of the Southeastern United States.

According to fire ecologist Dr. Cecil Frost (1998), "... fire once played a role in shaping all but the wettest, the most arid, or the most fire-sheltered plant communities of the United States."

The Natchez Trace Parkway has approximately 1,000 miles of boundary and its fire history is directly influenced by local land practices. Farmland lies adjacent to 56% of the Parkway's boundary. Fire is commonly used by farmers to burn off their fields to reduce crop stubble and enhance pasture grasses. Many of these fires spread across the park boundary requiring suppression actions to be taken. Fire records at the Natchez Trace Parkway indicate that 2060 fires have burned 34,353 acres on the Parkway from 1938 through 2006¹.

While a natural fire regime no longer exists throughout much of the Southeastern United States, the inherent role of fire is becoming increasingly recognized and incorporated into forest management. The NPS Wildland Fire Management Guidelines (DO-18) state that, "all parks with vegetation that can sustain fire must have a fire management plan." The purpose of this federal action is to develop a fire management plan and program that utilizes the benefits of fire to achieve desired natural and cultural resource conditions while minimizing the fire danger to park resources and adjacent lands from hazardous fuel accumulations. There is a need to manage native plant communities and restore and protect the historic landscape. At the same time, visitors, facilities, and resources on and adjacent to the Parkway must be safeguarded.

1.4 BACKGROUND

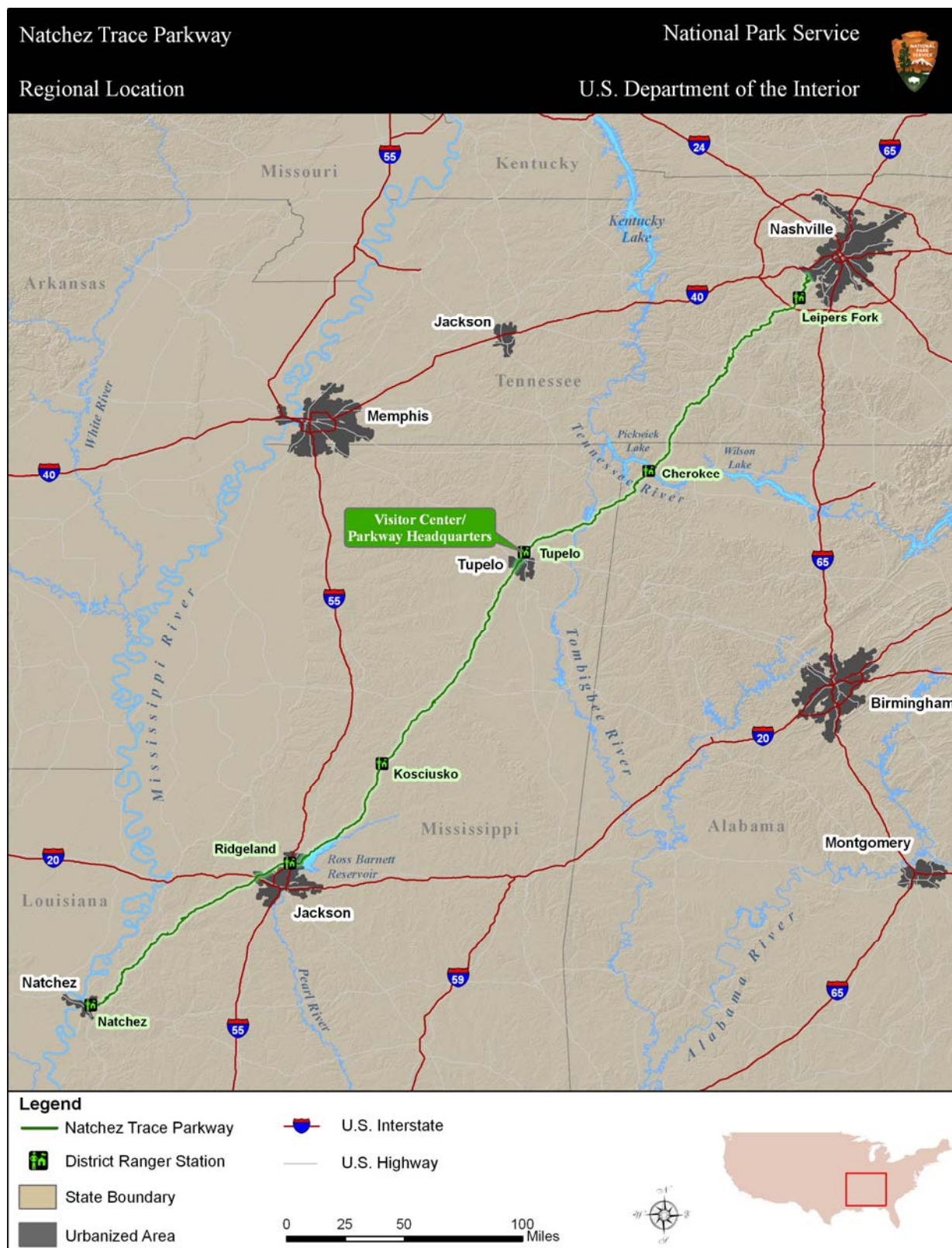
The Natchez Trace was one of the most ancient and important Indian roads leading from present day Nashville, TN in a southwest course across the Tennessee River at Colbert Shoals and through the Chickasaw and Choctaw Indian lands into present day Mississippi. The road continued in an almost direct course through Jackson, Mississippi and terminated at Natchez, Mississippi. The Natchez Trace was made famous for the service it rendered in affording General Jackson a route over which much of his forces moved to take part in Jackson's famous victory over the British at New Orleans. General Jackson then returned with his army over the Natchez Trace to Nashville after the Battle of New Orleans.

¹ Note that this figure includes off-park acres.

The Natchez Trace Parkway was established in 1938 as a unit of the NPS, traversing the states of Mississippi, Alabama, and Tennessee and consisting of six districts; Leipers Fork in Tennessee, Cherokee in Tennessee and Alabama, Tupelo, Kosciusko, Ridgeland, and Natchez in Mississippi (Figure 1-1).

Two broadly defined woodland types are found on Parkway lands. The oak/pine type is dominant in Mississippi with a gradual shift to an oak/hickory dominant in Tennessee. Marshes, canebreaks, savannas, and prairies are found interspersed among the forest associations, providing a diversity of plants and animals. Among the rolling hills and flat bottomlands of the Parkway are found 2530 species of flora and fauna. Numerous cultural and historical structures are also located on Parkway lands.

Figure 1-1 Natchez Trace Parkway



1.5 FIRE MANAGEMENT OBJECTIVES

National Park Service Wildland Fire Management Guidelines (DO-18) require that all parks with vegetation capable of sustaining fire develop a wildland fire management plan. The plan should meet the specific resource management objectives for that park and ensure that firefighter and public safety are not compromised. This guideline identifies fire as the most aggressive natural resource management tool employed by the National Park Service. The guideline further states that all non-structural fires occurring in the wildland are classified as either wildland fires or prescribed fires. Prescribed fires and wildland fire use may be authorized by an approved wildland fire management plan and contribute to a park's resource management objectives. The use of unplanned ignitions (wildland fires) to achieve management objectives will not be utilized on the Natchez Trace Parkway. Due to the narrow linear configuration of the park, maximum allowable areas would be too small to afford effective resource management or fuel reduction benefits.

Wildland is an area in which development is essentially nonexistent, except for roads, railroads, power lines, and similar transportation facilities. Structures, if any, are widely scattered.

Wildland fires are any non-structure fires, other than prescribed fires, that occur in the wildland. This term encompasses fires previously called both wildfires and prescribed natural fires.

Prescribed Fires are any fires ignited by management actions in defined areas under predetermined weather and fuel conditions to meet specific objectives.

Wildland fire use is the management of naturally ignited (*e.g.* lightning) or human-ignited wildland fires to accomplish specific pre-stated resource management objectives in predefined geographic areas outlined in Fire Management Plans.

DO-18 identifies three paramount considerations for each Park's fire management program. They are:

- 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

The purpose of the Fire Management Plan (FMP) is to provide a detailed plan for the management of wildland fire in such a manner as to safely accomplish resource management objectives. Under DO-18, fire activity is divided into two broad categories: wildland fire (including any unplanned ignition, whether natural or human caused) and prescribed fire (fire ignited by management for the purpose of achieving specific, predetermined objectives). Accordingly, this FMP articulates a comprehensive plan for the restoration of a healthy and safe fire environment at Natchez Trace Parkway through the effective and appropriate management of both wildland and prescribed fire.

The Parkway's fire management goals, which follow, incorporate the park's overall management objectives as well as previously-discussed federal fire management

Principle #3 of the 2001 *Federal Fire Policy* states that, "fire management plans, programs, and activities [would] support general and resource management plans and their implementations."

policy principles and goals, including firefighter and public safety, collaboration, and accountability.

This FMP serves as a detailed and comprehensive program of action to implement federal fire management policy principles and goals. As identified in its mission, the NPS Fire Management Program “is dedicated to protecting lives, property and resources while restoring and maintaining healthy ecosystems” (Wildland Fire Management Strategic Plan, 2003-2008). The use of fire is an important tool for meeting this goal. The Parkway’s fire management objectives tie directly to both this national fire program goal and to the Parkway’s resource management goals. General fire management goals for the Parkway, adapted from DO-18, are:

- Achieve maximum overall benefits and minimize damage from wildland fire suppression within the framework of land use objectives and resource management plans, while giving primary consideration to firefighter and public safety.
- Raise employee and public awareness about fire management program goals, objectives, and fire’s role in ecosystem management.
- Maintain the highest standards of professional and technical expertise in planning and safely implementing an effective wildland fire management program.
- Integrate fire management with all other aspects of park management.
- Manage wildland fire incidents in accordance with accepted interagency standards, using appropriate management strategies and tactics and maximize efficiencies realized through interagency coordination and cooperation.
- Scientifically manage wildland fire using best available technology as an essential ecological process to restore, preserve, or maintain ecosystems and use resource information gained through inventory and monitoring to evaluate and improve the program.
- Protect life and property and accomplish resource management objectives, including restoration of the natural role of fire in fire-dependent ecosystems.

1.6 SCOPING ISSUES AND IMPACT TOPICS

1.6.1 Scoping

On January 15, 2008, Natchez Trace Parkway announced to the public its intentions to revise and implement the 2005 Draft Fire Management Plan. The announcements were made through a press release sent via email to approximately 250 organizations, individuals, and newspapers. The press release described the fire management activities outlined in the proposed Fire Management Plan and encouraged the public to provide their comments and concerns regarding the plan to the park via e-mail or written correspondence. The public was also welcomed to visit the park office and speak personally with the appropriate staff members about the plan. The public scoping period ended on February 5, 2008.

1.6.2 Important Issues Raised During Scoping

No comments were received during the public scoping period.

1.6.3 Impact Topics Evaluated in this EA

Impact topics are derived from issues raised during internal and external scoping. Not every conceivable impact of a proposed action is substantive enough to warrant analysis. The following topics, also listed in Table 1-1, below, do merit consideration in this EA.

Soils: Low and moderate-severity fires can benefit soils through a fertilization effect, while high-intensity fires can damage soils. Impacts to soils are therefore analyzed in this EA.

Water Resources (including wetlands and floodplains): NPS policies require protection of water resources consistent with the Federal Clean Water Act. EO 11990 also requires federal agencies to minimize the loss or degradation of wetlands. This policy requires that impacts to wetlands be avoided if possible and may require mitigation if impacts to wetlands are unavoidable.

Thinning treatments, prescribed fires, and wildland fire suppression efforts can adversely impact water quality (sediment delivery, turbidity). Therefore, impacts to water resources, including wetlands and floodplains, are analyzed in this EA.

Vegetation: Thinning treatments, prescribed fires, and wildland fire suppression efforts can impact vegetation communities and rare plant species. Therefore, impacts to vegetation are analyzed in this EA.

Wildlife: There are resident populations of various species of reptiles, amphibians, birds, mammals, fish, and invertebrates that can be adversely and/or beneficially impacted by thinning treatments, prescribed fires, and wildland fire suppression activities. Therefore, impacts to wildlife are evaluated in this EA.

The Federal Endangered Species Act prohibits harm to any species of fauna or flora listed by the U. S. Fish and Wildlife Service (USFWS) as being either threatened or endangered. Such harm includes not only direct injury or mortality, but also disrupting the habitat on which these species depend. The Parkway is a permanent or seasonal home to 14 documented federally- and/or state-listed species. Therefore, impacts to federally- and state-listed T&E species are analyzed in this EA.

Air Quality: The 1970 Federal Clean Air Act stipulates that Federal agencies have an affirmative responsibility to protect a park's air quality from adverse air pollution impacts. All types of fires generate smoke and particulate matter, which can impact air quality within the park and surrounding region. In light of these considerations, air quality impacts are analyzed in this EA.

Visitor Use and Experience (including park operations): The 1916 Organic Act directs the NPS to provide for public enjoyment of the scenery, wildlife and natural and historic resources of national parks, “in such a manner and by such means as would leave them unimpaired for the enjoyment of future generations.” Fire management activities 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. Therefore, potential impacts of the proposed FMP on visitor use and experience are addressed in this EA.

Severe fires can potentially affect operations at national parks, especially in more developed sites like visitor centers, campgrounds, administrative and maintenance facilities. These impacts can occur directly from the threat to facilities of an approaching fire, and indirectly from smoke and the diversion of personnel to firefighting. Fires have caused closures of facilities in parks around the country. Thus, the potential effects of the FMP alternatives on park operations are considered in this EA.

Human Health and Safety: Wildfires can be extremely hazardous, even life-threatening, to humans. Current federal fire management policies emphasize that firefighter and public safety is the first priority and all Fire Management Plans must reflect this commitment (NIFC, 1998). Therefore, impacts to human health and safety are addressed in this EA.

Cultural Resources: Section 106 of the National Historic Preservation Act of 1966, as amended, provides the framework for Federal review and protection of cultural resources, and ensures that they are considered during Federal project planning and execution. There are 441 separate cultural/historical structures or sites and 29 cemeteries, 3 commemorative sites and one National Scenic Trail on Parkway lands. These cultural resources can be affected by fire itself and fire suppression activities, thus potential impacts to cultural resources are addressed in this EA.

1.6.4 Impact Topics Considered but Dropped from Further Analysis

NEPA and the CEQ Regulations direct agencies to “avoid useless bulk...and concentrate effort and attention on important issues” (40 CFR 1502.15). Certain impact topics that are sometimes addressed in NEPA documents on other kinds of proposed actions or projects have been judged to not be substantively affected by any of the FMP alternatives considered in this EA. These topics are briefly described and listed in Table 1-1 below, along with the rationale provided for considering them but dropping them from further analysis.

Noise: Noise is defined as unwanted sound. Fuels reduction, prescribed fires, and fire suppression efforts can all involve the use of noise-generating mechanical tools and devices with engines, such as chain saws, trucks, and tractors. Use of this equipment would be infrequent (on the order of hours, days, or at most weeks per year), and limited to small areas of the Parkway to create defensible spaces around structures. This is not frequent or widespread enough to substantially interfere with human activities in the area or with wildlife behavior. Nor would such infrequent bursts of noise chronically impact the solitude and tranquility associated with the park. Therefore, this impact topic is eliminated from further analysis in this EA.

Waste Management: None of the FMP alternatives would generate substantial quantities of either hazardous or solid wastes that need to be disposed of in hazardous waste or general sanitary landfills. Therefore this impact topic is dropped from additional consideration.

Utilities: Substantial construction work is not proposed under any of the alternatives and, therefore, will not likely impact above and below-ground telephone, electrical, natural gas, water, and sewer lines and cables. Nor will proposed actions exert a substantial, long-term demand on telephone, electrical, natural gas, water, and sewage infrastructure, sources, and service, thereby compromising existing service levels or causing a need for new facilities to be constructed. Therefore, utilities are eliminated from any additional analysis.

Land Use: Visitor and administrative facilities occur within the park. Fire management activities would not affect land uses within the park or in areas adjacent to it. Therefore, land use is not included for further analysis in this EA.

Socio-economics: NEPA 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 community’s overall population, income and employment base. Therefore, this impact topic is dismissed from further analysis.

Transportation: None of the FMP alternatives would substantively affect road, railroad, water-based, or aerial transportation in and around the park. One exception to this general rule would be the temporary closure of nearby roads during fire suppression activities or from smoke emanating from wildland fires or prescribed fires. Over the long term, such closures would not significantly impinge local traffic since they would be both very infrequent, and, in the case of prescribed fire, of short duration (on the magnitude of 1-2 hours). Therefore, this topic is not included for further analysis in this EA.

Environmental Justice/ Protection of Children: Presidential Executive Order 12898 requires Federal agencies to identify and address disproportionate impacts of their programs, policies and activities on minority and low-income populations. Executive Order 13045 requires Federal actions and policies to identify and address disproportionately adverse risks to the health and safety of children. None of the alternatives would have disproportionate health or environmental effects on minorities or low-income populations as defined in the Environmental Protection Agency’s Environmental Justice Guidance. Therefore, these topics are not further addressed in this EA.

Indian Trust Resources: Indian trust assets are owned by Native Americans but held in trust by the United States. Indian trust assets do not occur within the Natchez Trace Parkway and, therefore, are not evaluated further in this EA.

Prime and Unique Agricultural Lands: Prime farmland has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. Unique land is land other than prime farmland that is used for production of specific high-value food and fiber crops. Both categories require that the land is available for farming uses. There are no

prime and unique agricultural lands within the boundaries of the Natchez Trace Parkway; therefore, this impact topic is not evaluated further in this EA.

Wilderness: According to National Park Service Management Policies (2001), proposals having the potential to impact wilderness resources must be evaluated in accordance with National Park Service procedures for implementing the National Environmental Policy Act. Since there are no proposed or designated wilderness areas within or adjacent to the park, wilderness impacts are not further evaluated in this EA.

Resource Conservation, Including Energy, and Pollution Prevention: The National Park Service's *Guiding Principles of Sustainable Design* provides a basis for achieving sustainability in facility planning and design, emphasizes the importance of biodiversity, and encourages responsible decisions. The guidebook articulates principles to be used such as resource conservation and recycling. Proposed project actions would not minimize or add to resource conservation or pollution prevention on the park and, therefore, this impact topic is not evaluated further in this EA.

Table 1-1 Impact Topics for Natchez Trace Parkway Draft FMP EA

Impact Topic	Retained or Dismissed from Further Evaluation	Relevant Regulations or Policies
Soils	Retained	<i>NPS Management Policies 2001</i>
Water Resources (including wetlands and floodplains)	Retained	Clean Water Act; Executive Order 12088; <i>NPS Management Policies</i> ; Executive Order 11988; Executive Order 11990; Rivers and Harbors Act; Clean Water Act; DO 77-1; DO 77-2
Vegetation	Retained	<i>NPS Management Policies</i>
Wildlife	Retained	<i>NPS Management Policies</i> ; Endangered Species Act; Migratory Bird Treaty Act
Air Quality	Retained	Federal Clean Air Act (CAA); CAA Amendments of 1990; <i>NPS Management Policies</i>
Visitor Use and Experience (including park operations)	Retained	<i>NPS Management Policies</i>
Human Health & Safety	Retained	<i>NPS Management Policies</i>
Cultural Resources	Retained	Section 106; National Historic Preservation Act; 36 CFR 800; NEPA; Executive Order 13007; Director's Order #28; <i>NPS Management Policies</i>
Noise	Dismissed	<i>NPS Management Policies</i>
Waste Management	Dismissed	<i>NPS Management Policies</i>
Utilities	Dismissed	<i>NPS Management Policies</i>
Land Use	Dismissed	<i>NPS Management Policies</i>
Socioeconomics	Dismissed	40 CFR Regulations for Implementing NEPA; <i>NPS Management Policies</i>
Transportation	Dismissed	<i>NPS Management Policies</i>
Environmental Justice	Dismissed	Executive Order 12898
Indian Trust Resources	Dismissed	Department of the Interior Secretarial Orders No. 3206 and No. 3175
Prime and Unique Agricultural Lands	Dismissed	Council on Environmental Quality 1980 memorandum on prime and unique farmlands
Wilderness	Dismissed	The Wilderness Act; Director's Order #41; <i>NPS Management Policies</i>
Resource Conservation, Including Energy, and Pollution Prevention	Dismissed	NEPA; <i>NPS Guiding Principles of Sustainable Design</i> ; <i>NPS Management Policies</i>

Chapter 2 Issues and Alternatives

This Chapter describes the range of alternatives, including the Proposed Action and No Action Alternatives, formulated to address the purpose of and need for the proposed project. These alternatives were developed through evaluation of the comments provided by individuals, organizations, governmental agencies, and the Interdisciplinary Team (IDT).

2.1 ALTERNATIVES CONSIDERED BUT NOT ANALYZED FURTHER IN THIS EA

2.1.1 Fire Management Plan to include wildland fire suppression only

CEQ regulations for implementing NEPA require that Federal agencies explore and objectively evaluate all reasonable alternatives to a proposed action, and to briefly discuss the rationale for eliminating any alternatives that were initially considered but not evaluated in detail. A single alternative, implementation of a Fire Management Plan to include wildland fire suppression only, was considered in addition to the No Action and Proposed Action alternatives, but was dismissed from further analysis.

Under this alternative, all human and naturally caused wild fires within the Parkway's boundaries would be suppressed. In addition, prescribed burning or other fire management activities, including debris burns and manual/mechanical fuel treatments, would not be utilized. This alternative was considered, but not in detail because it would not meet 2001 Federal Fire Policy goals to incorporate fire management into the planning process, or previously identified NATR policies to re-establish fire as a natural component of the park ecosystem. In addition, elimination of prescribed burning and fuel treatments from management practices would increase the fire hazard throughout the park and lead to increased risks to human health and safety.

2.2 ALTERNATIVES CONSIDERED AND ANALYZED IN THIS EA

2.2.1 Alternative 1 (No Action Alternative) – Continue to operate under the 2005 Fire Management Plan

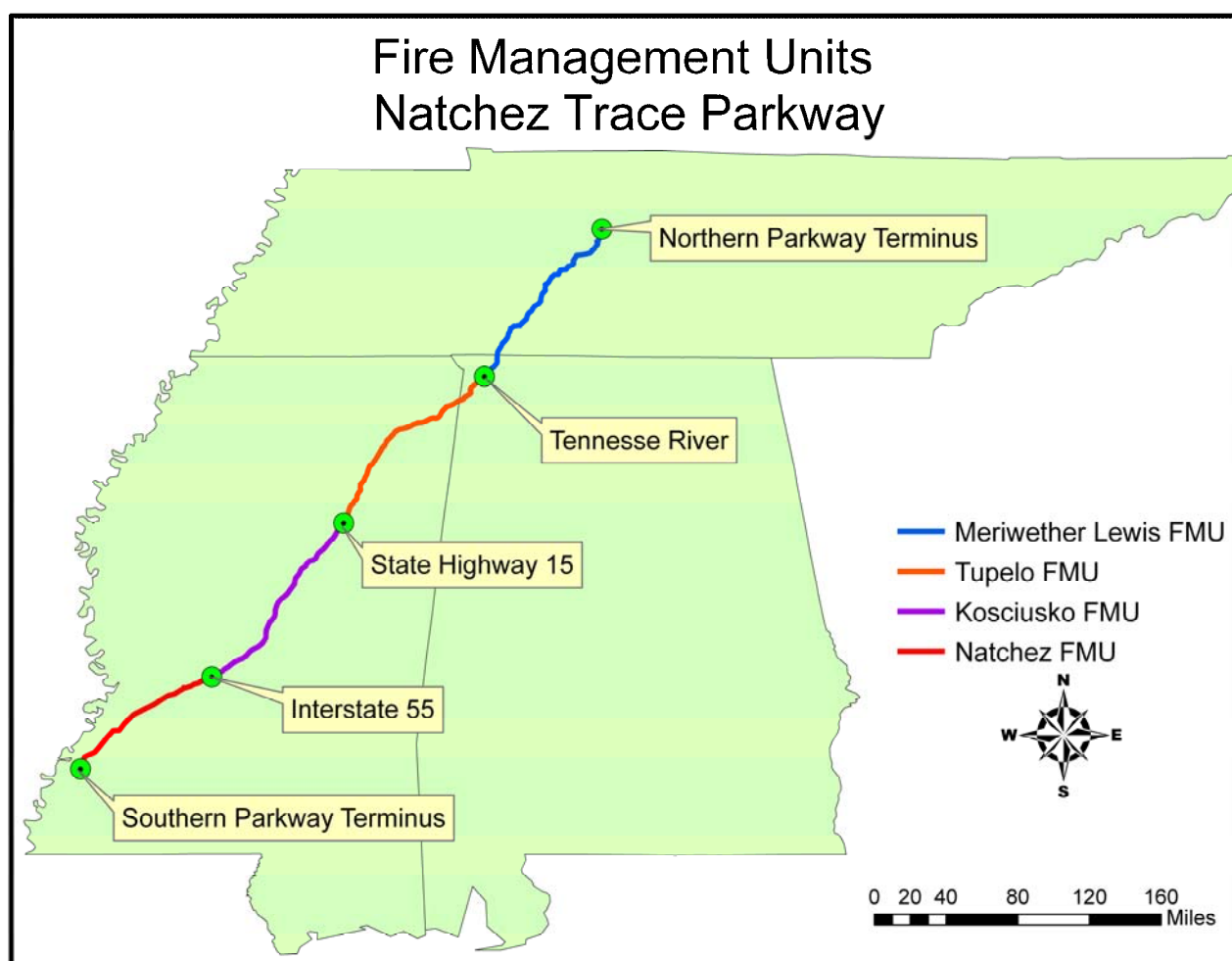
The No Action alternative, required by NEPA, assumes “no change” from current conditions or management, and provides a baseline for comparing the effects of action alternatives. Currently, fire management at the Parkway is regulated by the 2005 FMP, which serves as an implementation document to the 1997 NATR Resource Management Plan. Under this alternative, all wildland fires would be suppressed. In addition, hazard fuels accumulations would be managed with prescribed fires and manual or chemical treatments.

The Natchez Trace Parkway is unique in that it has been divided into two broad Fire Planning Units (FPUs) within the Fire Management Plan, the North Mississippi FPU, and the Tennessee/Green

River FPU. Each FPU is further divided into Fire Management Units. The three southernmost Fire Management Units of Natchez, Kosciusko, and Tupelo belong to the North Mississippi FPU, while the northernmost Meriwether Lewis Fire Management Unit belongs to the Tennessee/Green River FPU (Figure 2-1).

Beginning at the southern end of the parkway, the Natchez Fire Management Unit starts in Natchez and ends at Interstate 55. The Kosciusko Fire Management Unit starts at Interstate 55 and ends at Highway 15. The Tupelo Fire Management Unit starts at Highway 15 and ends at the Tennessee River. The northernmost unit is the Meriwether Lewis Fire Management Unit (a subset of the Tennessee/Green Rivers Fire Planning Unit) which begins at the Tennessee River and ends at the northern terminus of the Parkway.

Figure 2-1 Fire Management Units on the Natchez Trace Parkway



The management objectives for each unit are as follows (detailed descriptions of each unit are provided under the Proposed Action alternative):

Objective 1: Protect life, property, and park resources from the effects of unwanted fire

Objective 2: Manage fuels to meet management objectives

Objective 3: Prevent adverse impacts from fire suppression

Implementation of these objectives includes the following management actions:

Wildland Fire Suppression

All wildland fires would receive initial attack action and be totally suppressed using the appropriate management response (AMR). The AMR is variable, dependent upon many factors, such as values to be protected, management objectives, external concerns, and land use. Therefore, the specific response must be formally assessed for each event, also taking into account firefighter and public safety and estimated cost of suppression. The Incident Commander will develop the AMR as part of the size-up process by analyzing the current situation and expected fire weather (NPS, 2001). Minimum impact suppression tactics (MIST) would also be utilized in all wildland fire events.

Prescribed Fire

Prescribed fire is one of the preferred strategies for achieving the Park's resource management objectives and for managing hazard fuels. Prescribed fire would be used where appropriate to protect life, property, and park resources from the effects of unwanted fire and to manage ecosystems and associated fuels to meet management objectives. Under the No Action alternative, approximately 600-1100 acres would be prescribed burned on NATR each year. Prescribed burning activities would include all associated chemicals, drip torch fuel, and gas gel. Helicopters and all-terrain vehicles may also be used for ignition purposes. Specifically, prescribed fire will be used to accomplish the following:

- Reduce hazard fuel loadings.
- Improve endangered species habitat (e.g. Tennessee purple coneflower).
- Maintain vistas
- Restore/maintain historic scenes (pine stands, fields, and prairies).
- Manage and/or restore native ecosystems and control non- native species.
- Manage pests using integrated pest management (southern pine bark beetle).
- Replicate the effects of natural fires.

Non-Fire Applications

There are two significant issues that will affect the Parkway's ability to use prescribed fire. First, the narrow geometry of the park results in burns that are smaller than 50 acres, and this increases treatment cost per acre. Secondly, the urban interface and development along the Parkway increases the smoke management complexity of the burns. In cases where both of these issues prohibit prescribed fire, non-fire treatments may be applied. Mechanical and chemical treatments of overstocked stands or exotic species may be more practical than prescribed fire. Specifically, bobcats, tractors, and chippers would be used to remove dead and downed fuels in wildland-urban interface areas, and chainsaws and brushcutters would be used to thin stands and restore prairie lands. Logging of approximately 100 acres per year of storm and pine beetle damaged trees with knuckleboom trucks, skidders, and dozers would also occur. Pile burning of woody debris would be conducted to reduce fuel hazards, and use of chemical herbicides would aid in resource management and reduction of exotic species.

Wildland Fire Use

The use of unplanned ignitions (wildland fires) to achieve management objectives will not be utilized on the Natchez Trace Parkway. Due to the narrow linear configuration of the park, Maximum Allowable Areas would be too small to afford effective resource management or fuel reduction benefits.

2.2.2 Alternative 2 (Proposed Action) – Implement updated and revised FMP

The Fire Planning Units and Fire Management Units at NATR have not changed since establishment of the 2005 FMP. Fire management goals and objectives at the Parkway have largely remained the same as well. Some additional fire management activities have been proposed to achieve these goals and objectives. Current fire management objectives include:

Wildland Fire Suppression

All wildland fires would receive initial attack action and be totally suppressed using the appropriate management response (AMR). The AMR is variable, dependent upon many factors, such as values to be protected, management objectives, external concerns, and land use. Therefore, the specific response must be formally assessed for each event, also taking into account firefighter and public safety and estimated cost of suppression. The Incident Commander will develop the AMR as part of the size-up process by analyzing the current situation and expected fire weather (NPS, 2001). Minimum impact suppression tactics (MIST) would also be utilized in all wildland fire events.

Tractor plows have been used in rare circumstances on prior occasions in already disturbed areas such as rights-of-way and agricultural lease tracts. Under the Proposed Action alternative they would also be utilized for protection of high value risks including structures. Aerial suppression methods, including fire retardants and foam may also be considered for use under the Proposed Action alternative.

Prescribed Fire

Prescribed fire is one of the preferred strategies for achieving the park's resource management objectives and for managing hazard fuels. Prescribed fire would be used where appropriate to protect life, property, and park resources from the effects of unwanted fire and to manage ecosystems and associated fuels to meet management objectives. Under the Proposed Action alternative, prescribed burning activities would increase to approximately 2500 acres per year. Prescribed burning activities would include all associated chemicals, drip torch fuel, and gas gel. Helicopters and all-terrain vehicles may also be used for ignition purposes. Specifically, prescribed fire will be used to accomplish the following:

- Reduce hazard fuel loadings.
- Improve endangered species habitat (e.g. Tennessee purple coneflower).
- Maintain vistas
- Restore/maintain historic scenes (pine stands, fields, and prairies).
- Manage and/or restore native ecosystems and control non- native species.
- Manage pests using integrated pest management (southern pine bark beetle).

- Replicate the effects of natural fires.

Non-Fire Applications

There are two significant issues that will affect the Parkway's ability to use prescribed fire. First, the narrow geometry of the park results in burns that are smaller than 50 acres, and this increases treatment cost per acre. Secondly, the urban interface and development along the Parkway increases the smoke management complexity of the burns. In cases where both of these issues prohibit prescribed fire, non-fire treatments may be applied. Mechanical and chemical treatments of overstocked stands or exotic species may be more practical than prescribed fire. Specifically, bobcats, tractors, and chippers would be used to remove dead and downed fuels in wildland-urban interface areas, and chainsaws and brushcutters would be used to thin stands and restore prairie lands. Logging of approximately 100 acres of storm and pine beetle damaged trees with knuckleboom trucks, skidders, and dozers would also occur. Pile burning of woody debris would be conducted to reduce fuel hazards, and use of chemical herbicides would aid in resource management reduction of exotic species.

Under the Proposed Action alternative, minor thinning would be conducted in overstocked pine stands to reduce hazardous fuel accumulations. Mastication using a Gyro-Trac, timber ax, or brush hog would also reduce hazardous fuels and invading shrub layers such as privet or dwarf palmetto. These activities would occur on approximately 200 acres of vegetation per year.

Wildland Fire Use

The use of unplanned ignitions (wildland fires) to achieve management objectives will not be utilized on the Natchez Trace Parkway. Due to the narrow linear configuration of the park, Maximum Allowable Areas would be too small to afford effective resource management or fuel reduction benefits.

Fire Planning Units

North Mississippi Fire Planning Unit

This is the largest FPU (37,933 acres) in the park. This unit includes the Natchez, Kosciusko, and Tupelo Fire Management Units.

Fire Ecology of the MS FPU

There are more than 40 forest alliances along the Parkway, as identified by the preliminary vegetation classification (NatureServe, 2004). Although vegetation mapping is not complete at the time of this writing, completion is expected by 2009. Generally, the Mississippi FPU consists primarily of pine-hardwood and loblolly/shortleaf pine forests with some bottomland hardwood stands. There are also many agricultural fields and old fields succeeding into brush. Refer to the Fire Monitoring Plan (Appendix H of Draft FMP) and park vegetation classification (NatureServe, 2004) for more detailed information.

Fire occurrence in this unit is high (average of 17 fires/year). Debris burning ("controlled burns" that escape or are left unattended) off the park is the primary cause of the high occurrence rate.

Although this practice appears to be a common cultural practice that is decreasing, overall occurrence of "controlled burns" remains high. From 1996-2006, there were 167 fires, totaling 680 acres.

Lightning fires are not considered as large a threat as human-caused fires because heavy rain usually occurs during severe thunderstorms, thereby preventing lightning ignitions from becoming larger fires. Human-caused fire was the major environmental force shaping this unit's ecosystem. There is widespread recognition that fires played a major role in maintaining pine- and oak-dominated communities in the eastern United States before European settlement (Brewer, 2001). Widespread and frequent fires created the historic landscape of savannas, prairies, and canebrakes that has all but disappeared with the advent of fire suppression.

The majority of the forested systems in the MS FPU had frequent, low intensity surface fire. Intense fires likely occurred in drought years. Therefore, drought and moist cycles strongly influenced fire frequency and intensity (Rapid Assessment Reference Condition Model, 2005b). Disturbances in addition to fire, such as insect infestations and ice storms, have also contributed to stand structure and therefore can affect fire management. Average fire return interval for these systems is estimated at 4-8 years. Because of past fire suppression and invasion of exotic species, the majority of this FMU is estimated to be in Fire Regime Condition Class 2.

Tennessee/Green Rivers Fire Planning Unit

The Tennessee/Green Rivers Fire Planning Unit (TN FPU) contains one Natchez Trace Fire Management Unit, referred to as the Meriwether Lewis Fire Management Unit. The Meriwether Lewis FMU covers 13,290 acres.

Fire Ecology of the TN FPU

The unit consists primarily of oak-hickory forests with some occasional occurrence of shortleaf pine, cedar, or beech. Agricultural fields and old fields succeeding into brush are also present. Because most of this FPU is dominated by oak-hickory forest, fire occurrence in this unit is moderate (average of 4 fires/year). Debris burning off the park is the primary fire cause. Fires in this unit have the potential to be more damaging to park resources due to steep slopes and the presence of species that are less fire-tolerant. Refer to the Fire Monitoring Plan (Appendix H) and park vegetation classification (NatureServe, 2004) for more detailed information.

Historic fire occurrence in this unit was lower than in the southern units due to fewer thunderstorms and precipitation that was generally more evenly distributed throughout the year, but fire was still a major influence on vegetation. From 1996-2006, there were 31 fires, totaling 95 acres. Although forest vegetation would have been fairly similar to southern units in species composition, stand composition (basal area) would have been much less with greater numbers of savannas, canebrakes, and small grasslands/prairies. Historically, the oak-hickory forest is characterized by a fire regime of low-severity surface fires. Studies suggest that the fire interval for an oak-dominated forests may be 20 years or less (Schuler and McClain, 2003). When fire return intervals span several decades, shade-tolerant, late-successional species tend to invade. Native American fires historically accounted for more than 95% of the ignitions in oak-hickory landscapes, and aided in the

maintenance of associated grasslands (Rapid Assessment Reference Condition Model, 2005). Oak-hickory forests of the TN FPU are intermixed with areas of more moist, midslope forests (less fire-dependent), and with drier oak-pine forests (more fire-dependent). Much of the TN FPU is likely in Fire Regime Condition Class 1. However, areas that are uncharacteristically dense due to fire suppression, and areas that have been invaded with exotic species can be classified as Fire Regime Condition Class 2. Please refer to the Parkway's Fire Monitoring Plan for more information (Appendix H).

2.2.3 Environmentally Preferred Alternative

The National Park Service is required to identify the environmentally preferred alternative(s) for any of its proposed projects, which is the alternative that would promote the national environmental policy expressed in NEPA (Section 101 (b)). This includes alternatives that:

- 1) Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
- 2) Ensure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings;
- 3) Attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;
- 4) Preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice;
- 5) Achieve a balance between population and resource use that would permit high standards of living and a wide sharing of life's amenities; and
- 6) Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

In essence, the environmentally preferred alternative would be the one(s) 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" (CEQ, 1978).

In this case, Alternative 2 is the environmentally preferred alternative for the Natchez Trace Parkway since it best meets goals 1, 2, 3, and 4 described above. Fire management activities would restore and maintain native plant communities in the park, mimic the natural ecological processes, and help protect park resources and adjacent lands from the threat of wildfires. Finally, Alternative 2 best protects and helps preserve the historic, cultural, and natural resources of the park for current and future generations.

2.3 MITIGATION MEASURES AND MONITORING

NPS Fire Monitoring Handbook

The NPS has established a well-defined set of monitoring protocols and recommended standards that are useful in the development of a monitoring program. These guidelines and methods are presented in the *NPS Fire Monitoring Handbook* (USDI NPS 2001). The fire effects monitoring program established at NATR follows the guidelines and recommendations described in the *NPS Fire Monitoring Handbook* with some modifications.

Recommended Standard Monitoring Levels

FMH 2001 provides recommended standards, divided into four monitoring levels, which constitute the lowest level of fire monitoring to be conducted by NPS units. Table 2-1 illustrates how these monitoring levels correspond to the given management strategy.

Table 2-1 Management Strategies and Recommended Standard (RS) Monitoring Levels

Management Strategy	RS Level
Suppression: All management actions are intended to extinguish or limit the growth of a fire.	1. Environmental 2. Fire observation -Reconnaissance -Fire conditions
Prescribed fire: Management uses intentionally set fires as a management tool to meet specific objectives.	1. Environmental 2. Fire observation -Reconnaissance -Fire conditions 3. Short-term change 4. Long-term change

Bold face print in RS level column indicates mandatory monitoring for the given management strategy.

Wildland and Prescribed Fire Monitoring

The fire effects monitor (FEMO) assigned to the prescribed fire will perform Level 1 and 2 monitoring. Results of this monitoring will be provided in a FEMO report, which is completed shortly after the prescribed fire. The fire effects crew and fire ecologist will be responsible for Levels 3 and 4 monitoring. In particular, the fire ecologist is responsible for analysis and dissemination of monitoring data to management. Such information will be used to determine if, and to what extent, burn objectives were met. This process will be repeated and modified so that operational practices and the prescribed fire prescription can be modified to create the greatest probability of meeting objectives. Refer to the Natchez Trace Parkway Fire Monitoring Plan (Appendix H of the Draft FMP) for further information regarding monitoring.

Environmental monitoring provides a basic level of data that can be collected before a burn event, and may consist of basic environmental monitoring data already being taken in a park.

Examples of environmental monitoring include weather, fire danger rating, fuel conditions, resource availability, protection of structures and values, historical and archeological data, as well as other biological, geographical, geological and social data. Fire observation monitoring provides a physical description of a fire event. Data collected for fire observation monitoring include fire cause, ignition point, fire location and size, logistical information, fuels and vegetation descriptions, current and predicted fire behavior, fire spread potential, current and forecasted weather events, resource threats, safety concerns, and smoke volume and movement measures.

Short- and long-term levels of monitoring require more detailed descriptive measures of fuel and vegetation changes in response to management actions within specific monitoring types that provide a quantitative assessment of whether a management objective was met. While both short- and long-term monitoring may use similar measurement protocols, they differ in timing and emphasis. Short-term monitoring can be effective in management programs with short-term objectives but may be extended to long-term monitoring if trends or longer-term response changes are of interest. Both short- and long-term monitoring are required for a prescribed fire program.

Monitoring and evaluating the effects of fire upon Parkway lands is critical for determination of whether fuels treatments are meeting management objectives. This data, along with information gathered through research studies, will be used to improve the effectiveness of the fire management program. Fire prescriptions are written to permit fire to maintain or restore natural processes within the environment, and to be used as a tool to achieve park management objectives. Prescriptions will be developed by Burn Bosses based on training, research, and the experience of cooperators with extensive prescribed fire programs, and refined based on the results of fire effects monitoring.

2.4 IMPACT DEFINITIONS

Table 2-2 depicts the impact definitions used in this Environmental Assessment. Significant impact thresholds for the various key resources were determined in light of compliance with existing state and federal laws, and compliance with existing Natchez Trace Parkway planning documents.

Table 2-2 Impact Definitions

Key Resources	“Minor” Impact	“Moderate” Impact	“Major” Impact	Duration
Soils	The effects to soils would be detectable, but likely short-term. Damage to or loss of the litter/humus layers that cause slight localized increases in soil loss from erosion; effects to soil productivity or fertility would be small, as would the area affected; short-term and localized compaction of soils that does not prohibit re-vegetation. If mitigation were needed to offset adverse effects, it would be relatively simple to implement and likely successful.	The effect on soil productivity or fertility would be readily apparent, long term, and result in a change to the soil character over a relatively wide area; fire severe enough to cause a noticeable change in soil community; intermittent areas of surface sterilization of soils that may cause some long term loss of soil productivity that may alter a portion of the vegetation community; short-to long-term and localized compaction of soils that may prohibit some re-vegetation. Mitigation measures would probably be necessary to offset adverse effects and would likely be successful.	The effect on soil productivity or fertility would be readily apparent, long-term, and substantially change the character of the soils over a large area inside and outside of the park. Damage to or loss of the litter/ humus layers that would increase soil loss from erosion on a substantial portion of the burn area; fire severe enough to cause substantial damage to the soil community; substantial surface sterilization of soils that may cause long term loss of soil productivity and that may alter or destroy the vegetation community over most of the burned area; long-term and widespread soil compaction that affects a large number of acres and prohibits re-vegetation. Mitigation measures to offset adverse effects would be needed, they may be extensive, and their success could not be guaranteed.	<p><u>Short Term</u> Recovers in less than 3 years</p> <p><u>Long Term</u> Takes more than 3 years to recover</p>

Key Resources	“Minor” Impact	“Moderate” Impact	“Major” Impact	Duration
Water Resources (Including Wetlands and Floodplains)	Changes in water quality would be measurable, although small, likely short-term, and localized; localized and indirect riparian impacts that do not substantively increase stream temperatures or affect stream habitats; no alteration of natural hydrology of wetlands. A U.S. Army Corps of Engineers 404 permit would not be required; no filling or disconnecting of the floodplain; short-term impacts that do not affect the functionality of the floodplain. No mitigation measures associated with water quality would be necessary.	Changes in water quality would be measurable and long-term but would be relatively local; localized and indirect riparian impacts that may slightly increase stream temperatures or affect stream habitats; alteration of natural hydrology of wetlands would be apparent such that an U.S. Army Corps of Engineers 404 permit could be required; alteration of the floodplain apparent. Wetland or floodplain functions would not be affected in the long-term. Mitigation measures associated with water quality or hydrology would be necessary and the measures would likely succeed.	Changes in water quality would be readily measurable, would have substantial consequences, and would be noticed on a regional scale; localized and indirect riparian impact that may substantively increase stream temperatures or affect stream habitats; effects to wetlands or floodplains would be observable over a relatively large area would be long-term, and would require a U.S. Army Corps of Engineers 404 permit; filling or disconnecting of the floodplain; long-term impacts that affect the functionality of the floodplain. Mitigation measures would be necessary and their success would not be guaranteed.	<p><u>Short Term</u> Recovers in less than 1 year</p> <p><u>Long Term</u> Takes more than 1 year to recover</p>
Vegetation	Temporarily affect some individual native plants and would also affect a relatively small portion of that species’ population; short-term changes in plant species composition and/or structure, consistent with expected successional pathways of a given plant community from a natural disturbance event; increase in invasive species in limited locations; occasional death of a canopy tree; mitigation to offset adverse effects, including special measures to avoid affecting species of special concern, could be required and would be effective.	The effect on some individual native plants along with a sizeable segment of the species’ population in the long-term and over a relatively large area; long-term changes in plant species composition and/or structure, consistent with expected successional pathways of a given plant community from a natural disturbance event; widespread increase in invasive species that does not jeopardize native plant communities; repeated death of canopy trees; mitigation to offset adverse effects could be extensive, but would likely be successful; some species of special concern could also be affected.	Considerable long-term effect on native plant populations, including species of special concern, and affect a relatively large area in and out of the park; violation of the Endangered Species Act of 1973; widespread increase in invasive species that jeopardizes native plant communities; mitigation measures to offset the adverse effects would be required, extensive, and success of the mitigation measures would not be guaranteed.	<p><u>Short Term</u> Recovers in less than 3 years</p> <p><u>Long Term</u> Takes more than 3 years to recover</p>

Key Resources	“Minor” Impact	“Moderate” Impact	“Major” Impact	Duration
Wildlife	Temporary displacement of a few localized individuals or groups of animals; mortality of individuals of species not afforded special protection by state and/or federal law; mortality of individuals that would not impact population trends; mitigation measures, if needed to offset adverse effects, would be simple and successful.	Effects to wildlife would be readily detectable, long-term and localized, with consequences affecting the population level(s) of specie(s). Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.	Effects to wildlife would be obvious, long-term, and would have substantial consequences to wildlife populations in the region; violation of the Endangered Species Act of 1973; mortality of a number of individuals that subsequently jeopardizes the viability of the resident population; extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.	<p><u>Short Term</u> Recovers in less than 1 year</p> <p><u>Long Term</u> Takes more than 1 year to recover</p>
Air Quality	Changes in air quality would be measurable, although the changes would be small, short-term, and the effects would be localized; temporary and limited smoke exposure to sensitive resources. No air quality mitigation measures would be necessary.	Changes in air quality would be measurable, would have consequences, although the effect would be relatively local; all air quality standards still met; short-term exposure to sensitive resources. Air quality mitigation measures would be necessary and the measures would likely be successful.	Changes in air quality would be measurable, would have substantial consequences, and be noticed regionally; violation of state and federal air quality standards; violation of Class II air quality standards; prolonged smoke exposure to sensitive receptors. Air quality mitigation measures would be necessary and the success of the measures could not be guaranteed.	<p><u>Short Term</u> Recovers in 7 days or less</p> <p><u>Long Term</u> Takes more than 7 days to recover</p>

Key Resources	“Minor” Impact	“Moderate” Impact	“Major” Impact	Duration
Visitor Use & Experience	Temporary displacement of recreationists, or closure of trails and recreation areas during off-peak recreation use; temporary or short-term alteration of the vista, or temporary presence of equipment in localized area; smoke accumulation during off-peak recreation use. The visitor would be aware of the effects associated with the alternative, but the effects would be slight.	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.	Permanent closure of trails and recreation areas; conflict with peak recreation use; long-term change in scenic integrity of the vista; substantive smoke accumulation during peak recreation use. The visitor would be aware of the effects associated with the alternative and would likely express a strong opinion about the changes.	<p><u>Short Term</u> Occurs only during the treatment effect</p> <p><u>Long Term</u> Occurs after the treatment effect</p>
Human Health & Safety	The effect would be detectable and short-term, but would not have an appreciable effect on public health and safety; potential for small injuries to any worker or visitor (e.g. scrapes or bruises); limited exposure to hazardous compounds or smoke particulates at concentrations below health-based levels. If mitigation were needed, it would be relatively simple and likely successful.	The effects would be readily apparent and long-term, and would result in substantial, noticeable effects to public health and safety on a local scale; non-life threatening injuries to any worker or visitor; limited exposure to hazardous compounds or smoke particulates at concentrations at or slightly above health-based levels. Mitigation measures would probably be necessary and would likely be successful.	The effects would be readily apparent and long-term, and would result in substantial noticeable effects to public health and safety on a regional scale. Serious life-threatening injuries to any worker or member of the public; limited or prolonged exposure to hazardous compounds or smoke particulates at concentrations well above health-based levels. Extensive mitigation measures would be needed, and their success would not be guaranteed.	<p><u>Short Term</u> Occurs only during the treatment effect</p> <p><u>Long Term</u> Occurs after the treatment effect</p>

Key Resources	“Minor” Impact	“Moderate” Impact	“Major” Impact	Duration
Cultural Resources	For archeological resources, the impact affects an archeological site(s) with modest data potential and no significant ties to a living community’s cultural identity Temporary, non-adverse effects to registered cultural resource sites, eligible cultural resource sites, sites with an undetermined eligibility, and traditional cultural properties; no affect to the character defining features of a National Register of Historic Places eligible or listed structure, district, or cultural landscape.	For archeological resources, the impact affects an archeological site(s) with high data potential and no significant ties to a living community’s cultural identity; temporary adverse effects to registered cultural resource sites, eligible cultural resource sites, sites with an undetermined eligibility, and traditional cultural properties, but would not diminish the integrity of the cultural resource to the extent that its National Register eligibility is jeopardized.	For archeological resources, the impact affects an archeological site(s) with exceptional data potential or that has significant ties to a living community’s cultural identity; long-term adverse impacts to registered cultural resource sites, eligible cultural resource sites, sites with an undetermined eligibility, and traditional cultural properties that would diminish the integrity of the cultural resource to the extent that its National Register eligibility is jeopardized.	<p><u>Short term</u> Treatment effects on the natural elements of a cultural landscape (e.g., three to five years until new vegetation returns)</p> <p><u>Long term</u> Because most cultural resources are non-renewable, any effects would be long term</p>
Park Operations	The effect would be detectable and likely short-term, but would be of a magnitude that would not have an appreciable effect on park operations; short term suspension of non-critical park operations; negligible impact to park buildings and structures If mitigation were needed to offset adverse effects, it would be relatively simple and likely successful.	The effects would be readily apparent, be long-term, and would result in a substantial change in park operations in a manner noticeable to staff and the public; long term suspension of all park operations (1 to 2 days); detectable adverse impacts to park buildings and structures; mitigation measures would probably be necessary to offset adverse effects and would likely be successful	The effects would be readily apparent, long-term, would result in a substantial change in park operations in a manner noticeable to staff and the public and be markedly different from existing operations; prolonged suspension of all park operations; substantial adverse impacts to park buildings and structures; mitigation measures to offset adverse effects would be needed, would be extensive, and their success could not be guaranteed.	<p><u>Short term-</u> Effects lasting for the duration of the treatment action</p> <p><u>Long term-</u> Effects lasting longer than the duration of the treatment action.</p>

2.5 COMPARISON OF ALTERNATIVES

Table 2-3 briefly summarizes the environmental effects of the various alternatives. It provides a brief comparison of how well the alternatives respond to the project need, objectives, important issues and impact topics. Chapter 3 outlines the environmental consequences of each of the alternatives in detail.

Table 2-3 Comparison of Alternatives

Impact Topics	Alternative 1 - No Action Alternative	Alternative 2 – Implement updated and revised FMP
Geology and Soils	Very minor, localized, short-term soil compaction and erosion impacts resulting from fuels treatments and fire suppression activities; benefits to soil development and soil nitrification with prescribed fire use	Minor, localized, short-term soil compaction and erosion impacts resulting from fuels reduction and fire suppression activities; increased use of tractors for suppression and mastication would contribute to additional impacts; benefits to soil development and soil nitrification with prescribed fire use
Water Resources (including floodplains)	Minor, localized impacts from soil erosion	Minor, localized impacts from soil erosion; short and long-term impacts if fire retardants or foams are misapplied or mishandled; increased use of tractors for suppression and mastication would contribute to additional impacts; prescribed fires would have no direct general impact
Vegetation	Minor, short-term, adverse impacts to plants due to suppression and fuel treatment activities; fuel loadings reduced; fire management activities resulting in ground disturbance could result in the spread of invasive exotic plants; plant habitat and diversity improved in long-term with prescribed fire use	Minor, short-term, adverse impacts to plants due to suppression and maintenance activities; fuel loadings reduced; fire management activities resulting in ground disturbance could result in the spread of invasive exotic plants; plant habitat and diversity improved in long-term with prescribed fire use

Impact Topics	Alternative 1 - No Action Alternative	Alternative 2 – Implement updated and revised FMP
Wildlife	Suppression, debris burns, fuels treatment, and prescribed burn activities would temporarily displace and result in minor adverse impacts to some wildlife species; individual mortality of some species likely; long-term beneficial impacts on some species	Suppression, debris burns, fuels treatment, creation of fire break, and prescribed burn activities would temporarily displace and result in minor adverse impacts to some wildlife species; individual mortality of some species likely; long-term beneficial impacts on some species
Air Quality	Very minor and temporary impacts due to prescribed fire and heavy equipment usage; minor smoke impacts on sensitive receptors (e.g. private residences)	Very minor and temporary impacts due to prescribed fire and heavy equipment usage; minor smoke impacts on sensitive receptors (e.g. private residences);
Visitor Use and Experience (including Park Operations)	Minor, temporary, and short-term impacts on visual resources and visitor use and experience during prescribed burn activities (e.g. trail or road closures, presence of work crews in the vista); temporary effect on park operations	Minor, short-term impacts on visual resources and visitor use and experience during fuels treatments and prescribed burn activities (e.g. trail or road closures, presence of work crews in the vista); temporary effect on park operations
Human Health & Safety	Potential for injury to workers conducting suppression, fuels reduction, and prescribed burn activities; very minor exposure to smoke by workers and the public during prescribed burns	Potential for injury to workers conducting suppression, fuels reduction, and prescribed burn activities; very minor exposure to smoke by workers and the public during prescribed burns
Cultural Resources	No impact to known cultural resources	No direct impact to known cultural resources; cultural landscape benefits from vegetation maintenance

Chapter 3 Environmental Analysis

This chapter summarizes the existing environmental conditions and the probable environmental consequences (effects) of implementing the No-Action and Proposed Action alternatives. This chapter also provides the scientific and analytical basis for comparing the alternatives. The probable environmental effects are quantified where possible; where not possible, qualitative descriptions are provided. Descriptions of the Affected Environments for the various impact topics were taken from the Parkway's 1978 Final Environmental Statement, 1987 General Management Plan, 1997 Resource Management Plan, 2004 Natural Resources Summary, and other relevant documents.

3.1 SOILS AND GEOLOGY

3.1.1 Affected Environment

Tennessee

The Tennessee section of the Parkway crosses the Highland Rim which is a broad peneplain that slopes gently westward from an elevation of 1,000 feet at the foot of the Cumberland Mountains to an elevation of 600-800 feet near the western Tennessee River Valley. The rim entirely surrounds the oval depression of the Central Basin or "Blue Grass" region of Tennessee. Its edges are dissected by streams into steeply rounded hills and spurs.

The blue phosphate deposits of Tennessee underlie the eastern portion of the Western Highland Rim in Hickman and parts of Lewis and Maury Counties. The deposits crop out along the sides of the narrow valleys of the streams, such as Swan Creek, that have dissected part of the rim. Brown phosphate occurs in the western portion of the Central Basin adjacent to the Highland Rim.

The surface stratum of the Western Highland Rim is the Fort Payne chert. This is a formation of angular gravel, silt, and clay. Below the Fort Payne chert are numerous limestone formations in which the phosphate rock is sandwiched. Limestone in the area forms the Nashville Dome, and quantities are readily available for use as building materials, both crushed as aggregate and as cut building stones.

Alabama and Mississippi

These Parkway sections are in the area of Upper Coastal Plain soils. The major geologic structures are the Eutaw formation, which surfaces in the western portion of the area, and the Tuscaloosa formation which surfaces in the eastern portion of the area. The surface materials from the two formations are sands, gravel, and clays forming the Cuthbert, Ruston, Colbert Clay, and Guinn soil associations. The Eutaw and Tuscaloosa are the parent materials for these associations and, except along streams and sharp breaks, does not surface.

Developed mineral resources in the area are sand and gravel deposits, casting sand deposits, limestone quarry, building sandstone quarry, and asphaltic limestone deposits. No oil, gas, or coal has been discovered in the area. No mineral resources are located within existing Parkway

property, except a small abandoned stone quarry. This quarry was a marginal operation used infrequently prior to Parkway acquisition.

A portion of the Parkway is located in the Jackson Prairie soils area. The primary soil association is the Yazoo clay. The land surface is slightly rolling with slopes 0 to 4 percent bisected with several small streams (branches) that dry up during the summer.

3.1.2 Environmental Consequences

Soil impacts were qualitatively assessed using soil characteristics, literature reviews, and in light of mitigation measures.

3.1.2.1 Alternative 1 (No Action)

Activities with the potential to impact soils under the No Action Alternative include building and maintaining fire lines; the use of heavy equipment to contain and control wild fires; thinning activities; excessive use of water during wildland fire suppression activities; and the use of prescribed burning. Minor and localized soil compaction would occur from wildfire suppression and thinning activities, and vehicle use would be restricted primarily to existing roads. Fire line construction and excessive use of water during wildland fire suppression would result in soil disturbance and could lead to increased erosion. During all suppression activities, Minimum Impact Suppression Tactics (MIST) would be incorporated to the greatest extent possible, employing methods least damaging to park resources for the given situation. For example, to minimize potential soil impacts, hand lines would be located outside of highly erosive areas, and other sensitive areas, and would use natural barriers (*e.g.* trails, roads) to the greatest extent possible. Following fire suppression activities, fire lines would be re-contoured, water barred, and possibly seeded with native plant species.

Fuels treatments such as manual and mechanical thinning and removal of dead or downed woody debris (*e.g.* chainsaws, mowers, hand tools) would be utilized to simulate natural fire effects, reduce fuel loads, and pretreat for prescribed fire use. This limited amount of manual and mechanical thinning would result in only minor and localized soil compaction and soil erosion. Use of herbicides to control exotic species would be conducted via broadcast spraying in prairie restoration projects and some single-tree injections. These activities would contribute to minor and short-term increases in soil disturbance.

Prescribed fire and burning of slash piles would release nutrients into the soil and the fertilization effects of ash would provide an important source of nutrition for new growth. Soil organic matter also increases as ash and charcoal residue resulting from incomplete combustion builds up in the soil profile, contributing to soil porosity; decreased compaction; and surface areas for essential microorganisms, micorrhizal fungi, and roots. The blackened, burned areas following prescribed fires would also raise the soil temperature by several degrees, particularly in the spring, and would increase fungal, bacterial, and algal activity, which in turn would increase available nitrogen. The increased microorganism activity would also help to increase soil temperature while aiding in nutrient cycling (Vogl, 1979).

3.1.2.2 Alternative 2 (Proposed Action)

General soil impacts would be similar to those described under the “No Action” Alternative. Under the Proposed Action alternative, however, the increased use of tractor plows to maintain defensible space around structures, thinning in overstocked pine stands, and mastication activities to reduce invading shrub layers would contribute to increased soil impacts beyond those described above. Additional equipment usage in forested areas would add to soil compaction and vegetation removal would lead to minor increases in soil erosion. However, given the small scale at which these activities would be implemented, the effects would likely be short term and minimal.

Conclusion

Both alternatives would have minor, localized, and short-term soil compaction and erosion impacts resulting from suppression, mechanical thinning, fuels reduction, and prescribed fire activities. Under Alternative 2, soil impacts would be slightly greater than those described under Alternative 1.

The implementation of either alternative would not impair geologic and soil resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, and (3) identified as a goal in the park’s general management plan or other Park Service planning documents.

3.2 WATER RESOURCES (INCLUDING WETLANDS AND FLOODPLAINS)

3.2.1 Affected Environment

The Parkway passes through 8 major watersheds. The major drainages along the Parkway are the Harpeth and Duck Rivers in Tennessee, Bear Creek in Alabama, Mackeys Creek in northern Mississippi, and the North Fork of Coles Creek and St. Catherine Creek, both in southern Mississippi.

Approximately 130 miles of streams and rivers lie within the NATR park boundaries, most of which are intermittent or perennial streams. Some of the major rivers that cross NATR include the Tennessee, Buffalo, Tombigbee, Duck, and Pearl Rivers and Bear Creek. None of these has been included in the Wild and Scenic Rivers System. In addition, several lakes and reservoirs, totaling nearly 40 acres, lie within the park boundaries. These include Pickwick Lake, Ross R. Barnett Reservoir, Bay Springs Lake, and Bayou Pierre.

There has not yet been a comprehensive study of the surface water in the park; however, long-term water quality monitoring on NATR began in 2007. Water quality data for surface water in the states, including areas along NATR, have been monitored by multiple states, federal and local agencies. In compliance with Section 303(d) of the Clean Water Act, a list of impaired

waterways as of 2002 was compiled by the U.S. Environmental Protection Agency (EPA) and contained 31 water bodies that intersected NATR. As of 2006-2007 NATR park records indicated that this had been reduced to 22 water bodies. Impaired waterways are defined as those that do not meet the standards set for their use. Concerns among the listed waterways include sediment and siltation, nutrients, organic enrichment, pathogens, pesticides, pH levels, and biological criteria. One of the listed waterways occurs in Tennessee and the remaining 30 are in Mississippi (Cooper et al, 2004).

Wetlands and Floodplains

Wetland ecosystems along the NATR have not been delineated by the Park Service; however, data obtained from the USFWS National Wetlands Inventory indicate that there are approximately 2,750 acres of wetlands within the NATR park boundaries (Table 3-2). Most of this is comprised of freshwater forested shrub wetland habitat. Palustrine, or freshwater wetlands are by far the most common type in the Southeast region of the U.S. and of these, forested wetlands comprise nearly 75% (FWS, 2007). Protection of known wetland resources on the NATR are covered by DO-77-1, which identifies the goal of “no net loss” of wetlands on National Park lands and commits the NPS to a longer-term goal of achieving a “net gain” of wetlands in the National Park System by means of restoring degraded wetlands.

Table 3-2 Wetlands located within NATR boundaries

Wetland Type	Acres
Freshwater Emergent	49
Freshwater Forested/Shrub	2,455
Freshwater Pond	72
Freshwater Lake	67
Riverine	104
Total Wetlands	2,747

Source: USFWS National Wetlands Inventory Database

3.2.2 Environmental Consequences

Water resource impacts were qualitatively assessed using presence/absence of surface water resources and floodplains, literature reviews, and in light of mitigation measures.

3.2.2.1 Alternative 1 (No Action)

Proposed activities with the potential to impact water resources include building and maintaining fire lines, fire suppression activities, prescribed burning, herbicide use, and limited thinning. These activities may cause minor damage to or loss of the litter/humus layer, and erosion of these materials into adjacent waterways can cause increased turbidity and chemical contamination. However, in light of the mitigation measures employed during fire management activities (e.g. no fire line construction in highly sloped areas; no fire retardant use within 100 feet of surface water resources), there would be little, if any, direct impacts to surface water resources in the park.

Under the No Action alternative, fire retardants and foams would not be applied aerially; however, if foams are misapplied or mishandled during ground applications, these could potentially cause short and long-term impacts to water resources. Foams contain detergents that can interfere with the ability of fish gills to absorb oxygen. The degree of impact would depend on the volume of retardant/foam dropped into the water body, the size of the water body, and the volume of flow in the stream or river. The use of chemical ignition methods in prescribed burning may also lead to water damage if misapplied or mishandled.

Under the No Action alternative, Roundup (glyphosate) would be applied via broadcast spraying using a tractor, and Accord (glyphosate) would be applied via backpack sprayer for prairie restoration projects. Although some drift may occur during broadcast spraying, adequate stream buffer zones would be maintained to reduce the risk of herbicides reaching water sources. Herbicides may also enter streams following foliar treatment by surface or subsurface runoff. Glyphosate is strongly adsorbed to soil, with little potential for leaching into ground water. Microbes in the soil readily and completely degrade it even under low temperature conditions. It tends to adhere to sediments when released to water and does not tend to accumulate in aquatic life (US EPA, 2007c). Triclopyr has an intermediate mobility potential in soils. In water, the salt formulation is soluble and, may degrade in several hours with adequate sunlight. The ester formulation is not water-soluble and can take significantly longer to degrade. The ester formulation can be extremely toxic to fish and aquatic invertebrates (Tu et al., 2001).

The targeted application of herbicides, including E-Z-Ject (triclopyr) and E-Z-Ject (imazapyr) used to inject trees would not be subject to runoff. Imazapyr has a high potential to leach into groundwater and a high surface runoff potential (WSDOT, 2006a). It is persistent in soils and does not tend to adsorb to suspended solids and sediment. Studies have shown that it does not tend to have considerable impacts on aquatic species (CETOS, 2007).

Wetlands

Activities with the potential to impact wetlands under the No Action alternative include building and maintaining fire breaks, fire suppression activities, prescribed burning, and limited thinning. Impacts would be similar to those in other areas of the park.

Fires in wetland areas would likely be less severe than fires elsewhere. During fire suppression, water would be used in lieu of foams whenever possible. Mitigation measures would be employed during fire management activities (e.g. no fire line construction in highly sloped areas; no foam use within 100 feet of surface water resources).

A U.S. Army Corps of Engineers 404 permit and any other necessary compliance would be obtained prior to alterations that may alter natural hydrology of wetlands and thus require consultation. Moreover, the proposed activities would not involve the filling or disconnection of the floodplain, and would not affect the functionality of the floodplain. There would be minor and short-term, if any, direct impacts to wetlands in the park.

3.2.2.2 Alternative 2 (Proposed Action)

Proposed activities with the potential to impact water resources include building and maintaining fire lines; fire suppression, including aerial application of fire retardants or foams; prescribed fire use; hazardous fuels reduction; and use of chemical herbicides. Water resource impacts with regard to building fire lines, prescribed burning, herbicide use, and thinning activities would be the same as in the “No Action” Alternative. Increased vegetation removal and use of heavy equipment for fuels reduction may lead to an increase in turbidity and sediment delivery to nearby water sources as a result of soil erosion, however, the degree of soil erosion would be minor and localized, and thus any increase in turbidity and sedimentation would also be minor.

Aerial applications of fire retardants or foams could potentially cause short and long-term impacts to water resources, if misapplied or mishandled. Retardants contain ammonia and phosphate or sulfate ions, which can change the chemistry of a water body, thus making it lethal to fish and other aquatic organisms. Foams contain detergents that can interfere with the ability of fish gills to absorb oxygen. The degree of impact would depend on the volume of retardant/foam dropped into the water body, the size of the water body, and the volume of flow in the stream or river.

For example, if an 800-gallon drop is made into a fast flowing river, it is likely that the lethal effects to aquatic resources would be short-lived as dilution below the toxic level is quickly achieved. On the other hand, a 3,000-gallon drop in a stagnant pond would likely cause toxic levels to persist for some time (USDA, 1999).

Wetlands

General impacts to wetland resources and mitigation measures would be similar to those described under the “No Action” Alternative.

Aerial application of fire retardants or foam may impact the water quality of wetlands. The degree of impact would depend on the volume of retardant/foam dropped into the water body, the size of the water body, and the volume of flow in the stream or river. Wetland areas where flushing of water is wind driven, such as in high marshes, may be impacted more severely than wetlands that are more saturated.

Conclusion

Among the alternatives, the general impacts to water resources, including wetlands, would be similar in nature and very minor. The Proposed Action alternative may result in higher levels of erosion and turbidity due to an increased use of heavy equipment. Aerial spraying of fire retardants and foams under Alternative 2 may also lead to increased water resource impacts if they are misapplied or mishandled. The implementation of any of the alternatives would not impair water resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, and (3) identified as a goal in the park’s general management plan or other Park Service planning documents.

3.3 VEGETATION

3.3.1 Affected Environment

There are more than 40 forest alliances along the Parkway, as identified by the preliminary vegetation classification (NatureServe, 2004). The broad vegetation classifications that comprise a majority of the proposed treatment area include the following:

Southern Pine

The southern pine forest of the Parkway, which includes the loblolly pine forest alliance (*Pinus taeda*) and the shortleaf forest alliance (*P. echinata*) (NatureServe, 2004), is dominated by loblolly pine and a combination of hardwoods and conifers including sweetgum (*Liquidambar styraciflua*), flowering dogwood (*Cornus florida*), elms (*Ulmus* spp.), eastern red cedar (*Juniperus virginiana*) southern red oak (*Quercus falcata*), and hickories (*Carya* spp.). The loblolly pine cover type is common on disturbed areas. A broad range of associated species includes black gum (*Nyssa sylvatica*), black oak (*Q. velutina*), and red maple (*Acer rubrum*). The subcanopy can include eastern hophornbeam (*Ostrya virginiana*), ironwood (*Carpinus caroliniana*), redbud (*Cercis canadensis*) and a variety of shrub species (*Callicarpa americana*, *Vaccinium* spp., *Viburnum* spp. and *Ligustrum* spp.). Herbaceous species that may be present include several grasses (*Andropogon* spp., *Stipa* spp., *Panicum* spp.) sedges (*Carex* spp.), and rushes (*Juncus* spp.). In addition, forbs such as ticktrefoils (*Desmodium* spp.), lespedezas (*Lespedeza* spp.), thoroughworts (*Eupatorium* spp.), flowering spurge (*Euphorbia* spp.), and many asteraceous species are common. Common vine species include poison ivy (*Toxicodendron radicans*), greenbrier (*Smilax* spp.), grapevine (*Vitis* spp.), Japanese honeysuckle (*Lonicera japonica*) and Carolina jessamin (*Gelsemium sempervirens*).

Some southern pine-dominated areas along the Parkway have a strong oak species component. More specifically, the ecological alliance that describes these southern pine forests of the Parkway is the loblolly pine - white oak, southern red oak, post oak (*Quercus. alba*, *Q. falcata*, *Q. stellata*) forest alliance (NatureServe, 2004). This alliance encompasses loblolly pine-oak forests of the Coastal Plain and some adjacent provinces of the eastern United States. Mesic sites tend to be codominated by loblolly pine and white oak, while dry to dry-mesic examples are usually codominated by loblolly pine and southern red oak (NatureServe, 2004).

Although shortleaf and loblolly pine intermingle as dominants in some areas of the Parkway, these two species are separated into 2 forest alliances (NatureServe, 2004). However, many of the species associated with the loblolly alliance are found in the shortleaf pine forest alliance. The shortleaf pine-dominated areas are located on clay soils, hillsides, ridges, flats, and low hills, while the loblolly-pine dominated areas are typically found on more mesic sites.

Historic fire regimes for southern pine are estimated from old records, field observations, available experimental studies, and species traits (Wade *et al.*, 2000). The accepted generalized fire return interval for the southern pine forest is less than 13 years (Frost, 1998), but estimations vary with topography, and individual site characteristics. Wright and Bailey (1982)

report that the time between fires for areas dominated by shortleaf and loblolly pines is approximately 10 years, with 5-10 year intervals recommended for suppressing hardwood species. On fertile sites at lower elevations, shortleaf can tolerate shorter fire return intervals of 2-6 years. Along the Parkway, most of the southern pine areas are classified as Fire Regime Group I, since fire return intervals average less than 35 years with low severity.

Historically, this ecosystem is thought to have been dominated by pines in association with dry-mesic oaks, with relatively low levels of herbaceous diversity. Drought and moisture cycles strongly influence fire frequency and intensity in this system, and periods of drought likely resulted in rare stand replacement fires (Landfire RA, 2005).

Oak-Hickory

The oak-hickory forest type includes the dry white-southern red- post oak alliance as well as the more mesic white oak-water oak alliances. These alliances describe codominant hickory species such as mockernut (*Carya. alba*) and pignut (*C. glabra*). This forest type is similar to Kuchler's oak-hickory forest, and is characterized by stands in which at least 50% of the dominant trees are oaks or hickories (Wade, *et al*, 2000). Associated species are similar to those of the southern pine forest type (see above).

Pre-European settlement vegetation data (from 1815) suggests that the Mississippi Alluvial Plain of Missouri was wooded with white oak, black oak, sweetgum and hickories at a density of 146 trees/ha (59 trees/ac) (Nelson 1997). Such density estimations may have been applicable to forested areas at the southern end of the Parkway. Lack of fire in such ecosystems can lead to change in forest structure by invasion of shade-tolerant species such as red maple. Currently along the Parkway, density of pole-sized trees alone is estimated to be over 300 trees/ha (121 trees/ac).

Settlement of lands that would become the Natchez Trace Parkway significantly influenced the fire return interval of the oak-hickory vegetation type. Results of a study that analyzed post oak wedges from the Missouri Ozarks area suggested a presettlement mean fire return interval of 2.8 years for the oak-hickory forest (Cutter and Guyette, 1994). Post-settlement, the mean fire return interval increased to 24 years, a result found to be comparable with similar studies. Settlement activities, such as grazing and land conversion to agriculture, likely altered the vegetation mosaic by increasing length of time between fires.

The fire regime of the oak-hickory forest is generally characterized by infrequent, low intensity surface fires occurring during the spring and fall months (Wade, *et al*, 2000). Although presettlement fire frequencies are not well known, it is thought that Native Americans used fire to maintain trails and to promote herbaceous growth for game. Along the Parkway, most of the oak-hickory areas are currently classified as Fire Regime Group I, since fire return intervals average 0-35 years with low to mixed severity.

Blackbelt Prairie

The blackbelt prairie community found along the Parkway (e.g. Chickasaw Village site) is categorized as the bluestem-indiangrass (*Schizachyrium scoparium* - *Sorghastrum nutans*) herbaceous alliance (NatureServe, 2004b). This community is similar to Kuchler's blackbelt prairie type. In addition, portions of the Parkway (e.g. Blackbelt Overlook) can be further classified as the bluestem- indiangrass- white prairie clover -scaly blazingstar (*Schizachyrium scoparium* - *Sorghastrum nutans* - *Dalea candida* – *Liatris squarrosa*) vegetation alliance (Nordman, 2004 personal communication). This herbaceous association includes the blackbelt tallgrass prairies of Alabama, Mississippi, and southern Tennessee. Species include bushy and broomsedge bluestems (*Andropogon glomeratus*, *A. virginicus*), sideoats grama (*Bouteloua curtipendula*), and switchgrass (*Panicum virgatum*). Other species may include Florida paspalum (*Paspalum floridanum*), marsh bristlegrass (*Setaria parviflora*), and smut grass (*Sporobolus indicus*).

Conversion to agriculture, grazing, fire suppression and invasion by eastern red cedar are the primary causes associated with the decline of this community. Currently, this habitat is listed as endangered by the United States Forest Service, reduced by approximately 98% of its former range. While the specific historic fire regime is not well-known, prescribed fire has been generally shown to restore native prairie by decreasing encroachment by woody competition. Kucera and Koelling (1964) found that annual burning of big and little bluestem prairies in Missouri resulted in a decline of broad-leaved species. The reduction of woody species density and litter accumulation can encourage growth of prairie species.

Along the Parkway, the blackbelt prairie sites are classified as Fire Regime Group II, since fire return intervals average less than 35 years and exhibit stand-replacement severity.

3.3.2 Environmental Consequences

Vegetation impacts were qualitatively assessed using professional judgment based on presence/absence of plant species, literature reviews, and by determining the number of acres impacted.

3.3.2.1 Alternative 1 (No Action)

Activities with the potential to impact vegetation within the park include wildland fire suppression, debris burns, prescribed fire use, chemical herbicide use, and manual/mechanical fuel treatments and vegetation removal.

Wildland fire suppression activities, such as digging of firelines and the removal of vegetation, would result in the mortality of plants and trees in the areas where suppression has taken place. These adverse impacts are expected to be minor because the loss of individual members of a given plant species would not jeopardize the viability of the populations on and adjacent to the park and would be limited to the area of treatment only. These impacts would also be short-term, as native vegetation is expected to recolonize after wildland fire events have occurred.

Fire suppression activities that result in soil disturbance (e.g. thinning, building of firelines, or inadvertently denuding the soil of vegetation) would make those disturbed areas more susceptible to invasive and exotic plant infestations. Disturbed areas would be monitored to guard against such infestations and may be planted with native vegetation. Coupled with mitigation measures aimed at reducing soil damage, fire suppression activities that result in soil disturbance would also help reduce the extent of existing exotic species infestations in the park.

Prescribed burning would have long-term beneficial impacts in each of the vegetation classifications that fall within the treatment area. Prescribed fires would serve to restore proper ecosystem function in systems that have evolved with regular fire-return intervals because fire plays an essential role in maintaining serial stages of succession. Generally, fire controls plant species and communities by triggering the release of seeds; altering seedbeds; temporarily eliminating or reducing competition for moisture, nutrients, heat and light; stimulating vegetative reproduction of top-killed plants; stimulating the flowering and fruiting of many shrubs and herbs; selectively eliminating invasive and exotic components of a plant community; and influencing community composition and successional stage through its frequency and/or intensity (Wade et al., 1980). Since lack of fire favors fire-intolerant species over fire-dependent ones, plant habitat and diversity would be improved with the reintroduction of fire. Fuel loadings would be reduced. After the initial prescribed burn, the area would be monitored for the presence of exotic species, which, if spotted, may be removed through spot application of chemical herbicides.

Spraying, via tractor or backpack, of the herbicides Roundup (glyphosate), Accord (glyphosate), and Garlon 4 (triclopyr) for prairie restoration projects may cause damage to surrounding vegetation. Glyphosate is metabolized by some, but not all plants. It is harmless to most plants once in the soil because it is quickly adsorbed to soil particles, and even when free it is not readily adsorbed by plant roots (Tu et al., 2001). Triclopyr remains persistent in plants until they die, has little or no impact on grasses, and is used to control broadleaf herbs and woody species. The ester formulation of Triclopyr can be highly volatile and therefore should be used on cool days with little to no wind (Tu et al., 2001).

Limited logging to remove storm and pine beetle damaged trees would improve overall forest health and reduce the likelihood of severe wildland fire outbreaks. Maintaining defensible space around buildings, park boundaries, and cultural sites via regular mowing, thinning, and subsequent debris burns would have minor impacts to the vegetation that is currently there.

3.3.2.2 Alternative 2 (Proposed Action)

Minor, short-term, adverse impacts from wildland fire suppression, debris burns, prescribed fire use, herbicides, and fuels treatments would be similar to those described under the “No Action” alternative. The increased use of heavy equipment for fuels reduction and minor thinning would lead to increased vegetation mortality; however, the limited scope of these activities would not drastically impact vegetation resources. To ensure that park resources are not unduly impacted, park staff will be responsible for overseeing the performance of contractors performing mechanical reduction projects.

Conclusion

Although vegetation impacts would be somewhat greater due to the increased use of heavy equipment and thinning activities, Alternative 2 (Preferred) would attain the widest range of beneficial uses without environmental degradation, risk to human health or safety, or other unintended consequences.

The implementation of either alternative would not impair vegetation resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park's, and (3) identified as a goal in the preserve's General Management Plan or other NPS planning documents.

3.4 WILDLIFE

3.4.1 Affected Environment

The Parkway is host to a broad spectrum of plant and animal species. Within the park, at least approximately 2,195 species of plants support 59 species of mammals, at least 136 species of birds, at least 47 species of reptiles, at least 22 species of amphibians and a variety of other vertebrates and invertebrates. In general, the direct management of animal populations has not been necessary; however, some species pose special problems and opportunities for the park. These include deer, beaver, and fish populations.

Deer populations abound throughout the park, particularly in those specific locations which have been identified by vehicle/deer accident reports. At these specific locations, deer population studies are needed to identify home ranges and travel patterns to investigate ways to prevent or reduce the vehicle/deer accidents.

The beaver is commonly found along the Parkway and is a native species. In some instances the dams built by the beaver create problems by blocking drainages and culverts and causing erosion to the roadbed; or by backing water onto adjacent private lands. A Beaver Management Plan exists to assist field personnel in determining which dams pose potential problems and must be removed or managed and which ones can be left to provide wildlife habitat.

The Parkway has many man-made ponds within its boundary. Although only a few are used by visitors for recreational fishing, these ponds may represent an untapped recreational resource.

Threatened and Endangered Species, and Designated Critical Habitat

Currently available data indicates that the following Federal and State Listed species have been documented in or are possible inhabitants of NATR:

Table 3-3 Federally- and State-Listed Species Identified at NATR

Common Name	Scientific Name	Status			
		Federal	TN	MS	AL
Plants					
Price's potato-bean	<i>Apios priceana</i>	T	E	CI	I
Georgia rockcress	<i>Arabis Georgiana</i>	X	X	X	CI
Braun's rockcress	<i>Arabis perstellata</i>	E	E	X	X
Water stitchwort	<i>Arenaria fontinalis</i>	X	T	X	X
Tennessee milk-vetch	<i>Astragalus tennesseensis</i>	X	SC	X	X
Prairie-clover	<i>Dalea foliosa</i>	E	E	X	X
Tennessee purple coneflower	<i>Echinacea tennesseensis</i>	E	E	X	X
Eggert's sunflower	<i>Helianthus eggertii</i>	X	T	X	X
Goldenseal	<i>Hydrastis Canadensis</i>	X	Sc	X	X
Tennessee glade cress	<i>Leavenworthia exigua</i> var.	X	SC	X	X
Pasture glade cress	<i>Leavenworthia exigua</i> var.	X	E,PX	X	X
Short's bladderpod	<i>Lesquerella globosa</i>	X	E	X	X
Lyrate bladderpod	<i>Lesquerella lyrata</i>	T	X	X	CI
Indian plantain	<i>Rugelia nudicaulis</i>	X	E	X	X
Limestone flameflower	<i>Talimun calcaricum</i>	X	SC	X	X
Creeping clover	<i>Trifolium stoloniferum</i>	E	X	X	X
Tennessee yellow-eyed grass	<i>Xyris tennesseensis</i>	E	E	X	X
Mammals					
Gray bat	<i>Myotis grisescens</i>	E	X	E	SP
Indiana bat	<i>Myotis sodalis</i>	E	E	E	SP
American black bear	<i>Ursus americanus</i>	S/A-T	X	CI	X
Louisiana black bear	<i>Ursus americanus luteolus</i>	T	X	CI	x
Reptiles					
American alligator	<i>Alligator mississippiensis</i>	S/A/T	X	X	X
Ringed sawback turtle	<i>Graptemys oculifera</i>	T	X	E	X
Amphibians					
Hellbender	<i>Cryptobranchus alleganiensis</i>	X	D	X	SP
Cave salamander	<i>Eurycea lucifuga</i>	X	X	E	X
Northern spring salamander	<i>Gyrinophilus porphyriticus</i>	X	X	E	X
Birds					
Bachman's sparrow	<i>Aimophila aestivalis</i>	X	E	X	X
Red-cockaded woodpecker	<i>Picoides borealis</i>	E	X	E	SP
Appalachian Bewick's wren	<i>Thryomanes bewickii altus</i>	X	E	E	SP
Fish					
Crystal darter	<i>Crystallaria asprella</i>	X	D	E	SP
Spotfin chub	<i>Cyprinella monacha</i>	T	T	X	SP
Slackwater darter	<i>Etheostomaboschungii</i>	T	T	X	SP
Crown darter	<i>Etheostoma corona</i>	X	E	X	X
Bayou darter	<i>Etheostoma rubrum</i>	T	X	E	X
Flame chub	<i>Hemitremia flammea</i>	X	D	X	X

Common Name	Scientific Name	Status			
		Federal	TN	MS	AL
Invertebrates					
Cumberland combshell	<i>Epioblasma brevidens</i>	E	X	E	X
Oyster mussel	<i>Epioblasma capsaeformis</i>	E	X	E	X
Slabside Pearlymussel	<i>Lexingonia dolabelloides</i>	C	X	C	X
Birdwing pearly mussel	<i>Conradilla caelata</i>	E	X	X	X
Yellow-blossom pearly mussel	<i>Epioblasma florentina</i>	E	X	X	X
Turgid-blossom pearly mussel	<i>Epioblasma turgidula</i>	E	X	X	SP
Tan riffle shell	<i>Epioblasma walkeri</i>	E	E	X	X
Orange-footed pearly mussel	<i>Plethobasus cooperianus</i>	E	E	X	SP
Cumberland monkeyface pearly	<i>Quadrula intermedia</i>	E	E	X	SP
Pale lilliput pearly muscle	<i>Toxolasma cylindrellus</i>	E	E	X	SP

Key to table: E = endangered; SC = species of special concern; T = threatened; SP = state protected; D = deemed in need of management; S/A-T; CI = critically imperiled; I = imperiled; PX = possibly extirpated

Identified critical habitat along the Natchez Trace Parkway consists of two segments of slackwater darter habitat and one area of oyster mussel habitat, one area of habitat for the Cumberlandian Combshell, and habitat for the gray bat.

In compliance with Section 7 of the Endangered Species Act, the appropriate U.S. Fish and Wildlife Service (FWS) field office in each of the three states has reviewed and commented on the proposed Fire Management Plan (Appendix A). The FWS provided determinations of species in the park, as listed above, and provided comments regarding potential species-specific impacts (listed below, under Environmental Consequences). According to FWS, the FMP includes Section 7(a)(1) conservation efforts to improve and maintain habitats for threatened and endangered species and other wildlife resources at the park, and thus complies with Section 7 of the Endangered Species Act.

3.4.2 Environmental Consequences

The effects of the alternatives on wildlife were qualitatively assessed using professional judgment based on literature reviews, general knowledge, and research specific to the area.

3.4.2.1 Alternative 1 (No Action)

Activities with the potential to impact wildlife within the park include wildland fire suppression, prescribed fire use, debris burns, limited logging, and chemical herbicide use.

All wildland fire suppression, debris burns, and manual fuels treatments, such as maintenance of defensible space and limited logging, could result in the temporary displacement of wildlife or individual mortality of wildlife species. These adverse impacts would not jeopardize the viability of the populations on and adjacent to the Parkway, and thus would be minor. Generally, fire determines wildlife habitat patterns and populations by increasing the amount, availability, and palatability of foods for herbivores; regulating yields of nut and berry-producing plants; regulating insect populations which are important food sources for many

birds; and by controlling the scale of the total vegetative mosaic through fire size, intensity, and frequency (Wade et al., 1980).

Impacts to bird species protected by the Migratory Bird Treaty Act would be similar to those on other wildlife species within the park. Temporary alteration of habitat as a result of fire suppression, prescribed fire, and fuels treatments could result in temporary, small-scale displacement of individuals from nesting or foraging sites. These impacts would not jeopardize the viability of migratory bird populations.

Prescribed fire use would have many long-term beneficial impacts for species whose survival is dependent on the open, post-fire conditions, under which these ecosystems have evolved.

Use of chemical herbicides for exotic species control and resource management may result in negative impacts to certain wildlife species. Under the No Action alternative, Roundup (glyphosate), Accord (glyphosate), and Garlon 4 (triclopyr) would be applied via tractor or backpack sprayer for prairie restoration projects. Glyphosate has a low toxicity in birds and mammals. The primary risk it poses to mammals is as an eye irritant and typical exposure occurs from drift. Therefore, it is likely that aerial spraying of this herbicide would negatively impact wildlife. The average half-life is 47 days in the field. The formula for terrestrial application should not be used in or near aquatic systems as the surfactant can be toxic to fish and other aquatic organisms. If used according to the instructions on the label it should present no direct harm to birds and mammals. However, if used to clear a large area it can cause habitat loss and may lead to the displacement and/or death of some individual animals (Tu et al., 2001). Triclopyr is regarded as only slightly toxic to birds and mammals. The tendency for triclopyr to dissipate quickly in the environment tends to preclude any problems with bioaccumulation in the food chain. Garlon 3A® can cause severe eye damage to both humans and wildlife, due to the high pH of its water-soluble amine salt base. Care must therefore be taken during mixing and application to prevent accidental splashing into eyes (Tu et al., 2001).

E-Z-Ject (triclopyr) and E-Z-Ject (imazapyr) would be used to inject trees. Imazapyr is non-toxic to mammals and slightly toxic to some birds and fish. Imazapyr is rapidly eliminated in the urine and feces of animals, and is not known to accumulate in animal tissues. When used according to label instructions this herbicide should pose little threat to wildlife. The half-life of this product is 10 days (WSDOT, 2006).

Endangered Species

Impacts on federally endangered or threatened species or species of special concern resulting from the No Action Alternative would be similar to impacts on other wildlife.

As stated in the National Park System's 2006 Management Policies, if a federally- or state-listed species is documented within park boundaries, active management programs would be undertaken to inventory, monitor, restore, and maintain the listed species' habitats, control detrimental non-native species, control detrimental visitor access, and re-establish extirpated populations as necessary to maintain the species and habitats upon which they depend. The park would also manage designated critical habitat, essential habitat, and recovery areas to

maintain and enhance their value for the recovery of threatened and endangered species. Measures taken to protect those species, or their required habitat, would supersede other management activities in the event any of those management activities would negatively impact the listed species. If fire management activities are proposed where federally listed species or their critical habitats occur, the appropriate FWS field office would be contacted for further consultation.

Wildland fire due to natural causes, such as lightning, may potentially strike critical habitat for threatened and endangered species. However, proper monitoring and mitigation would likely thwart adverse effects on species as a result of unplanned fire events.

Based on FWS consultation, habitat for the federally endangered gray bat overlaps the Natchez Trace Parkway prior to it crossing the Tennessee River/Pickwick Lake. Declines in gray bat populations have been attributed to pesticide use; siltation of aquatic environments resulting in the loss of prey; deforestation; caves being flooded from water impoundment; cave entrance closure; and human disturbances. Recommendations by the FWS to conduct all prescribed fire activity within potential gray bat habitat during the day, to cease activities at night, and to avoid or minimize use of heavy equipment near potential bat habitat would be followed.

The federally endangered Indiana bat may also inhabit the Tennessee River/Pickwick Lake area. The FWS recommendation to conduct surveys for the presence of Indiana bats in this area prior to any non-fire treatments of overstocked stands, and to contact the Daphne, Alabama field office for further consultation, would be followed if treatments are planned for summer months (April through September).

3.4.2.2 Alternative 2 (Proposed Action)

Proposed activities with the potential to impact wildlife would be similar to those described under the No Action alternative. Additional activities proposed under this alternative, including the use of tractor plows, additional thinning, mastication, and aerial fire suppression methods could contribute to additional wildlife impacts. However, the additional impacts would likely be minor and short-term, given the small scale of these activities.

Endangered Species

General impacts to endangered or threatened species or species of concern resulting from wildland fire suppression, debris burns, and prescribed fire would be the same as in the “No Action” alternative. Adverse impacts may jeopardize the viability of the populations on and adjacent to the park, and thus could be moderate to major and long-term. However, with close monitoring and mitigation as required by the National Park System’s 2006 Management Policies (as described in the No Action alternative), impacts should be minor in intensity.

Conclusion

Habitat conditions for many wildlife species would improve with the restoration of the historic high frequency, low intensity fire regime characteristic. The implementation of either alternative would not impair wildlife resources or values that are (1) necessary to fulfill specific

purposes identified in the enabling legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the Seashore, and (3) identified as a goal in the park's General Management Plan or other Park Service planning documents.

3.5 AIR QUALITY

3.5.1 Affected Environment

Under the terms of the 1990 Clean Air Act amendments, NATR is designated as a Class II quality area. By definition, Class II areas of the country are set aside for protection under the Clean Air Act. Protection is somewhat less stringent than in Class I areas. The primary means by which the protection and enhancement of air quality is accomplished is through implementation of National Ambient Air Quality Standards (NAAQS). These standards address six pollutants known to harm human health including ozone, carbon monoxide, particulate matter, sulfur dioxide, lead, and nitrogen oxides (USDA, 2000a). Under Class II, modest increases in air pollution are allowed beyond baseline levels for particulate matter, sulfur dioxide, nitrogen, and nitrogen dioxide; provided the NAAQS are not exceeded.

Populated areas surrounding NATR are the primary source of air pollutants; however, there is also concern about the incremental additions from pollutants that emerge from the Parkway's automobile traffic (Cooper et al, 2004).

3.5.2 Environmental Consequences

Air quality impacts were qualitatively assessed upon review of National Park Service best management practices to reduce air emissions, state prescribed fire permit specifications and requirements, and the extent of proposed prescribed fire activities under all the alternatives.

3.5.2.1 Alternative 1 (No Action)

The use of prescribed fires and debris burns has the potential to impact air quality. Smoke consists of dispersed airborne solids and liquid particles, called particulates, which could remain suspended in the atmosphere for a few days to several months. Particulates can reduce visibility and contribute to respiratory problems. Very small particulates can travel great distances and add to regional haze problems. Regional haze can sometimes result from multiple burn days and/or multiple burnings within an airshed over a period of time too short to allow for dispersion.

The Alabama Department of Environmental Management, the Mississippi Department of Environmental Quality, and the Tennessee Department of Environment and Conservation have overall air quality regulatory authority within their respective states. Smoke management and prescribed burning regulations and permitting have been transferred to the Alabama Forestry Commission, the Mississippi Forestry Commission, and the Tennessee Department of Agriculture, Division of Forestry, each of which require specific measures and information prior to issuing prescribed burning permits.

For prescribed fires, there are three principle strategies to manage smoke and reduce air quality effect. They include:

1. **Avoidance:** This strategy relies on monitoring meteorological conditions when scheduling prescribed fires to prevent smoke from drifting into sensitive receptors, or suspending burning until favorable weather (wind) conditions prevail.
2. **Dilution:** This strategy ensures proper smoke dispersion in smoke-sensitive areas by controlling the rate of smoke emissions or scheduling prescribed fires when weather systems carry smoke away from the area, not under conditions when a stable high-pressure area is forming with an associated subsidence inversion. An inversion would trap smoke near the ground.
3. **Emission Reduction:** This strategy utilizes techniques to minimize the smoke output per unit area treated. Smoke emission is affected by the number of acres burned at one time, pre-burn fuel loadings, fuel consumption, and the emission factor. Reducing the number of acres that are burned at one time would reduce the amount of emissions generated by that burn. Reducing the fuel beforehand, e.g. removing firewood, reduces the amount of fuel available. Prescribed burning when fuel moistures are high can reduce fuel consumption. Emission factors can be reduced by pile burning or using certain firing techniques such as mass ignition.

The Parkway would manage smoke in compliance with federal, state, and local requirements, so as to minimize its effects on visitors, firefighters, adjoining lands and neighbors, natural and cultural resources, and roads and highways. The Parkway would inform the appropriate state forestry division of all fire management activities, as follows:

- A burning permit would be obtained from the appropriate state forestry division for each prescribed burn; the Parkway would comply with all limitations stated within the permit.
- Notification would be given to the appropriate state forestry division within 24 hours of the scheduled burn.

In addition, specific mitigation measures would be taken to manage smoke and to avoid injury during prescribed burning activities:

Program Actions to Manage Smoke - The management of smoke would be incorporated into the planning or suppression of all fires. Sensitive areas would be identified and precautions would be taken to safeguard visitors and local neighbors. The following precautions would be taken to protect the public's life and health:

- Traffic control would be implemented as needed.
- All prescribed burns would mitigate, through planning, the effects of smoke upon traffic flow, visitors, local neighbors and on other sensitive areas. Smoke management prescriptions would be written into all prescribed burn plans. All local, state, and federal

air quality regulations and permitting procedures would be followed. Any smoke situation that may arise and threaten sensitive areas would be immediately suppressed.

- Prescribed burns would not be conducted if atmospheric conditions exist that would permit the further degradation of air quality to a point which would affect public health. The state and federal air quality standards will be the basis for this decision process. All local, state, and national regulations and permitting requirements would be followed.

Mitigation Strategies and Techniques to Reduce Smoke Impacts

- Smoke warning signs would be placed on the Natchez Trace Parkway as a precaution. The major smoke concern would be that wind would carry smoke onto the Parkway before it could be dispersed. The smoke would be monitored and fire personnel would request assistance to temporarily close the Parkway if vehicle visibility fell below 500 feet (as measured by Burn Boss). Resources may be diverted to assist in these efforts if needed.
- Smoke warning signs may be placed on local county roads at the discretion of the Burn Boss.
- Each individual unit contains interior roads, trails, fireline, mowline and/or creeks. The fragmented nature of each unit would serve as holding points should any control/smoke management concerns occur.

Overall, impacts to air quality resulting from prescribed burning are expected to be minor with potential to become moderate, and short-term.

3.5.2.2 Alternative 2 (Proposed Action)

Under Alternative 2, air quality impacts would be similar to those described under the No Action alternative. Air quality impacts from wildfires would be reduced through suppression efforts. Impacts to air quality are expected to be minor with potential to become moderate, and short-term.

Conclusion

The implementation of either alternative would not significantly impact, nor impair, air quality resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the park; (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park; and (3) identified as a goal in the park's General Management Plan or other National Park Service planning documents.

3.6 VISITOR USE AND EXPERIENCE (INCLUDING PARK OPERATIONS)

3.6.1 Affected Environment

The Natchez Trace Parkway is visited by about 6 million people each year. Visitors typically engage in activities such as driving, hiking, biking, horseback riding, and camping.

There are more than a dozen campgrounds along the Natchez Trace Parkway corridor, three in the park, and many others just outside the park. The three Parkway campgrounds are free, primitive, and available on a first come, first serve basis. They do not offer electricity, showers, or dump stations and they are spread out along the Parkway. Many of the other campgrounds along the Parkway corridor offer electricity, showers, and dump stations.

NATR is a designated bike route and biking along the Parkway is popular during the spring and fall seasons. A number of services are available for bikers, including ranger offices and water stations, a list of and directions to food and supply stops, and suggested traveling hours.

Ranger stations and district offices are located at several points along the Parkway. The visitor center is located at the Parkway headquarters in Tupelo, Mississippi.

3.6.2 Environmental Consequences

Recreation impacts were qualitatively assessed in light of the intensity and duration of fire management activities as they related to visitor use and experience. Visual resource impacts in this environmental assessment were assessed in terms of scenic integrity, visual wholeness, and unity of the landscape.

3.6.2.1 Alternative 1 (No Action)

There would be some short-term reduction in visitor use and experience during and immediately following any thinning, wildfire suppression and/or prescribed fire activities from the presence of engines and thinning or fire crews. Impacts would be minor because: 1) fire management activities would likely involve only short-term presence of vehicles and people, 2) the thinning treatments would involve only limited and selective removal of trees and shrubs, and 3) smoke accumulations would be temporary since prescribed fires would be ignited under favorable conditions for smoke dispersion.

Thinning and prescribed fire treatments would not considerably disrupt or prevent visitor use of the Parkway smoke would be kept to a minimum. Some of these activities may result in temporary visitor off-road access restrictions to certain areas of the park for short periods.

In the event of a wildfire within or adjacent to the park, Parkway operations may be temporarily affected depending on the severity of the fire and situation at hand.

3.6.2.2 Alternative 2 (Proposed Action)

General impacts to visitor use and experience would be similar to those described under the “No Action” alternative.

Any prescribed fires would likely produce minor short-term smoke accumulations that impact local visibility. Minimizing smoke emissions through best management practices would reduce short-term impacts. Prescribed fire activities may result in short term closures of certain off-road sites (a half to two days) when operations occur near campsites.

Hazardous fuels reduction activities would result in the short-term presence of work crews and equipment within the park, which may impact visitor experience. These activities would also result in temporary visitor off-road access restrictions to certain areas of the park where hazardous fuels reduction treatments were being conducted.

Conclusion

Negative impacts to the park, under either alternative, would be very minor and temporary during thinning, suppression, and/or prescribed burning activities (e.g. road closures, trail closures or limited access to certain areas, presence of work crews in the vista). However, the implementation of any of the alternatives would not significantly impact the visitor use and experience (1) necessary to fulfill specific purposes identified in the enabling legislation of the park; (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park; and (3) identified as a goal in the park’s General Management Plan or other National Park Service planning documents.

3.7 HUMAN HEALTH AND SAFETY

3.7.1 Affected Environment

Firefighter and public safety always take precedence over property and resource protection during any fire management activity. The nature of the Parkway and adjacent development create opportunities for fire management activities to affect public safety. Smoke from wildfires and prescribed fires can create hazardous situations on the Parkway and other roads. Wildfires or prescribed fires that escape the park boundary can threaten residential, commercial, or industrial areas. Fires may affect park visitors or residents. Firefighters may respond to urban/wildland interface wildfires within the mutual aid zones.

The following steps have been taken to provide for the public safety during fire management operations:

- The development of a professional and skilled fire management organization capable of safely suppressing wildfires and conducting prescribed fires.
- The development of fire prevention programs.
- The development of a hazard fuel management program.

- Improving interagency coordination and cooperation.

Informing and educating the public is an important part of fire suppression, fire prevention, prescribed burning, and the Park Service mission. Information and education is critical to gaining public support of fire suppression, fire prevention, and prescribed fire programs.

During wildfire suppression the Incident Commander is in charge of the dispersal of fire information to the press and/or public on the wildland incident. The IC may request a Fire Information Officer to assist with these tasks if needed. There has been little need to do this in the past, but the need may arise as park boundary development increases.

Public information needs for the Parkway include education programs/interpretive media designed to show the historic role of fire, and the need for prescribed fire in the park. Efforts toward this include completion of the fire management portion of the Parkway's website. Other platforms for fire education, such as displays that could be located onsite during and after prescribed burns and pamphlets/brochures to hand out during operations, are being developed. The purpose of these efforts is to educate the public on the ecological and social needs for prescribed fire. In addition, the intent is to demonstrate the park's capability to safely conduct prescribed fire operations, and to increase the public's tolerance of smoke, road closings, and related inconveniences.

Burn Bosses will have the option of requesting an interpreter to assist at the scene of prescribed fires. This will be more critical during prescribed fire operations near developed areas. The District Rangers will be responsible for working with local cooperators to coordinate fire prevention activities. The cooperators usually take the lead role in these activities, but there are opportunities for the park to assist. The FMO has completed a Prevention Plan to guide these activities. The Interpretive Division will work with District Rangers to incorporate fire prevention messages into interpretive and/or outreach programs. Fire prevention materials may also be distributed to the public, and posted on park bulletin boards.

3.7.2 Environmental Consequences

Human health & safety impacts were qualitatively assessed through determination of activities, equipment and conditions that could result in injury, literature review of type and extent of injury caused by equipment and conditions, and in light of mitigation measures and best management practices.

3.7.2.1 Alternative 1 (No Action)

Factors most likely to adversely impact firefighter health and safety include activities associated with wildland fire suppression efforts (accidental spills, injuries from the use of fire-fighting equipment, smoke inhalation, and, in severe cases, injuries from wildland fires). Impacts to the public could include smoke inhalation, and in severe cases, injuries from wildland fires.

Accidental spills of fire retardants and foams are the most likely to adversely impact human health and safety. Fire retardants used in controlling or extinguishing fires contain about 85% water, 10% fertilizer, and 5% minor ingredients such as corrosion inhibitors and bactericides.

Fire suppressant foams are more than 99% water. The remaining 1% contains surfactants, foaming agents, corrosion inhibitors, and dispersants. These qualified and approved wildland fire chemicals have been tested and meet specific requirements with regard to mammalian toxicity as determined by acute oral and dermal toxicity testing as well as skin and eye irritation tests (USDA, 1999). However, they are strong detergents, and can be extremely drying to skin. All currently approved foam concentrates are irritating to the eyes as well. Application of a topical cream or lotion can alleviate the effects of a retardant, and protective goggles can prevent any injury to the eyes when using foams.

Fuel break construction can pose safety threats to firefighters. Injuries can occur from the use of equipment as well as from traveling overland to targeted areas for firefighting efforts during suppression activities. While each member of the crew is trained in the use of firefighting equipment, accidental injuries may occur from time to time. Strict adherence to guidelines concerning firefighter accreditation, and equipment and procedure safety guidelines should minimize accidents.

Smoke inhalation can also pose a threat to human health and safety. Smoke from wildland fires is composed of hundreds of chemicals in gaseous, liquid, and solid forms. The chief inhalation hazard appears to be carbon monoxide (CO), aldehydes, respirable particulate matter with a median diameter of 2.5 micrometers (PM_{2.5}), and total suspended particulate (TSP). Adverse health effects of smoke exposure begin with acute, instantaneous eye and respiratory irritation and shortness of breath, but can develop into headaches, dizziness, and nausea lasting up to several hours. Based on a recent study of firefighter smoke exposure, most smoke exposures were not considered hazardous, but a small percentage routinely exceeded recommended exposure limits for carbon monoxide and respiratory irritants (USDA, 2000b). Prescribed fire operations are only conducted when conditions favor smoke dispersion away from populated areas, unlike the situation with wildfires.

Use restrictions applied to areas of wildland fires or prescribed fires would minimize or eliminate public human health and safety concerns resulting from smoke exposure or fire injuries. When using prescribed fire, mitigation measures, such as construction of fire lines, the presence of fire engines, and strict adherence to prescribed burn plans, would minimize the potential for an out-of-prescription burn or escape. Elements of the prescribed burn plan that relate to ensuring a safe burn include such measures as fuel moisture, wind speed, rate of fire spread, and estimated flame lengths. While the potential for a fire escape always exists when conducting prescribed fires, the potential is small. Recent statistics summarized by the National Interagency Fire Center report that approximately 1% of prescribed fires on federal lands required suppression activities of some kind. In most cases these prescribed fires jumped a control line and suppression tactics were successfully used to control them. Out of the 1% of prescribed fires that required suppression, 90% were controlled without incident. Statistically, this result leaves about 0.1% of prescribed fires that required major suppression actions (Stephens, 2000).

The use of prescribed fire would indirectly benefit human health and safety by increasing burned areas, consequently reducing fuel accumulation in some areas, thus potentially

decreasing the risk of a catastrophic or stand replacement fire. The impacts of implementing this alternative would be minor.

3.7.2.2 Alternative 2 (Proposed Action)

The general impacts to human health and safety under Alternative 2 would be similar to those described under the No Action Alternative. The potential use of aerial suppression techniques to suppress wildland fires may lead to increased risks associated with contamination from fire retardants and foams. However, impacts to the public from smoke inhalation and injuries from wildland fires would decrease as a result of increased suppression activities. The impacts of implementing this alternative would be minor.

Conclusion

Under either alternative, there is the potential for injury to workers from suppressing wildfires, conducting mechanical thinning, and carrying out prescribed fire activities. However, the implementation of any of these alternatives would not significantly impact human health and safety resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, and (3) identified as a goal in the park's General Management Plan or other National Park Service planning documents.

Overall, public safety would be enhanced through fire management activities since fire would occur under carefully controlled conditions (prescribed burn), ensuring maximum safety, as opposed to the unpredictable and often dangerous conditions of a wildfire.

3.8 CULTURAL RESOURCES

Section 106 of the National Historic Preservation Act requires federal agencies to consider the effects of their proposals on historic properties, and to provide state historic preservation officers, tribal historic preservation officers, and, as necessary, the Advisory Council on Historic Preservation, a reasonable opportunity to review and comment on these actions.

3.8.1 Affected Environment

There are 639 archeological sites recorded in the National Park Service's Archeological Site Management Information System (ASMIS) for the Natchez Trace Parkway. These sites include historic structures, cemeteries, Civil War battlefields, Old Trace segments, Native American village and camp sites, and Native American burial and ceremonial mounds.

A list of Classified Structures (LCS) is also available in ASMIS.

3.8.2 Environmental Consequences

Cultural resource impacts were qualitatively assessed through a presence/absence determination of significant cultural resources and mitigation measures to be employed during wildfire suppression, thinning, and prescribed fire activities were considered.

3.8.2.1 Alternative 1 (No Action)

Proposed activities with the potential to impact known and unknown cultural resources include constructing fuel breaks, thinning, and prescribed fire. Guidelines from DO-28, in addition to those listed below, will be followed to protect the archaeological, cultural, and historic resources found within the Parkway:

- Proposed burn projects will be forwarded to the Cultural Resource Specialist for clearance.
- The Burn Boss (BB) or Incident Commander (IC) will identify all sites that may be, or have been affected by fire. If the Burn Boss is not sure of a site, he/she will contact the park Cultural Resource Specialist for clarification.
- The degree of heat penetration is the primary concern. The BB or IC will determine the fire's rate of spread and fuel consumption. A fire moving at a high rate of spread and not burning down to the soil will have little effect on lithics. However, if the fire is slow moving and is consuming all fuel to the mineral soil, the fire will be suppressed or (through firing techniques) excluded from the site.
- The BB or IC will not use tools, except for a leaf blower, to construct fire line within any archaeological site.

With the use of these fire management practices, there would be no effects to known cultural resource sites from fire management activities. However, there would be potential for fire management activities to affect unrecorded cultural resources within the Parkway.

3.8.2.2 Alternative 2 (Proposed Action)

The State of Alabama Historical Commission, the Mississippi Department of Archives and History, and the Tennessee Historical Commission each reviewed the proposed actions and determined that the FMP adequately addresses the concern for prehistoric and historic resources located within the Natchez Trace Parkway and the potential impacts from fire and fire management activities. The consultation responses can be found in Appendix A. All Indian Tribes that are culturally affiliated with sites on NATR property were also notified of the proposed action and given an opportunity to comment. A list of these tribes can also be found in Appendix A. General impacts to cultural resource sites under Alternative 2 would be similar to those described under the "No Action" Alternative.

Conclusion

The implementation of either alternative would not impair cultural resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the park, (2) key to the natural or cultural integrity of the Parkway or opportunities for enjoyment of the

park, and (3) identified as a goal in the park's General Management Plan or other Park Service planning documents.

3.9 CUMULATIVE IMPACTS

The cumulative impacts analysis for the Fire Management Plan EA considers the past, present, and reasonably foreseeable future actions that could add to (intensify) or offset (compensate for) the effects from the fire Management Plan alternatives. Cumulative impacts vary by resource and the geographic areas considered here are generally the park and areas adjacent to the park. In some instances, activities may result in both negative and positive impacts, depending on the duration of the effect. As a result, some resource categories in Table 3-4 show both positive and negative impacts resulting from a particular activity. The information provided in Table 3-4 is the basis for the cumulative impacts described in Table 3-5.

Table 3-4 Affected Impact Topics and Activities/Land Uses Contributing to Fire Management Plan Cumulative Impacts

	Soils	Water Resources	Vegetation	Wildlife	Air Quality	Visitor Use & Experience	Human Health & Safety	Cultural Resources
Septic tank effluent and stormwater runoff from adjacent properties	-	-	-	-		-	-	
Management of and construction on adjacent properties	-	-	-	-	-	-	-	
Current and proposed new trails	-	-	-	-		+		
Storm damage cleanup (hurricanes, tornadoes, ice, wind)			+ -	+ -		+	+ -	
Southern pine beetle cleanup			+			+	+ -	

DIRECT/INDIRECT EFFECTS KEY: (+) Positive/beneficial; (-) Negative/detrimental; (Blank) Neutral/no effect

Table 3-5 Cumulative Impacts

Resource	Impacts from Past and Present Activities/ Land Uses	Impacts from Future Activities/ Land Uses	Impacts from Proposed Actions (No Action, Alternative 2)	Cumulative Impacts from Proposed Actions
Soils	Negative impacts from effluent and construction on adjacent properties, and ongoing trail and road use	Proposed new trails would have negative impacts	Very minor, localized, short-term soil compaction and erosion impacts resulting from fuels reduction and fire suppression activities; benefits to soil development and soil nitrification with prescribed fire use	Fire Management Plan would not result in significant cumulative impacts; soils inside of the park would improve over time with soil development and nitrification from prescribed fires
Water Resources	Construction activities, septic tank effluent and stormwater from adjacent properties can harm water quality	Proposed new trails would have negative impacts	Minor, localized impacts from soil erosion; prescribed fires would have no direct general impact	FMP would not result in significant cumulative impacts; water resources would be indirectly affected; quality would improve over time
Vegetation	Septic tank effluent and stormwater runoff can harm soils and water resources and plants and animals that depend on them; offsite emissions can damage plants	Storms or drought conditions may damage vegetation and/or result in wildland fires, clean up may decrease these risks; new trails would have negative impacts on surrounding vegetation communities	Minor, short-term, adverse impacts to plants due to suppression and maintenance activities; wildland fire use may result in long-term impacts if fuel loads are high; fuel loadings reduced; fire management activities resulting in ground disturbance could result in the spread of invasive exotic plants; plant habitat and diversity improved in long-term with prescribed fire use	FMP would not result in significant cumulative impacts; invasive exotic plant species would continue to decline, while native species would thrive with restored natural fire cycles
Wildlife	Septic tank effluent and stormwater runoff can harm soils and water resources and plants and animals that depend on them; offsite emissions can harm sensitive	Hurricanes or drought conditions may damage wildlife and/or result in wildland fires, clean up may reduce these risks; new trails would have negative impacts on wildlife	Suppression, debris burns, fuels treatment, creation of fire break, and prescribed burn activities would temporarily displace and result in minor adverse impacts to some	FMP would not result in significant cumulative impacts; wildlife habitat would improve, including for T&E species, and diversity would increase

Resource	Impacts from Past and Present Activities/ Land Uses	Impacts from Future Activities/ Land Uses	Impacts from Proposed Actions (No Action, Alternative 2)	Cumulative Impacts from Proposed Actions
	wildlife habitats		wildlife species; individual mortality of some species likely; long-term beneficial impact on federal T&E species	
Air Quality	Offsite emissions can pollute air in park	N/A	Very minor and temporary impacts due to managed natural fire and prescribed fire; minor smoke impacts on sensitive receptors (e.g. private residences); fewer emissions from wildland fire use	FMP would not result in significant cumulative impacts; Class II air quality standards would not be violated
Visitor Use and Experience (including Park Operations)	Nearby construction, septic tank effluent and stormwater runoff can harm plants or animals that visitors enjoy	Construction of new trails would improve visitor experience	Minor, temporary, and short-term impacts on visual resources and visitor use and experience during fuels treatments and prescribed burn activities (e.g. trail or road closures, presence of work crews in the vista); temporary effect on park operations	FMP would not result in significant cumulative impacts; long-term enhancement of recreation resources and opportunities would offset short-term recreation inconveniences from fire management activities

Resource	Impacts from Past and Present Activities/ Land Uses	Impacts from Future Activities/ Land Uses	Impacts from Proposed Actions (No Action, Alternative 2)	Cumulative Impacts from Proposed Actions
Human Health & Safety	Effluent, runoff and offsite emissions can cause harm to human health and safety	Hurricane or drought conditions may cause harm to human health and safety, cleanup would reduce these risks	Potential for injury to workers conducting suppression, fuels reduction, and prescribed burn activities; very minor exposure to smoke by workers and the public during wildland fires and prescribed burns; more suppression may result in fewer impacts from smoke	FMP would not result in significant cumulative impacts; Fire Management activities would improve human health and safety in the event of wildfire
Cultural Resources	Construction of new trails would improve visitor access to cultural resources	N/A	No direct impact to known cultural resources; cultural landscape benefits from vegetation maintenance	FMP would not result in significant cumulative impacts; cultural and component landscapes continue to be preserved and enhanced

Chapter 4 Consultation and Coordination

4.1 LIST OF PREPARERS

Jennifer Karanian, Project Manager, Mangi Environmental Group
Mark Blevins, Geographic Information Systems (GIS) Analyst, Mangi Environmental Group

4.2 PERSONS, ORGANIZATIONS, AND AGENCIES CONSULTED

Lisa McInnis, Natchez Trace Parkway, National Park Service
William J. Pearson, Daphne, AL Field Office, U.S. Fish and Wildlife Service
Kathy Lunceford, Jackson, MS Field Office, U.S. Fish and Wildlife Service
David Felder, Jackson, MS Field Office, U.S. Fish and Wildlife Service
Jim Widlak, Cookeville, TN Field Office, U.S. Fish and Wildlife Service
Lisa Demetropoulos Jones, Alabama Historical Commission
Jim Woodrick, Mississippi Department of Archives and History
E. Patrick McIntyre, Jr., Tennessee Historical Commission
Ms. Sabrina Little Axe, Absentee-Shawnee Tribe
Ms. Debbie Thomas, Alabama-Coushatta Tribe of Texas
Mr. Tarpie Yargee, Alabama-Quassarte Tribal Town
Mr. Richard L. Allen, Cherokee Nation of Oklahoma
Ms. Giny Nail, Chickasaw Nation of Oklahoma
Mr. Alton LeBlanc, Jr., Chitimacha Tribe of Louisiana
Mr. Russell Townsend, Eastern Band of Cherokee Indians
Ms. Christine Norris, Jena Band of Choctaw Indians
Mr. George G. Wickliffe, United Keetoowah Band of Cherokee Indians
Mr. Gary Bucktrot, Kialegee Tribal Town
Mr. Kenneth Carleton, Mississippi Band of Choctaw Indians
Mrs. Joyce A. Bear, Muskogee Creek Nation, Oklahoma
Mr. Terry Cole, Choctaw Nation of Oklahoma
Mr. Ron Sparkman, Shawnee Tribe
Mr. George Scott, Thlopthlocco Tribal Town
Mr. Earl Barbry Sr., Tunica-Biloxi Indian Tribe

4.3 PERSONS, ORGANIZATIONS, AND AGENCIES WHO RECEIVED THIS EA

Kathy Lunceford, U.S. Fish and Wildlife Service, Jackson, MS
William J. Pearson, U.S. Fish and Wildlife Service, Daphne AL
Jim Widlak, U.S. Fish and Wildlife Service, Cokeville, TN
Alabama Department of Conservation and Natural Resources
Mississippi Department of Wildlife, Fisheries & Parks
Tennessee Wildlife Resources Agency
Alabama Department of Environmental Management
Mississippi Department of Environmental Quality
Tennessee Department of Environment and Conservation

Chapter 5 References Cited

(CEQ, 1978) Council on Environmental Quality, Executive Office of the President. 1978. Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act. Code of Federal Regulations Title 40, Parts 1500-1508. Washington, D.C.

(CETOS, 2007). Center for Ethics and Toxics, Critical Habitat Project. Imazapyr Factsheet. Accessed at: <http://www.cetos.org/criticalhabitat/imazapyr.pdf> 1 June 2007.

(Cooper et al, 2004) Cooper, Robert J, Sandra B. Cederbaum, and Jill J. Gannon. December 2004. Natural Resource Summary for Natchez Trace Parkway. Warnell School of Forest Resources, University of Georgia, Athens, GA.

(Cutter and Guyette, 1994) Cutter, B. E, and Guyette, R. P. 1994. Fire frequency on an oak-hickory ridgetop in the Missouri Ozarks. *American Midland Naturalist*. 132(2): 393-395.

(DOI, 2001a) United States Department of the Interior, National Park Service. 08 January 2001. Conservation Planning, Environmental Impact Analysis, and Decision Making. Director's Order #12 and Handbook.

(DOI, 2001b) United States Department of the Interior, National Park Service. 27 December 2001. *2001 NPS Management Policies*.

(Frost, 1998) Frost, Cecil C. 1998 Presettlement Fire Frequency Regimes of the United States: A First Approximation. In Teresa L. Pruden and Leonard A. Brennan (eds.) *Fire in Ecosystem Management: Shifting the Paradigm from Suppression to Prescription*. Tall Timbers Fire Ecology Conference Proceedings, No. 20. Tall Timbers Research Station, Tallahassee, FL.

(FWS, 2007) United States Fish and Wildlife Service, National Wetlands Inventory. *Southeast Wetlands*. Accessed at: http://www.fws.gov/nwi/Pubs_Reports/Sewet/contents.html. 13 November 2007.

(Kucera and Koelling, 1964) Kucera, C. L, and Koelling, M. 1964. The influence of fire on composition of central Missouri prairie. *American Midland Naturalist*. 72(1): 142-147.

(Landfire, 2005) Landfire Rapid Assessment Reference Condition Model. 2005. Models for the Eastern US. <http://www.landfire.gov/ModelsPage2.html>

(NatureServe. 2004) NatureServe. International Ecological Classification Standard: Terrestrial Ecological Classifications. Natchez Trace Parkway and Surrounding Areas. NatureServe Central Databases. Arlington, VA and NatureServe Ecology South. Durham, NC. Data current as of 21 July 2004.

(NatureServe 2004b) NatureServe Explorer: An online encyclopedia of life [web application]. Version 4.0. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed: September 15, 2004).

(NIFC, 1998) National Interagency Fire Center. 1998. *Wildland and Prescribed Fire Management Policy Implementation Procedures Reference Guide*.

(Nordman, 2004) Nordman, Carl. 2004. Personal communication. Regional Vegetation Ecologist, NatureServe. 6114 Fayetteville Rd., Suite 109, Durham, NC 27713.

(NPS, 2001) United States Department of the Interior, National Park Service. 2001. Reference Manual – 18P: Wildland Fire Management (RM-18).

(NPS, 1997) United States Department of the Interior, National Park Service. 1997. Resources Management Plan, Natchez Trace Parkway.

(NPS, 1978) United States Department of the Interior, National Park Service. 1997. Natchez Trace Parkway Final Environmental Statement.

(Stephens, 2000) Stephens, Scott L. 07 June 2000. Congressional Testimony on Reducing Fire Hazard in Coniferous Forests and in the Urban-Wildland Intermix. Accessed at: http://www.cnr.berkeley.edu/stephens-lab/Publications/Testimony_6-00.pdf.

(Tu et al., 2001). Tu, M. Hurd, C., Robison, R. and Randall, J.M. April 2001. Weed Control Methods Handbook, The Nature Conservancy. Accessed at: <http://tncweeds.ucdavis.edu/handbook.html>. 6 December 2007.

(USDA, 2000a) United States Department of Agriculture, Forest Service. April 2000. *Incorporating Air Quality Effects of Wildland Fire Management into Forest Plan Revisions – A Desk Guide (Draft)*.

(USDA, 2000b) United States Department of Agriculture, Forest Service, Pacific Northwest Research Station. July 2000. Smoke Exposure at Western Wildfires. Research Paper. PNW-RP-525.

(USDA, 1999) United States Department of Agriculture, Forest Service. November 1999. Wildland Fire Chemical Products Toxicity and Environmental Issues and Concerns. Accessed at: www.fs.fed.us/rm/fire/documents/envissu.pdf.

(US EPA, 2007). United States Environmental Protection Agency Office of Ground Water and Drinking Water. Accessed May 2007 at <http://www.epa.gov/safewater/index.html>.

(Vogl, 1979) Vogl, R.J. Some basic principles of grassland fire management. *Environmental Management* 3(1): 51-57, 1979.

(Wade et al, 2000) Wade, D. D., Brock, B. L., Brose, P. H., Grace, J. B., Hoch, G. A., and Patterson III, W. A. 2000. In: Wildland fire in ecosystems; effects of fire on flora. Brown,

James K.; Smith, Jane Kapler, eds . Gen. Tech. Rep. RMRS-GTR-42-vol. 2. Ogden, UT: U. S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 53-96.

(Wade et al., 1980) Wade, Dale, John Ewel, and Ronald Hofstetter. March 1980. Fire in South Florida Ecosystems. USDA Forest Service General Technical Report SE-17, Southeastern Forest Experiment Station: Asheville, NC.

(Wright and Bailey, 1983) Wright, H. A., and Bailey, A. W. 1983. Fire Ecology- United States and Southern Canada. USA. John Wiley and Sons, Inc. 363-365.

(WSDOT, 2006). Washington State Department of Transportation. Imazapyr Roadside Vegetation Management Herbicide Fact Sheet. Accessed 16 May 2007 at <http://www.wsdot.wa.gov/Maintenance/pdf/Metsulfuron.pdf>.

APPENDIX A

**CONSULTATIONS WITH
U.S. FISH AND WILDLIFE SERVICE**

**STATE HISTORIC PRESERVATION OFFICES
and
TRIBAL HISTORIC PRESERVATION OFFICES**

PAGE INTENTIONALLY LEFT BLANK



United States Department of the Interior

FISH AND WILDLIFE SERVICE
1208-B Main Street
Daphne, Alabama 36526

JAN 29 2008

IN REPLY REFER TO:
2008-TA-0246

Ms. Jennifer Karanian, Project Manager
MANGI Environmental Group
7915 Jones Branch Drive
McLean, VA 22102

Dear Ms. Karanian:

Thank you for the opportunity to provide comments for the National Park Service's Natchez Trace Parkway Draft Fire Management Plan. These comments are restricted to the portion of the Parkway occurring in Northwest Alabama and are prepared in accordance with the requirements of the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) and the Fish and Wildlife Coordination Act (16 U.S.C. 661-667e).

Our records indicate the gray bat (*Myotis grisescens*) has been reported immediately south of the Natchez Trace Parkway prior to it crossing the Tennessee River/Pickwick Lake. Gray bat studies have shown adult bats forage over aquatic and woodland riparian habitats for large distances; juveniles forage more often in woodland riparian habitats. Declines in population have been attributed to pesticide use; siltation on aquatic environments resulting in the loss of prey; deforestation; caves being flooded from water impoundment; cave entrance closure; and human disturbances.

We recommend that all prescribed fire activity within this area take place during the day and cease at night when bats are active. If caves are present in the area, fire crews should be cautioned when operating heavy equipment in order to minimize disturbance.

The area may also be inhabited by the Indiana bat (*Myotis sodalis*). During summer months (April thru September), Indiana bats roost in trees and forage for insects primarily in riparian and upland forest. The most important characteristics of roost trees are structural, exfoliating bark with space for bats to roost between the bark and bole of the tree. To a limited extent, tree cavities and crevices are used for roosting. Indiana bats feed exclusively on flying insects. The Draft Fire Management Plan mentions the use of non-fire applications such as mechanical and chemical treatments of overstocked stands that may be more practical than prescribed fire. If these types of treatments are planned for the area in question between April 15 and September 15, surveys for the presence of Indiana bats should be conducted and this office contacted for further discussion.

www.fws.gov

PHONE: 251-441-5181



FAX: 251-441-6222

Ms. Jennifer Karanian

2

Thank you again for the opportunity to comment on your Fire Management Plan. As mentioned above, the Alabama Field Office can only comment on the portion of the Natchez Trace Parkway that exists within state borders. For consultation on listed species in Mississippi and Tennessee, the appropriate field office in each state should be contacted. If you have any questions or concerns, please contact Mr. Josh Rowell, of my staff, at (251) 441-5836

Sincerely,



Rob W. Tawes
Assistant Field Supervisor
Alabama Ecological Services Field Office

cc: Tennessee Field Office, Cookeville, TN
Jackson Field Office, Jackson, MS

Email correspondence was received from the Jackson, Mississippi Field office:

Jennifer,

I have no objections or concerns regarding the natchez trace fire management plan. However, for clarification or for future use, I recommend you add the following federally listed species to Table 1.

Invertebrates

Cumberlandian combshell (*Epioblasma brevidens*) endangered
Oyster mussel (*Epioblasma capsaeformis*) endangered Slabside
Pearlymussel (*Lexingonia dolabelloides*) candidate

Thanks
David Felder



United States Department of the Interior

FISH AND WILDLIFE SERVICE
446 Neal Street
Cookeville, TN 38501

January 31, 2008

Ms. Jennifer Karanian
Project Manager
The Mangi Environmental Group, Inc.
7915 Jones Branch Drive, Suite 2300
McLean, Virginia 22102

Re: FWS #08-FA-0265

Dear Ms. Karanian:

Thank you for your correspondence of December 26, 2007, regarding the National Park Service's proposed Draft Fire Management Plan (FMP) for the Natchez Trace Parkway in Davidson, Hickman, Lawrence, Lewis, Maury, Wayne, and Williamson counties Tennessee, Alabama, and Mississippi. According to our records, the list of federally listed species provided in your correspondence appears to be complete. Many of the specific activities proposed in the draft FMP could have adverse impacts on these species. Accordingly, we will need to review each FMP activity proposed for use where federally listed species or their critical habitats occur in order to determine potential impacts.

Please note that our comments address only that portion of the project that will occur in Tennessee. Additional comments should be requested from the following Fish and Wildlife Service offices in Alabama and Mississippi:

U. S. Fish and Wildlife Service
1208-B Main Street
Daphne, Alabama 36526

U.S. Fish and Wildlife Service
Ecological Services
6578 Dogwood View Parkway, Suite A
Jackson, Mississippi 39213

<1 4

Thank you for the opportunity to comment on this proposed action. If you have any questions regarding the information which we have provided, please contact Wally Brines of my staff at 931/528-6481, extension 222, or at wally_brines@fws.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "Lee Barclay". The signature is fluid and cursive, with the first name "Lee" and last name "Barclay" clearly distinguishable.

Lee A. Barclay, Ph.D.
Field Supervisor



STATE OF ALABAMA
ALABAMA HISTORICAL COMMISSION
468 SOUTH PERRY STREET
MONTGOMERY, ALABAMA 36130-0900

COLONEL (RET.) JOHN A. NEUBAUER
EXECUTIVE DIRECTOR

January 9, 2008

TEL: 334-242-3184
FAX: 334-240-3477

Jennifer Karanian
Mangi Environmental Group
7915 Jones Branch Drive
McLean, Virginia 22102

Re: AHC 08-0283
Fire Management Plan
Natchez Trace Parkway
Multiple Counties, Alabama

Dear Ms. Karanian:

Upon review of the information forwarded by your office, we have determined that we can concur with proposed activities provided they avoid any structures or sites listed on or eligible for the National Register of Historic Places (NRHP). Also, if any areas are to be impacted which have not been assessed, we will request that a professional archaeologist conduct a cultural resource assessment to identify any archaeological sites or historic structures that may be affected. The resulting report shall be submitted to our office for review and approval prior to activities taking place within these areas.

We appreciate your efforts on this project. Should you have any questions, the point of contact for this matter is Greg Rhinehart at (334) 230-2662. Please have the AHC tracking number referenced above available and include it with any correspondence.

Truly yours,

A handwritten signature in black ink, appearing to read "Elizabeth Ann Brown".

Elizabeth Ann Brown
Deputy State Historic Preservation Officer

EAB/LAW/GCR/gcr

MISSISSIPPI DEPARTMENT *of* ARCHIVES AND HISTORY



HISTORIC PRESERVATION
Ken P'Pool, Director
PO Box 571, Jackson, MS 39205-0571
601-576-6940 • Fax 601-576-6955
mdah.state.ms.us

January 28, 2008

Jennifer Karanian
Project Manager
Mangi Environmental Group, Inc.
7915 Jones Branch Drive
McLean, Virginia 22102


RE: Proposed Environmental Assessment (EA) for the Fire Management Plan,
Natchez Trace Parkway, MDAH Project Log #12-081-07

Dear Jennifer:

Thank you for providing the draft Environmental Assessment (EA), received on December 17, 2007, for the above referenced project. After reviewing the draft EA, in accordance with our responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR Part 800, we find the plan to be acceptable, and concur with the recommendations provided. If you have any questions, please do not hesitate to contact us at (601) 576-6940.

Obviously, we were not able to respond within the thirty (30) comment period requested. I apologize for the delay in our response.

Sincerely,


Jim Woodrick
Review and Compliance Officer

FOR: H.T. Holmes
State Historic Preservation Officer

c: Clearinghouse for Federal Programs



TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

December 19, 2007

Ms. Jennifer Karanian
The Mangi Environmental Group, Inc.
7915 Jones Branch Drive
McLean, Virginia 22102

RE: NPS, NATCHEZ TRACE PKWY FIRE MGMT PLAN, UNINCORPORATED,
WILLIAMSON COUNTY

Dear Ms. Karanian:

Pursuant to your request, this office has reviewed documentation concerning the above-referenced undertaking received Monday, December 17, 2007. This is a requirement of Section 106 of the National Historic Preservation Act for compliance by the participating federal agency or applicant for federal assistance. Procedures for implementing Section 106 of the Act are codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

Considering available information, we find that the project as currently proposed will not adversely affect any property that is eligible for listing in the National Register of Historic Places. Therefore, this office has no objection to the implementation of this project. Please direct questions and comments to Jennifer M. Barnett (615) 741-1588, ext. 105. We appreciate your cooperation.

Sincerely,

A handwritten signature in black ink, reading "E. Patrick McIntyre, Jr.", is written over a horizontal line.

E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

EPM/jmb

Correspondence with Tribal Historic Preservation Offices

Indian Tribes found to be culturally affiliated with sites on NATR property were notified of the proposed action and given an opportunity to respond. None of the notified tribes expressed concerns or objections to the proposed FMP activities.

The tribes were notified as follows:

Absentee-Shawnee Tribe
Alabama-Coushatta Tribe of Texas
Alabama-Quassarte Tribal Town
Cherokee Nation of Oklahoma
Chickasaw Nation of Oklahoma
Chitimacha Tribe of Louisiana
Eastern Band of Cherokee Indians
Jena Band of Choctaw Indians
United Keetoowah Band of Cherokee Indians
Kialegee Tribal Town
Mississippi Band of Choctaw Indians
Muskogee Creek Nation, Oklahoma
Choctaw Nation of Oklahoma
Shawnee Tribe
Thlopthlocco Tribal Town
Tunica-Biloxi Indian Tribe